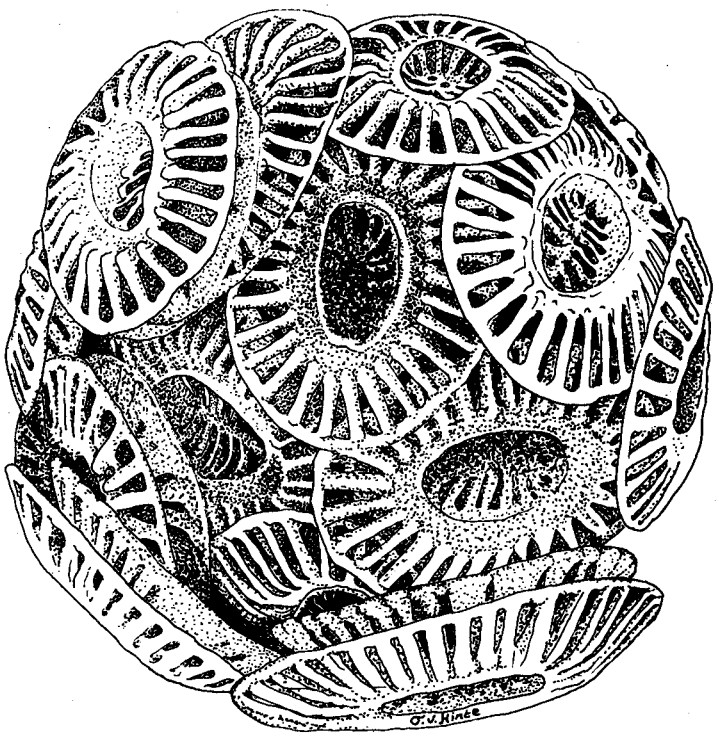
INA NEWSLETTER



INTERNATIONAL NANNOPLANKTON ASSOCIATION

VOLUME 8 NUMBER 2 1986

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INA NEWSLETTER

proceedings of the

INTERNATIONAL NANNOPLANKTON ASSOCIATION

volume 8 number 2 November 1986

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!! NOTE !!

SALES OFFICE

Separate issues of the INA Newsletter can be obtained from the Secretary/Treasurer. Price per issue is:

- for non-members	£ 10.-	($15.-)
- for members	£ 5.-	($7.50)
- for student members	£ 2.50	($3.75)

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MAILING POLICY

Recent issues will be mailed by surface mail for countries inside Europe, by airmail for countries outside Europe. Back-issues will be mailed by surface mail, unless the extra costs for airmail are paid to the Treasurer.

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MEMBERSHIP

Applications for membership of the International Nannoplankton Association should be directed to the Secretary/Treasurer. Annual dues: £ 10.-/US$ 15.- Those who pay their dues in U.S. dollars are urged to send them to John Steinmetz (Marathon Oil, Denver Res. Center, P.O. 269, Littleton, Col., U.S.A.). Checks or money orders should be made out to INA; no account- or banknumber is necessary. Students can become a member for a reduced price (£ 5.-/US$ 7.50); please send a confirmation of your student-status when applying for membership.

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NEXT ISSUE

Contributions for the next issue of the INA Newsletter should be received before March 1987. Please send your contributions to: The editor of the INA Newsletter, S.E. van Heck (Address : see inside cover).

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INFORMATION TO CONTRIBUTORS

Manuscripts should not exceed four pages, although it is at the editor's discretion to accept longer papers. They will be reproduced in the INA Newsletter without being re-typed. Hence the authors are entirely responsible for the contents and quality of their contributions. Manuscripts of poor quality can be refused by the editor. Format: Manuscripts should be typed on A4 (this format); a blank margin of 2.5 cm (1 inch) should border the upper, the left and the right side of each page, and the margin on the lower side should be 3.5 cm (1.5 inch). DO NOT USE DOUBLE SPACING, as this takes up too much space !

INA MEETING IN LONDON, 1987 : REGISTRATION

For the latest information on the meeting, see p.59 of the Newsletter. Date of the meeting is now set at Wednesday August 19 to Friday August 21, with a fieldtrip on August 22. Hotel bookings have to be made individually (brochure enclosed). Those who wish to stay in student accomodation must book with us. We have reserved 15 rooms, which will be assigned to the first 15 people who book. Abstracts of papers must be in by May 15 th 1987.

Please complete this form as soon as you can, and send it to:

Shirley van Heck
Shell UK EXPRO
UEE/32
Shell-Mex House, Strand
LONDON WC 2R ODX
United Kingdom

NAME : _____

ADDRESS : _____

_____

will certainly / possibly attend the INA Meeting in London, 1987

and is certainly / possibly / not interested in a fieldtrip.

Will present a talk / poster with the following title : _____

_____

_____

_____

_____

_____

_____

Wants to book student accomodation. yes / no

Wants to participate in the social evening. yes / no

Please realise that the previous form was mainly a means of finding out which subjects people were interested in, and to get a rough estimate of how many people we could expect. Therefore, if you wish to participate, please complete this form, and send it as soon as possible, but before May 1987, as we need to make our final reservations by then.

to: The International Nannoplankton Association
Shirley van Heck
Shell UK EXPRO
UEE/32
Shell-Mex House, Strand
LONDON WC 2R ODX
United Kingdom

sender:

_____
_____
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INTERNATIONAL NANNOPLANKTON ASSOCIATION

INVOICE

INA Newsletter vol. 9, 1987

Contribution for 1987

Ordinary members	£ 10 Sterling	/ US $ 15
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If you pay in Pounds, please make a cheque or money order payable to:

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Account No. 0205466

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Robertson Research Int. Ltd
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And send it to: J. C. Steinmetz
Denver Research Center
Marathon Oil Company
P.O. Box 269
Littleton
Colorado 80160
U.S.A.

The Secretary/Treasurer

M. Jakubowski

EDITORIAL

We have received a new communication from the International Palaeontological Association requesting our help with the preparation of a new Directory of Palaeontologists of the World (see also INA Newsletter 7(3). They would like us to send them our membership list to complete their records. Of course we are willing to oblige, but appreciate that not everyone likes his/her address passed on in this way. Therefore, if you have any objections to your name and address being included, please inform our Secretary/Treasurer Martin Jakubowski, before May 1987.

