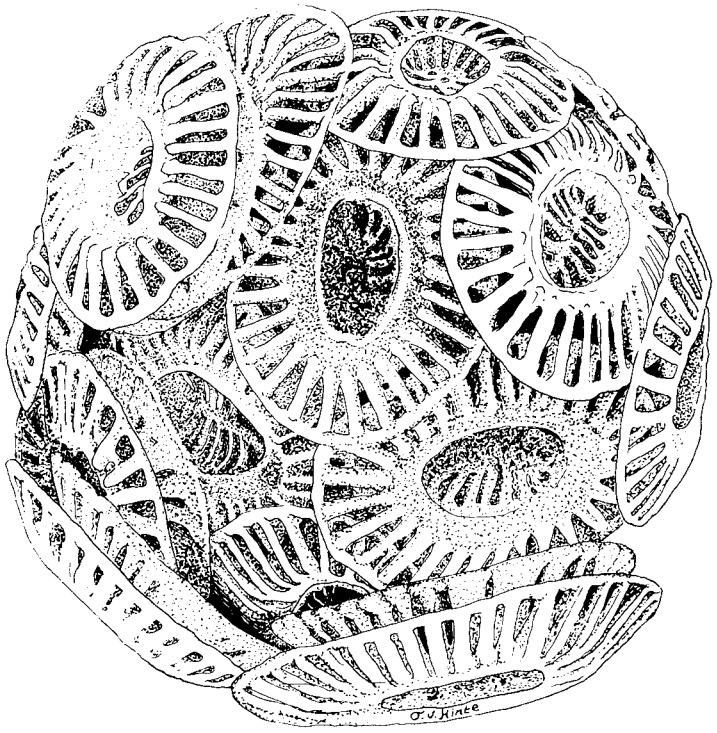
INA NEWSLETTER



INTERNATIONAL NANNOPLANKTON ASSOCIATION

VOLUME 8 NUMBER 1 1986

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!! NOTE !!

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NEXT ISSUE

Contributions for the next issue of the INA Newsletter should be received before October 1986. Please send your contributions to: The editor of the INA Newsletter, S.E. van Heck (Address : see inside cover).

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EDITORIAL

First and foremost, I would like to draw your attention to the fact that we have a new Secretary/Treasurer:

MARTIN JAKUBOWSKI
ROBERTSON RESEARCH INT
TY'N-Y-COED
LLANRHOS, LLANDUDNO
N. WALES
UNITED KINGDOM

Now all of you who haven't paid their 1986 membership fee yet, please send a cheque for £ 10.- to Martin. We will be sending reminders to all those who have not paid for previous periods, and be more strict in sending the Newsletter only to those members that are up-to-date with their payments. However, during our treasurer-less period administration may have become slightly inaccurate, so we apologise in advance to those members who get a reminder unjustly.

You will notice that £ 10.- is slightly more than Dfl. 35.-, and the dollar fee has gone up accordingly to $ 15.-. We hope to manage with this amount, but we are a bit short of money just now. Not only has everything become more expensive as usual, but London is definitely more expensive then Utrecht. However, we are firmly based in the UK now, and it would not be practical to have the Newsletter printed elsewhere. If any companies or consultants can be persuaded to donate a little extra money, that would be most welcome. After all, we would not like to have to cut down the number of pages or refuse contributions.

In this issue you will find the reviews of the "Bolli-book" and the first volume of the "Handbook", as well as a review on a Chinese edition. Which reminds me, those of you who publish in a language that is outside the commonly used group (English, French, German, Spanish) PLEASE include an English abstract, or at least send one to this Newsletter, so that the rest of the world is aware of the contents. It may take a lot of time trying to find someone who can understand Russian, Chinese or Czech.

Also in this issue some papers on taxonomy, a new UFO, and an update on silicoflagellates. Then there is some information on the Meeting planned for next year. You will find a registration form included.

S.v.H.

Please do not forget to send your reprints for calcareous nannofossils to John Steinmetz, and those for silicoflagellates to René Almekinders.

INA MEETING IN LONDON, 1987

When our last meeting in Vienna turned out to be a success it was decided there and then that we would organise another meeting within two years. It had already been decided to hold a meeting in Woods Hole this year, prior to the Second International Conference of Paleoceanography in September. Unfortunately, trips to the States are possible for only very few of us here in Europe, as European meetings are visited by only a few visitors from overseas.

London was suggested as the place for our next European meeting. Why London? Well, for several reasons. One is that I now live here, so that it is convenient for me. Another is, that London is a great town, which people might like to visit. More important, England holds a good number of classic localities, of which we shall try to visit some, and we shall try to make samples available of others. Another major reason is that I have found that there is a very active Nannoplankton Group here, a subdivision of the British Micropalaeontological Society, on which I am counting for help with the organisation.