In this issue you will find the results of the INA questionnaire 1985, an update on the London Conference, a call for help, and a few short contributions in addition to the usual bibliography. We had hoped to include a report on the workshop on "boreal Lower Cretaceous calcareous nannofossils" which was held in Zürich last February, including some papers, but not all of the authors had finished their manuscripts in time. Hopefully we will be able to include them in the next issue. We have also heard nothing of the Woodshole Conference yet.

Last but not least: please remember to pay your membership dues (£ 10.- or U$ 15.-), a merry Christmas and a happy new year!

S.v.H.

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INA MEETING IN LONDON, 1987 : UPDATE

We have now firmly decided on the following dates: Wednesday 19th to Friday 21st of August, with an excursion on Saturday 22nd. Registration fee is £ 35.- for ordinary participants and £ 10.- for students. The meeting will be held at University College London, which is close to the British Museum and Oxford Street. Parking is virtually impossible there, but it is easy to reach by public transport.

We thank those who sent in the preliminary registration form, which gave us some idea how many people to expect, even though there were many who did not yet know, and even though many people did not answer whom I would expect to come. With this issue we enclose the final registration form, asking for papers and posters. Quite a few members expressed an interest in the biology and ecology of nannoplankton, and we shall try to persuade several people to give a presentation. Other preferences mentioned are: taxonomy, (bio)stratigraphy, paleoecology, evolution, quantitative analysis. All time intervals were mentioned, with a slight preference for the Mesozoic.

Anybody who is interested in presenting a paper is welcome, as long as the paper is of general interest. An account of the nannoplankton assemblage of a section in Lutjebroek will not interest many people, unless there are implications for the stratigraphy or paleoecology of a large area, or it is used to illustrate a useful technique or so. Length of the talks will partly depend on the number of talks on offer, but we had two categories in mind: short talks of 10 to 15 minutes and main talks of 20 to 30 minutes, depending on the topics. We also want to reserve some time for round tables and discussion groups. There are also possibilities for

posters. Microscopes will be available, so please bring material to demonstrate.

Based on the preferences expressed for a fieldtrip, we have decided to organise an excursion to Kent, where we will be visiting the Gault Clay near Folkestone, Turonian Chalk near Dover and the Paleocene of Thanet. Material from other classical sections will be collected and will be available for sampling at the conference. Costs for the excursion will be £ 10.-.A maximum of 50 people can participate, so if you want to be sure of a place you will have to send in the registration form soon.

There are several hotels at walking distance from the university buildings, of which a brochure is enclosed. The following information was given:
Prices from 1st March 1987 (including VAT):

	single	double	Engl. breakfast	bathroom	TV
IMPERIAL	£ 45	£ 56	included	yes	yes
BEDFORD	£ 38	£ 50	included	yes	yes
PRESIDENT	£ 36	£ 46	included	yes	yes
TAVISTOCK	£ 32	£ 42	included	yes	yes
ROYAL NATIONAL	£ 38	£ 48	not incl.	yes	yes
COUNTY	£ 23	£ 34	included	no	no
ROYAL	£ 14	£ 28	not incl.	no	no

Participants will have to make their own reservations, at the latest two months in advance (see brochure for details). If you have any queries or problems, please contact Gunilla Gard at 53 Grove Road, Windsor, Berkshire SL 4 1JD, tel. (0753) 841728.

We have reserved 15 rooms student accomodation, which will have to be booked through us. We still don't know the exact price, but count on £ 15.- per night. We will hold the rooms until June 1st, after which we will return the rooms that have not been booked. Lunch will be available at the university.

We will organise a social evening with dinner and drinks on a riverboat. A contribution of £ 10.- per person will be required, while the rent of the boat will be paid for by sponsorship money. We hope that, like in Vienna, participants from industry will sponsor the students, so that everyone can come, although this would be on a voluntary basis.

A special issue of the Newsletter with abstracts of the talks and an excursion guide will be published in June. We therefore require the abstracts <u>before May 15th</u> . This issue will be sent to all members, and the final documentation will be enclosed for the conference participants.

Proceedings of the conference will be published, provided we get enough papers of good quality. Where, when and how has not been decided yet, but we will strive to get it published quicker than the proceedings of the Vienna conference. Therefore, be prepared to have your paper ready in October 1987. Depending on the money, participants will get a free copy of the proceedings or at least will be able to buy it at a discount.

INA QUESTIONNAIRE 1985

Return of our **1985 Questionnaire** was somewhat slow and not overwhelming. Nevertheless, here the results in form of remarks and a table.

By now the workshop on "boreal Lower Cretaceous calcareous nannofossils" in **Zürich** and the the calcareous nannoplankton workshop in **Woods Hole, USA** are history and preparations have started for the next general INA meeting in **London, Enland** in August 1987. The planning of a meeting in the **Pacific** area has not yet reached concrete forms. A. SAAVEDRA suggests a meeting in **France**, 1988, to "record all families, genera and species on magnetic tape" and J. FLORES VILLAREJO is prepared to organise an INA meeting in **SALAMANCA, SPAIN** in 1989 or 1990. Nobody has - or wants to share - any software, not even at a price.

We have received several indications of willingness to serve as an officer (editor, treasurer, bibliographer, secretary, "other", but no new president, yet!) of INA in the future. Thank you for your enthusiasm, As you can see from the back of the front cover, most of the INA activists are presently residing in the U.K., so meetings are relatively easy to organise and the telephone bills do not get too inflated, when quick contact is necessary. We count on you, however, once this practical configuration changes.

As you can see from the table, members of the INA are working with or interested in calcareous nannofossils from the Arctic Ocean to Antarctica, all continents and all major seas. Quite a few are also interested in or working with Silicoflagellates.

If you want your colleagues to know what YOU are presently working with , do not hesitate to send a copy of the table with your own entries to:

K. Perch-Nielsen
17 Orchard Rise
Richmond, Surrey TW10 5BX, ENGLAND

Those arriving before the deadline for the next INA Newsletter (9/1)will be compiled into another table there. Remember to use the table when sending out your reprints or asking for help for a specific problem. KPN

INA QUESTIONNAIRE 1985/6

KPN, 10.86

Living
Neogene
Paleogene
L. Cretaceous
E. Cretaceous
Jurassic/Pre-J.

	World-wide	N. America	C. & S. America	Asia	Europe	Oceania	Australia / N.Z.	Africa	Arctic Ocean	N. Atlantic	S. Atlantic	N. Pacific	S. Pacific	Mediterranean Sea	Indian Ocean	South China Sea	North Sea	Caribbean. G.o.Mexico	Antarctica	Biology	Calcification	(Paleo) ecology	Taxonomy	Morphometrics	Biogeography	Evolution	Stable Isotopes	Diagenesis	SILICOFLAGELLATES
AUBRY, M.P.																													
BARBIN, V.																													
BIEKART, J. W.																													
BIOLZI, M.																													
BIGG, P. J.																													
COOPER, M.K.E.																													
CRUX, J. A.																													
DRIEVER, B.																													
FILEWICZ, M.																													
FLORES VILLAREJO, J.																										Sph-enol. Ref.			
GALLAGHER, L																													
GARD, G.																													
GAZDZICKA, E.																													
JANIN, M.-C.																										C. lep-top. Bra.			
KHERADYAR, T.																													
KLEIJNE, A.																													
KLING, S. A.																													
LESHNER, O.																										Bio-ins. Lith-ash Luc.			
KRHOVSKÝ, J.																													
MANIVIT, H.																													
MIKKELSEN, N.																													
MILLER, P. L.																													
MORALEDA-DE-LEON, M.A.																													
MORTIMER, C.																													

INA QUESTIONNAIRE 1985/6

KPN, 10.86, cont.

Living
Neogene
Paleogene
L. Cretaceous
E. Cretaceous
Jurassic/Pre-J.

	World-wide	N. America	C. & S. America	Asia	Europe	Oceania	Australia / N.Z.	Africa	Arctic Ocean	N. Atlantic	S. Atlantic	N. Pacific	S. Pacific	Mediterranean Sea	Indian Ocean	South China Sea	North Sea	Caribbean, G.o.Mexico	Antarctica	Biology	Calcification	(Paleo) ecology	Taxonomy	Morphometrics	Biogeography	Evolution	Stable Isotopes	Diagenesis	SILICOFLAGELLATES
MUTTERLOSE, J.																				X		X			X				
NORRIS, R. E.																							X		X	X			
OKADA, H.																						X		X	X				
PAVŠIČ, J.																						X	X					X	
PERCH-NIELSEN, K.		X	X				X			X	X											X	X		X	X			
PUJOS, A.																						X	X		X	X			
RAFFI, I.																						X	X	X		X			
RIO, D.																						X	X	X		X			
ROOT, S.A.																							X						
ROSOL, M.	X	X			X															X		X			X	X	X		
ROTH, P. H.																						X	X		X	X		X	
SAAVEDRA, A. R.		X	X		X					X												X	X		X	X	X		
SMITH, C. C.	X	X																X				X	X		X			X	
STREETER, L.	X																	X				X			X				X
SU XIM																						X			X		X		
THEODORIDIS, S.	X																						X	X		X			
TOKER, V.				X																		X		X					
WEI KUO-YEN																							X	X		X			
WIJKER, M. C.					X												X					X	X		X	X			
XU YULIN				X						X												X	X	X					
YOUNG, B.	X							X								X	X	X				X							X
YOUNG, J.	X				X										X	X				X	X	X	X	X	X	X			
ZHONG, S.	X																			X		X	X	X	X	X		X	X

CALL FOR HELP

Some years ago, the Subcommission on Cretaceous Stratigraphy of the IUGS (International Union of Geological Sciences), after a meeting in 1983 in Copenhagen, suggested several sections in various countries to be studied with an eye to choose boundary stratotypes for the various **Cretaceous** stages (BIRKELUND et al., 1984, Bull. Geol. Survey, 33,1/2:3-20 - I can send you a copy if you are interested).

We were only very few calcareous nannofossil specialists present at that meeting, and none of us has since been too active in actually studying these sections. While, traditionally, stage boundaries in the Cretaceous were preferably defined by ammonites or other molluscs, the possibility to use more exotic fossils, such as planktic foraminifera and calcareous nannofossils were not only not disregarded, but actually positively encouraged for some boundaries. The realisation, that both deep sea drilling and oil-industry generate a wealth of data which is more readily useful if correlatable via microfossils has finally had an impact on an increasing number of members of the Subcommission on Cretaceous Stratigraphy. It is up to **US** to provide the necessary data and preferably also **initiate** multi-fossil-studies of these (and possibly other, even better suited) sections or areas. They are the following:

MAASTRICHTIAN
----------Kronmoor, N. Germany; Zumaya, N. Spain; Kef, Tunisia
CAMPANIAN
----------N. Germany; N. France; U.K.; Spain; N. Africa; California
SANTONIAN
----------El Fahs, Tunisia; Kent/Sussex, U.K.; N. Spain
CONIACIAN
----------Priesener Schichten, Czechoslovakia; Kef, Tunisia;
N. Germany; N. France
TURONIAN
----------Texas, USA; Mexico
CENOMANIAN
----------Western Central Tunisia; E. Algeria; Texas; Transdanubian
Central Range, Hungary
LATE
-------Folkstone, U.K.; Wissant, France; Texas, USA
ALBIAN MIDDLE
-------Aube, France
EARLY
----------Vörhum, N. Germany
APTIAN
----------SE France; Turkmenya; U.K.; N. Germany
BARREMIAN
----------SE France; SE Spain; Carpathians; Crimea or Caucasus,
USSR
HAUTERIVIAN
----------SE France; SE Spain; Crimea or Caucasus, USSR
VALANGINIAN
----------Barret-le-Bas, Angles, France; SE Spain; Crimea, Caucasus
BERRIASIAN/RYAZANIAN

I suggest that those interested in contributing new coccolith data to any boundary section indicate the relevant boundary(ies) on a copy of this page and send it as soon as possible to:

K. Perch-Nielsen,
17 Orchard Rise,
Richmond, Surrey 10TW 5BX U.K.

I will then send the list of volunteers on to Prof. J. Hancock, London, the Chairman of the Subcommission on Cretaceous Stratigraphy, with the request to send it to scientists/teams of scientists likely to be interested in/able to cooperate towards the task of finding the best (boundary)stratotypes.