We have had one brief meeting sofar, to discuss the possibilities for a Meeting. For time, we thought to organise the INA Meeting prior to the 20th European Micropalaeontological Colloquium held in England, in August. That would imply our Meeting could be from Thursday 21st to Saturday 23rd of August, with a fieldtrip either on Sunday only or on Sunday and Monday. Dates are, however, still open for discussion. For location of the meeting we are considering University College London, which is nicely central in town. Accomodation need not be a problem if we know in time how many people we can expect. We count on student accommodation to be available, which at the moment costs £ 11.50 per night, and is not expected to go up dramatically in price. Other than that, bed and breakfast accomodations and hotels are available in every price class, again provided we make reservations in time. What we need to know now before we can do much more, is how many people we might expect. In the mean time, we shall try to find some sponsors amongst the many oil companies and consultants in Britain. It will depend largely on them how much we can do and what the registration fee will be. For the moment we have estimated £ 30.- , and £ 10.- for students. We hope to find sponsors for a Congress Party, for the excursion bus, for a special issue with abstracts and for the proceedings. If you have any suggestions in that direction, we would like to hear from you.

The program of the meeting will be up to you, as usual. We suggest the same set-up as in Vienna, with short talks, poster sessions, workshops, and plenty of time for discussions. We trust that we shall manage to get some microscopes together to study material. Again, we suggest that talks should deal with problems, ideas, methods and topics of general interest rather than with the nannoplankton distribution of one particular locality. We are thinking of topics such as evolution, morphology, stratigraphy, systematics, ecology and biology, or anything exiting you can think of.

Britain is too large, and the classic localities too far apart to cover it all in one excursion of one or two days. We shall try to visit as many as possible beforehand, to assess which would be most suitable to visit. But if there are any localities in which you are particularly interested, then let us know so we can try to include them.

S.v.H.

REVIEW

BOLLI,H.M. et al., Plankton stratigraphy.
Cambridge Earth Science Series, Cambridge University Press, 1032 pp.
price: £ 95.- / $ 175.-
publication date: 7th November 1985

Contents:

This book presents the state of the art for plankton stratigraphy and is a must for any institution or company working with plankton stratigraphy. It is a treasure for anyone who can afford it and is warmly recommended to those who regularly work with different fossil groups. Those who work with one fossil group only may find it hard to pay so much money for a book of which they are only going to use a small part. And this is my major criticism of the book. A very large portion of the potential public will not use the book because they will be unwilling or unable to pay $175 or even £95 for one or two chapters. Even in the cases where companies or institutions have bought the book it can only be at one desk at the time, so again a large portion of potential users is cut off from its use. I am certain that, had it been issued as two or three volumes, it would have had a far wider use and many more people would have bought it. This is really a pity as it is an excellent book that one would want near the microscope at all times as an easy reference to all important markers. The amount of detail that is presented makes it very usefull both for the specialist and for the trained general biostratigrapher who is confronted with a group with which he or she is only vaguely familiar. It would also be very usefull for advanced students getting to grips with the details of any one group. As such it might be considered as a follow-up of the Haq & Boersma book on micropaleontology which is basically an introduction.

Although I would love to give you some information on each chapter, we shall have to restrict ourselves to the chapters dealing with nannoplankton, or this review might easily take up ten pages. I shall not discuss such matters as zonal criteria and systematics, as there are probably as many opinions as there are specialists. Instead I shall give the statistics and limit my critisism to technical matters.

Skipping over the introductory chapter, chapter 2 presents some very usefull correlations between the zonations based on forams, nannos, radiolaria, dinos, calpionellids, diatoms, silicos and paleomagnetics, as well as a correlation with two versions of the absolute timescale. The nanno zones quoted here are basically those of Sissingh (1977) for the Cretaceous (with some nomenclatural adaptations) and of Martini (1971) for the Cenozoic, although in the latter the adaptations go so far as to change the zonal interpretations. The M. inversus Zone has been made to correspond to NP 1 + NP 2, the C. tenuis Zone with NP 3, the C. danicus Zone with NP 4 and part of NP 5, while the E. macellus Zone and F. tympaniformis Zone make up the remainder of NP 5. I can only partly agree with this interpretation and I feel it should not have been quoted as Martini 1971 because it is not.

Chapter 10 : Mesozoic calcareous nannofossils (97 pp)

An introduction discusses techniques, practical problems in working with nannos, ecological indications and paleogeography.

The structure of the chapter is such that zonations are discussed per time interval, after which a systematical part follows. Rather limited rangecharts accompany the zonations, but many additional rangecharts are given in the systematical part. Although it is useful to have rangecharts for certain related taxa, it would have been more practical to have a general rangechart with all the species included. Ideally, this could have been an enclosure, which could be stuck against the wall.

Magnifications of light micrographs are generally 2000 X, with exception for the pre-Jurassic. Magnifications for electron micrographs are random, and nowhere indicated. A fixed magnification for those pictures would certainly have greatly facilitated comparison. A very nice feature, however, is the fact that the names are indicated directly below each separate photograph, so that it is not necessary to search for a name in a plate-explanation.