We would also be grateful for relevant references to already existing/published calcareous nannofossil investigations of these sections or from these regions. KPN

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Please send your reprints of publications on calcareous nannoplankton to:

John C. Steinmetz
Denver Research Center
Marathon Oil Company
P.O. Box 269
Littleton, Colorado 80160
U.S.A.

And please send reprints of publications on silicoflagellates to:

René Almekinders
Laboratory of Palaeobotany and Palynology
Heidelberglaan 2
3584 CS Utrecht
The Netherlands

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REMEMBER TO PAY YOUR MEMBERSHIP FEE !!!!

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Compiled by John C. Steinmetz

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Bekelithella BÓNA & GÁL 1985; p. 486, pl. 72, fig. 1. Type species: Bekelithella echinata BÓNA & GÁL 1985. [Description in German.] A275-4

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Braarudosphaera amputans JIANG & GARTNER 1986; p. 248, pl. 1, fig. 1; N. America, Texas, Maastrichtian, Micula murus Zone. A280-5

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Chiastozygus cruciatus (NOEL 1958) JIANG & GARTNER 1986; p. 248; (ex Discolithus). A280-5

Coccolithus orbiculatus REIMERS 1986; pp. 20, 22, pl. 8, fig. 5; N. America, Alabama, Paleocene, NP5. A285-7

Conusphaera rothii (THIERSTEIN 1971) JAKUBOWSKI 1986; p. 41; (ex Cretaturbella). A280-1

Crepidolithus pliensbachensis CRUX 1985; p. 31; new name for Crepidolithus ocellatus CRUX 1984 which was a homonym of Crepidolithus ocellatus (BRAMLETTE & SULLIVAN 1961) NOEL 1965. A276-7

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Eu-discoaster adamanteus (BRAMLETTE & WILCOXON 1967) FLORES VILLAREJO 1986; p. 33; (ex Discoaster). A277-7

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Homozygosphaera strigilis (GAARDER 1962) NORRIS 1985; p. 636; (ex Corisphaera). — A284-1

Lithraphidites moray-firthensis JAKUBOWSKI 1986; p. 40, pl. 1, figs. 4-5, 8-9; North Sea, Moray Firth Basin, lower Aptian, Lithraphidites moray-firthensis Zone. — A280-1

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Micrantholithus brevis JAKUBOWSKI 1986; p. 40, pl. 1, figs. 6-7; North Sea, Moray Firth Basin, lower Valanginian, Micrantholithus speetonensis Zone. — A280-1

Micula premura (BUKRY 1973) JIANG & GARTNER 1986; p. 250; (ex Tetralithus). — A280-5

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Pontosphaera panarium (DEFLANDRE 1954) AUBRY 1986; p. 328; (ex Discolithus). — A274-1

B137	Pontosphaera sigmoidalis (LOCKER 1967) AUBRY 1986; p. 329; (ex Transversopontis).	A274-1
	Pontosphaera wechesensis (BUKRY & PERCIVAL 1971) AUBRY 1986; p. 329; (ex Syracosphaera?).	A274-1
	Reticulofenestra placomorpha (KAMPTNER 1948) AUBRY 1986; p. 328; (ex Temalithus).	A274-1 *C-3
	Reticulofenestra pseudogammation (BOUCHÉ 1962) AUBRY 1986; p. 328; (ex Coccolithus (?)).	A274-1 *C-4
	Reticulofenestra reticulata (GARTNER & SMITH 1967) ROTH & THIERSTEIN 1972; p. 436 (ex Cyclococcolithus).	A157-5
	Reticulofenestra reticulata (GARTNER & SMITH 1967) AUBRY 1986; p. 329; (ex Cyclococcolithus).	A274-1 *C-5
	Syracolithus schilleri (KAMPTNER 1927) NORRIS 1985; p. 638; (ex Syracosphaera).	A284-1
	Thoracosphaera multiperforata REIMERS 1986; p. 42, pl. 7, figs. 3-5; pl. 8, figs. 1-2; N. America, Alabama, Paleocene, NP1-NP5.	A285-7

++

Species names in alphabetical order.

adamanteus, Eu-discoaster
amitikarenae, Gliscolithus
amputans, Braarudosphaera
anfractus, Phanulithus
arethusae, Helladosphaera
brevis, Micrantholithus
catillifera, Calyptrolithophora
challengeri, Eu-discoaster
cruciatus, Chiastozygus
echinata, Bekelithella
fragaria, Calyptrolithina
gaarderae, Calyptrolithina
galea, Calyptrolithophora
gracilis, Helladosphaera
hayi, Crucibiscutum
heimdalae, Calyptrosphaera
icarus, Eu-discoaster
isselii, Calyptrolithina
jansae, Mitrolithus
jerkovici, Noelaerhabdus
koesseni, Archaeozygodiscus
lafourcadii, Calyptrolithina
magnaghii, Calyptrolithina
moray-firthensis, Lithraphidites
multiperforata, Thoracosphaera
multipora, Calyptrolithina
orbiculatis, Coccolithus
ovata, Pontosphaera
panarium, Pontosphaera
panis, Markalius
pienaari, Helladosphaera
pirus, Dactylethra
placomorpha, Reticulofenestra
pliensbachensis, Crepidolithus
poritectum, Calyptrolithina
praemura, Micula
praeobliquum, Gartnerago
pseudogammation, Reticulofenestra
reniformis, Actinozygus
reticulata, Reticulofenestra
rhombicus, Diadozygus
rothii, Conusphaera
salebrosum, Crucibiscutum
schilleri, Syracolithus
sigmoidalis, Pontosphaera
signatorius, Noelaerhabdus *
strigilis, Homozygosphaera
tegulatus, ?Noelaerhabdus
theta, Gartnerago
varolii, Eprolithus
versa, Discolithina
wechensis, Pontosphaera
wettsteinii, Calyptrolithina

New genus names.

Archaeozygodiscus	Crucibiscutum
Bekelithella	Gliscolithus

* = Invalid

++

Comments

1 - A286-8: Also contains information on calcispheres.
2 - B136: Basionym of new combination is not indicated.
3- B137: Temalithus err. cit. pro Tremalithus; also this combination was introduced by STRADNER in HAQ 1968 and has priority.
4 - B137: This combination was introduced by LOCKER 1974 [A127-4, B92] and has priority.
5 - B137: This combination was introduced by ROTH & THIERSTEIN 1972 [A157-5, B137] and has priority.

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Corrections

INA Newsletter 7 (3) dated 1985 was actually distributed in January 1986. The following references should properly be dated 1986: A267-5, A267-6, A268-8.

With reference to systematics, this correction only effects Discoaster orbis REIMERS & DAIGRE 1986 [A267-6, B133].

A258-1: GAZDICKI should be GAZDZICKI.

A261-7: KRHOVSHY should be KRHOVSKY.

A262-1: The keyword REVIEW should be OVERVIEW.

A266-2: Add keyword PREJURA.

A270-3: The keyword Atlantic.C. should be Pacific.C.

B133: The proper citation for Discoaster orbis should be corrected to read as follows: Discoaster orbis REIMERS & DAIGRE 1986; p. 172; nom. nov. pro Discoaster circularis FURRAZOLA-BERMUDEZ & KREISEL 1972, non HOFFMANN 1970.

B133: Helicosphaera wallichii (LOHMANN 1902) DUAN 1985 is not invalid, but superfluous; this combination had been introduced earlier by OKADA & McINTYRE 1977 [A5-8].

B133: Sphenolithus elongatus MARTINI 1986 is superfluous; this combination had been introduced earlier by PERCH-NIELSEN 1980 [A65-9].

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Contributions for this edition of the Newsletter were made to me by S. E. van Heck and A. Nagymarosy, as well as many authors who sent reprints. Please continue to send reprints, comments, and corrections so that the Newsletter can remain informative, current, and correct. Thank you, John C. Steinmetz, Exploration and Production Technology, Marathon Oil Company, P. O. Box 269, Littleton, Colorado 80160, USA.

TEGULALITHUS A NEW GENUS OF EARLY CRETACEOUS CALCAREOUS NANNOFOSSILS

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Two species (*Lithastrinus septentrionalis* Stradner 1963, *Lithastrinus tessellatus* Stradner 1968) previously assigned to the genus *Lithastrinus* Stradner 1962, do not conform to the generic diagnosis. A new genus, *Tegulalithus*, is erected here to include these species.

Tegulalithus gen. nov.

Type species: *Lithastrinus septentrionalis* Stradner 1963
Derivation of name: (Latin) Tegula - a roof tile
Diagnosis: Circular or subcircular coccoliths consisting of proximal and distal plates composed of numerous small rhombohedral crystals which overlap one another like roof tiles. These plates are perforated by a single hole and may be joined to one another by 16 to 30 large wall forming elements.
Comments: The holotype of *Lithastrinus septentrionalis* is a line drawing interpreted from the light microscope. The structure shown does not match that observed in the scanning electron microscope for this species (Pl. 1, Figs. 1, 2). However, the holotype is from the Late Hauterivian of Germany as are the specimens shown here and it resembles the forms illustrated by the light micrographs in Pl. 1, Figs. 3-5

Reinhardt (1970) also assigned specimens similar to those observed in the present study to the species *L. septentrionalis* (Text-Fig. 74, Pl. 5, Figs. 6,7; Pl. 6, Fig. 1). However, his concept of the species included *L. tessellatus*, which is considered to be a separate species in the present study.

Tegulalithus septentrionalis (Stradner 1963) *nov. comb.*

Pl.1, Figs.1-5.

1963 *Lithastrinus septentrionalis* Stradner, p.177, Pl.2, Fig.7a-b.

1984 *Eprolithus septentrionalis* (Stradner) Perch-Nielsen, p. 43.

Comments: *Tegulalithus septentrionalis* does not conform to the generic description of *Eprolithus* Stover 1966. The possession of the distal and proximal plates composed of rhombohedral crystals is unique to the species *T. septentrionalis* and *T. tessellatus*.

Tegulalithus tessellatus (Stradner 1968) *nov. comb.*

1968 *Lithastrinus tessellatus* Stradner in Stradner, Adamiker and Maresch, p.43, Pls. 43 and 44, Text Figs. 7/1 and 7/2.

Comments: *T. septentrionalis* can be differentiated from *T. tessellatus* by a greater number of rhombohedral crystals in the proximal and distal plates of the latter. No illustrated specimens of *T. tessellatus* show the 16-30 large wall forming elements observed in *T. septentrionalis*, the presence or absence of these elements may be another diagnostic feature.
T. septentrionalis is stratigraphically restricted to the Late Hauterivian, while *T. tessellatus* occurs in the Aptian to Albian.

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Plate 1

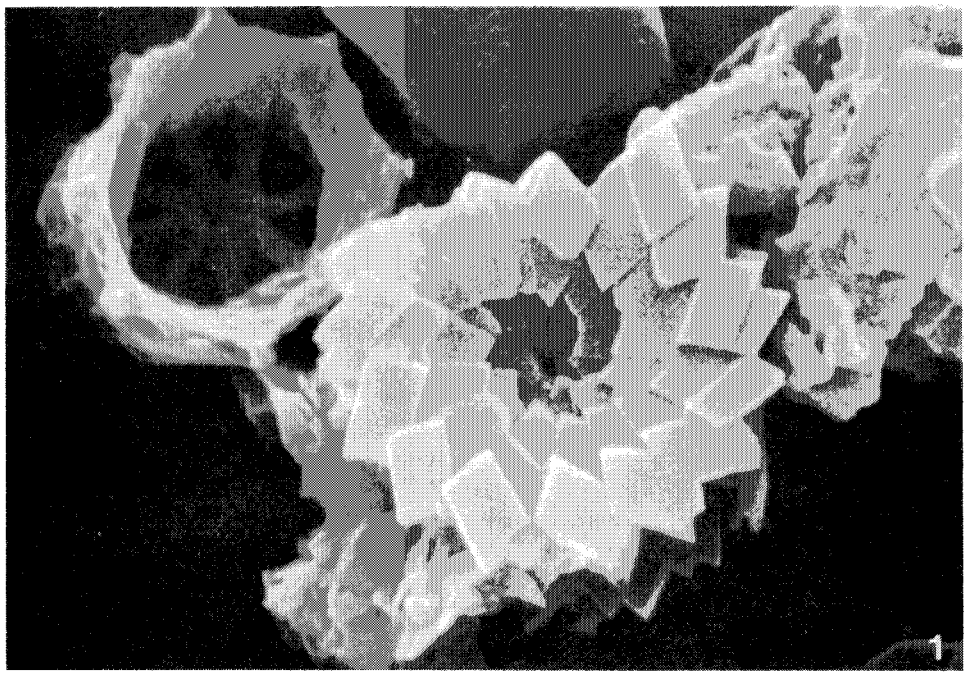
Figs. 1-5 *Tegulalithus septentrionalis* (Stradner 1963) *nov. comb.*

1. Plan view, 2. Side view, X 10.000, Otto Gott, Bed 50, *gottschei* Zone.

3. Plan view, x-nicols, 4. Plan view, bright field, X 2.800, Moorberg, Bed 67, *staffi* Zone.

5. Side view, bright field, X 2.800, Moorberg, Bed 67, *staffi* Zone.

Bed numbers after Mutterlose (1984).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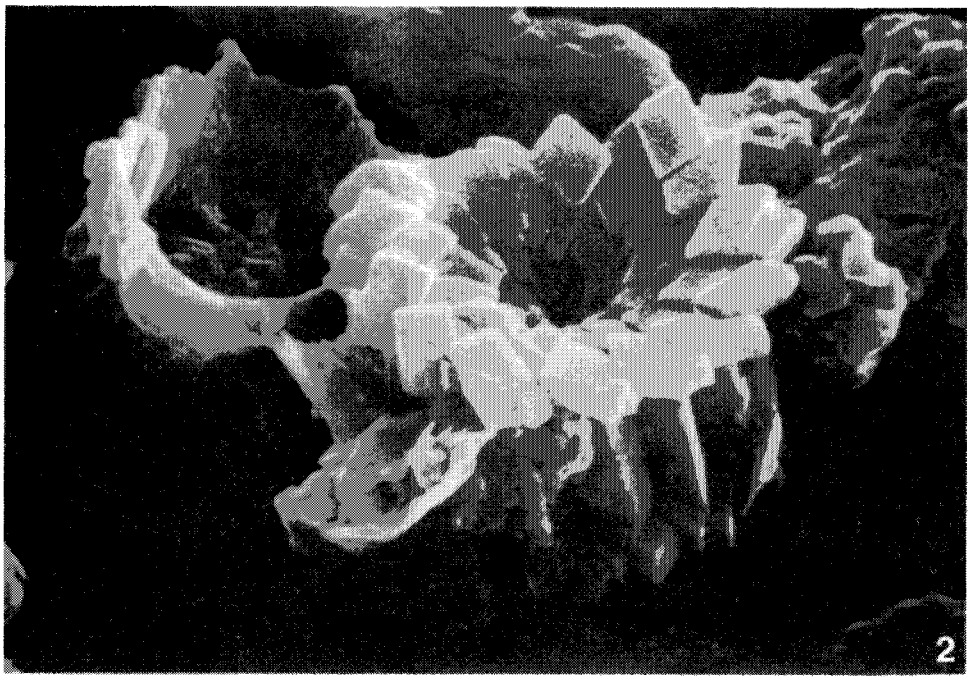
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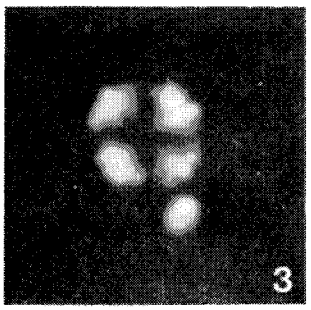
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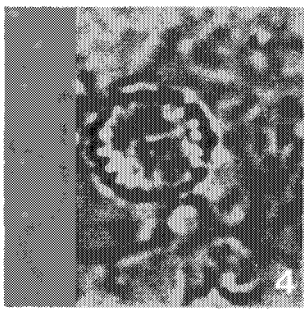
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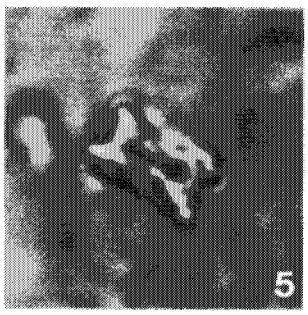
5

VALIDATION OF NEW COMBINATIONS

by M.-P. Aubry, Centre de Paléontologie stratigraphique et Paléoécologie, Université Claude Bernard, 27-46 Bd du 11 Novembre, 69622 Villeurbanne cedex, and Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543.

In the course of preparing Volume 4 of the Handbook of Cenozoic calcareous nannofossils, I have introduced new combinations which are hereby validated below:

Helicosphaera salebrosa (Perch-Nielsen) n. comb.
basionym: *Helicopontosphaera salebrosa* Perch-Nielsen, 1971. K. Dansk Vidensk. Selsk. Biol. Skr., 18(3), p. 43, pl. 43, fig. 5; pl. 36, fig. 5, 10; pl. 61, fig. 8, 9

Helicosphaera ? subantarctica (Edwards & Perch-Nielsen) n. comb.
basionym: *Helicopontosphaera ? subantarctica* Edwards & Perch-Nielsen, 1975. Init. Rep. D.S.D.P., Vol. 29, p. 482, pl. 14, fig. 1-7; pl. 15, fig. 1-3, 7, 8.

Pontosphaera aperta (Perch-Nielsen) n. comb.
basionym: *Discolithina aperta* Perch-Nielsen, K. Dansk Vidensk. Selsk. Biol. Skr., 18(3), p. 33, pl. 30, Fig. 1.

Pontosphaera distinctoides (Reinhardt) n. comb.
basionym: *Discolithus distinctoides* Reinhardt, 1967. Freiberger Forschungsh. C213, p. 212, pl. 3, Fig. 2, 3, 6.

Pontosphaera fibula (Getha) n. comb.
basionym: *Transversopontis fibula* Getha, 1976, in: Getha, N., Popescu, B. & Leu, M., Rev. Roum. Géol. Géophys. et Géogr., Géologie, 20(1), p. 144, pl. 2, fig. 1, 4-9.

Pontosphaera lata (Müller) n. comb.
basionym: *Transversopontis latus* Müller, 1970, Geologica bavarica, 63, p. 117, pl.1, fig. 1-3.

Pontosphaera lepida (Boudreaux & Hay) n. comb.
basionym: *Koczya lepida* Boudreaux & Hay, 1969, Rev. Esp. Micropal., 1(3), p.273, pl.7, fig. 7-15.

Pontosphaera ovata (Levin & Joërger) n. comb.
basionym: *Discolithina ovata* Levin & Joërger, 1967, Micropaleontology, 13(2), p. 167, pl. 2, fig. 6a-d.

Pontosphaera panarium (Deflandre) n. comb.
basionym: *Discolithus panarium* Deflandre, 1954, in: Deflandre, G. & Fert, C., Ann. Paléont., 40, p.141, text-fig. 39-40.

Pontosphaera pauciforata (Kamptner) n. comb.
basionym: *Discolithus pauciforatus* Kamptner, 1956, Anz. Oesterr. Akad. Wiss. Math.-Naturw., 93, p. 9 (=*Coccolithites pauciforatus* Kamptner, 1955, Verh. Kon. Ned. Akad. Wetensch. Natuurk., 2, p. 14, 15, fig. 14.)

Pontosphaera pax (Stradner & Seifert) n. comb.
basionym: *Transversopontis pax* Stradner & Seifert, 1980, Beitr. Paläont. Oesterr., 7, p. 281, 282, pl. 1-3, text-fig. A-C.

Pontosphaera pulchripora (Reinhardt) n. comb.
basionym: *Discolithus pulchriporus* Reinhardt, 1967, Freiberger Forschungsh., C213, p. 214, pl. 3, fig. 21-23; pl. 7, fig. 3.

Pontosphaera sigmoidalis (Locker) n. comb.
basionym: *Transversopontis sigmoidalis* Locker, 1967, Monatsberichte, 9(9/10), p. 763, 764, pl.1, fig. 3; pl. 2, fig. 4.

Pontosphaera vesca (Sullivan) n. comb.
basionym: *Discolithus vescus* Sullivan, 1965, Univ. California Publ. Geol. Sci., 53, p. 35, pl. 4, fig. 9a, b.

Pontosphaera wechesensis (Bukry & Percival) n. comb.
basionym: *Syracosphaera ? wechesensis* Bukry & Percival, 1971, Tulane Studies Geol. Pal., 8(3), p. 142, pl. 7, fig. 7-10.

A NEW PREPARATION TECHNIQUE FOR CALCAREOUS NANNOFOSSILS FROM ORGANIC-RICH ARGILLACEOUS SEDIMENTS

by Magdy H. Girgis

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INTRODUCTION

The technique described below was developed to extract nannofossils from the Senonian, organic-rich, micaceous, often phosphatic, silty shale ("Hot Shales") sequences in well sections drilled offshore West Africa. The technique may be applied to similar sediments of different ages with appropriate modifications.

The "Hot Shales" either contain very etched assemblages of calcareous nannofossils, dominated by the solution-resistent species *Micula staurophora*, or are occasionally barren. The assemblages recovered by conventional techniques (smear and short centrifuge as described by Taylor and Hamilton, 1982) contain moderately abundant specimens and show very low species diversity. Age determinations based on these nannofossil assemblages and other microfossils (foraminifera and palynomorphs) are essentially broad. This has prompted research into increasing the nannofossil concentration in order to observe more taxa and thus provide more detailed age determinations. These aims were achieved mainly by removing large proportions of the *non*-nannofossil particles, firstly by sieving (to remove particles >10 μm), secondly by centrifuging (to remove particles <3 μm), and thirdly by floatation (to remove kerogen) and then settling (to remove heavy minerals). As nannofossil concentration increases through these stages, a slide may be prepared after each stage until an age diagnostic assemblage is obtained, thus avoiding unnecessary treatments.

DISCUSSION

The organic matter in sediments is either soluble in organic solvent (oil and bitumen) or insoluble (kerogen, sensu stricto). Removing soluble organic matter from apparently barren Upper Liassic bituminous rocks has been proved to liberate nannofossils, resulting in rich assemblages being obtained (Herold-Vieuxblé, 1979). The soluble fraction (oil) in the present material is negligible (less than 0.5% by weight) and the removal of this does not appear to increase the abundance of nannofossils, although it produces cleaner specimens. The oil was extracted by a mixture of dichloromethane and methanol (95:5 by volume) in Soxhlet apparatus, which was run for seven hours. This extraction was described in detail by Herold-Vieuxblé (1979). The present technique was carried out on oil-free samples.

Kerogen and heavy minerals are known to have respectively lower and higher densities than calcite (specific gravity 2.715), of which nannofossils are composed, and thus a heavy liquid is needed to separate them. A mixture of tetrabromoethane (TBE) and acetone is the liquid chosen because it is a neutral solution (pH = approximately 7), easy to handle and can be prepared to give the wide range of densities necessary to separate both kerogen and heavy minerals. The density of the liquid varies between approximately 0.8 and 3.0 depending on the proportions of TBE and acetone used, as shown in Fig. 1. In order to determine the optimum densities of the liquid at which

kerogen and heavy minerals could be separated from nannofossils, the abundance of nannofossils (number of specimens in 100 fields of view) was recorded in both the float and sink fractions in the liquid at different densities. The relative abundances (in percentages) were calculated and presented in Fig. 2. Almost all the specimens (mainly *M. staurophora*) float at specific gravity 2.2 and sink at 2.9.

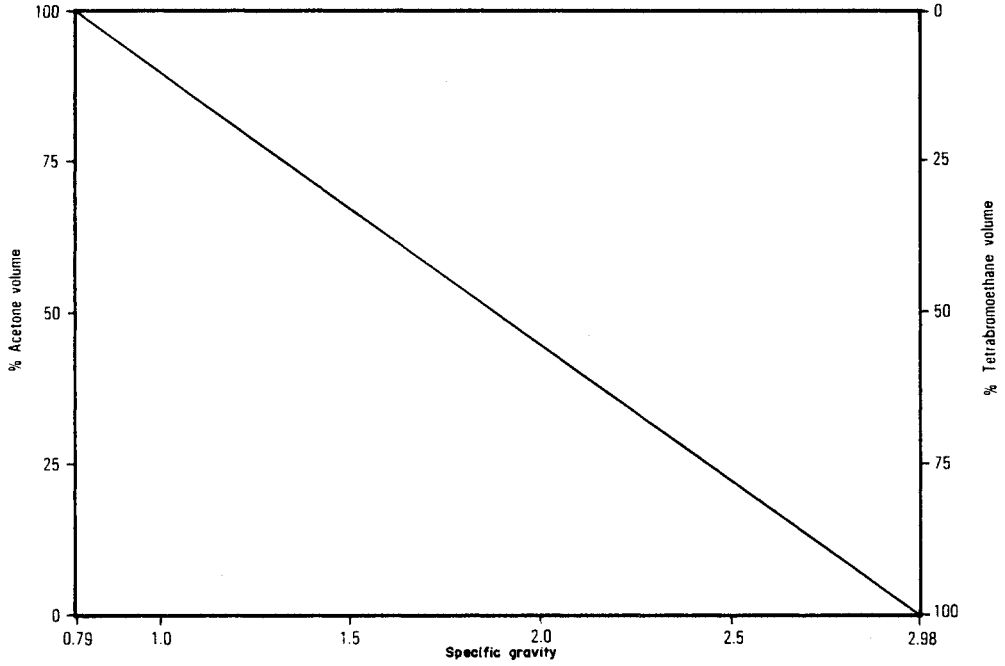

FIG. 1. Diagram showing the range of specific gravity of tetrabromoethane/ acetone at 20°C.

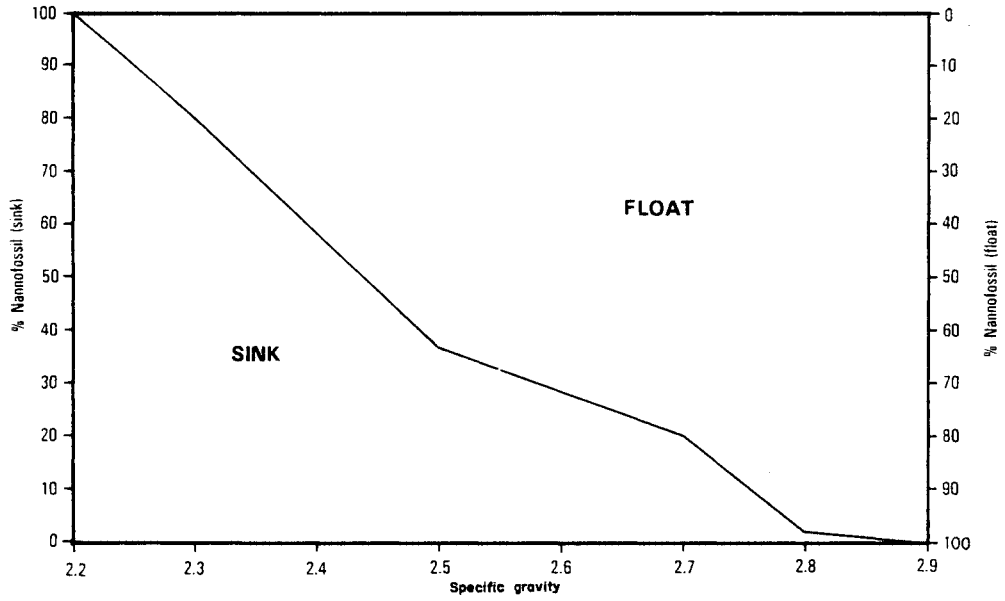

FIG. 2 Diagram showing relative abundances (in percentages) of nannofossils in the float and sink fractions at different densities.

METHODS

(1) Sieving: about 2cm^3 of oil-free sample was disintegrated in distilled water overnight, placed in ultrasonic vibration for a few seconds, shaken well and then passed through a 10 µm nylon sieve. Five to ten minutes are usually required to collect enough filtrate. A narrow jet of distilled water may be used to accelerate the process and ensure efficient sieving. The presence of a few 11-13 µm particles was noted in the filtrate, due to the deviation of the sieve's pores from circular shape and/or to pressure applied on the sieve. Considerable quantities of kerogen were removed by this sieving process.

(2) Centrifuging: the filtrate (<10 µm fraction) was centrifuged at 1000 r.p.m. for 104 seconds and decelerated using a brake. The supernatant containing particles <3 µm was discarded and the precipitate retained. The process was repeated on the precipitate until the supernatant was nearly clear. The speed and time are calculated for an Heraeus Christ model Labofuge 6000. The calculations to derive the required times and speeds for particle sizing are outlined in Katz (1978).

(3) Floatation: the dry residue from stage (2) was suspended in TBE/acetone of 2.2 sp. gr. and centrifuged at 3000 r.p.m. for 10 minutes to accelerate the separation. The floating kerogen and most of the TBE/acetone was pipetted off. The residue was resuspended in acetone and then centrifuged at 3000 r.p.m. for 10 minutes to settle the suspension. Acetone was then pipetted off and the residue was dried.

(4) Settling: the dry residue from (3) was suspended in TBE/acetone of 2.9 sp. gr. and centrifuged at high speed as in (3) to accelerate the separation. The float containing nannofossils was collected by a pipette and sufficient acetone was added to lower the specific gravity to at least 2.0. This mixture was shaken well, centrifuged at high speed and the supernatant was decanted off. This treatment on the float fraction was repeated three times to remove the TBE completely. The supernatant in the last stage was pipetted off, and the residue was dried and resuspended in distilled water ready for mounting on slides.

RESULTS

The abundance and species diversity of the nannofloral assemblages recovered by the present technique are considerably greater than that achieved by conventional preparations. The concentration is 4 to 6 times greater and diversity is 1.5 to 5 times higher. Among the age-restricted indicators which were observed only after the present technique had been employed are *Quadrum trifidum*, *Broinsonia parca constricta* and many specimens of the *Arkhangelskiella cymbiformis* group, sufficient for the determination of the group's mean length. This mean length was found to be important stratigraphically (Girgis, 1985).

ACKNOWLEDGEMENT

Thanks to the Directors of Robertson Research International Ltd. for the permission to publish this paper, Mr. K. West (RR Laboratory) for technical assistance and stimulating discussions, and Dr. P.R. Marshall (RR Petroleum Services) for critically reading the manuscript.

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