For the pre-Jurassic some species are described and their ages given, but no zonation is available yet. 12 species are figured (LM, SEM, TEM) and discussed. A magnification of 1800 X is used for the LMs, which I find too small, as the species themselves are so small already. No magnification is given of any of the EMs.

For the Jurassic, 5 zonations are compared in a system where arrows indicate both the zonal names and the markers. I find this system rather unclear and at times confusing, although I know that others are much in favour of this system. The zonation of Barnard & Hay (1974) is followed, with 22 zones discussed. The rangechart is arranged more or less on FOs and contains 33 species. 35 species have been figured as light micrographs accompanying the rangechart, though more species are mentioned in the zonal discussions. Not all markers have been figured (e.g. D. tubus). Additional stratigraphic and taxonomic data have to be extracted from the systematical part, which is rather cumbersome.

After a discussion of the Jurassic-Cretaceous boundary comes the Cretaceous zonation. An overview of the important literature is followed by a comparison of 7 zonations, of which Sissingh (1977) is used as a

reference. The same arrow system is followed as before. In the zonation of Perch-Nielsen (1979a, 1983) the FO of A. parcus is indicated at three different levels which is confusing to say the least. I am not sure whether these different entries represent different subspecies, different opinions, regional differences or some error. The 26 zones of Sissingh are discussed, and additional criteria given. The rangechart, again more or less arranged on FOs contains 61 species.

In the systematical part 22 families and a group incertae sedis are described. Some 200 genera are described, and in most cases the important species within those genera. 25 additional rangecharts are given, 14 of which simultaneously show the phylogeny. Ten determination keys for individual families or genera are given, and numerous schematical drawings to facilitate determination, next to more than 1100 photographs.

The chapter ends with an alphabethical list of taxa, arranged to genus name. This list is basically intended to show the nomenclature, and no page references are given. I only noticed later that an index arranged to species names, with page references, is included in the back of the book.

Chapter 11: Cenozoic calcareous nannofossils (127 pp)

As this chapter is written by the same author, the structure is the same, and the general remarks made for the previous chapter are also true for this one. The chapter starts with an extensive paragraph on ecology and paleobiogeography.

The part dealing with the Paleogene shows correlations between the Martini (1971) zonation and the Okada & Bukry (1980) zonation, and between 5 Paleocene zonations. The Martini zonation (this time the original version) with its 25 NP zones is used as reference. Each interval starts with a general description and a description of the boundary interval. In the discussions of the zones additional criteria are mentioned. The rangechart is arranged according to events, which implies an alternation of FOs and LOs, and 54 species are included. This rangechart is accompanied by 90 photographs of markers and some additional species.

The rangechart for the Neogene is arranged in the same way, and contains 48 species. The 21 NN zones of Martini are again discussed with additional criteria. No correlations are made between other zonations, though the Martini zonation and the Okada & Bukry zonation are shown side by side on the rangechart.

In the systematical part 20 families and incertae sedis are described, in which more than 80 genera are treated separately, and in most cases the important species within the genera. 16 additional rangecharts are presented, and 7 phylogenetic schemes. 5 determination keys are given, aided by numerous schematical drawings and over 1300 photographs.

In conclusion one can say that at some points the organisation of these chapters could have been more practical (such as all ranges combined on one rangechart per time interval), but all in all this is the most complete overview that exists, and as such is very valuable. The fact that all this was accomplished by a single author may be considered a major achievement.

Chapter 17 is on silicoflagellates. After an introduction dealing with preparation techniques, ecology and evolution, 5 zonations are presented. 21 (sub)zones are discussed, and a rangechart with 121 taxa is included, as well as a rangechart of Corbisema spp. with 31 taxa and one of Mesocena spp. with 24 spp. Taxonomy is at genus-level.

The book ends with an alphabethical index for each of the following groups: forams, nannos, radiolaria, diatoms, silicos and ichthyoliths.

I feel the authors and editors can be congratulated with this book, and I for one, am very happy to posses a copy of it.

S.v.H.

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REVIEW

AUBRY,M.P., 1984 : Handbook of Cenozoic Calcareous Nannoplankton, Book 1: Ortholithae (Discoasters).
Published by: Micropaleontology Press, NY., 266 pp.
price: $ 50.-

After a very long wait the first volume of the "Handbook" has now appeared. I had hoped that by this time the second and third volume would have appeared as well, but I haven't seen them yet, so we'll get on with this one. The book comes as a binder with the standard American paper format, somewhat shorter and wider than A4. The binder has six rings, three at the top and three at the bottom. Personally I would have preferred the standard four rings, which would have made it easier to insert sheets with my own observations, but then this seems more resistant to wear, and perhaps it is an American standard.

The preface explains the organisation of the book and the philosophy adapted towards systematics. It also gives a list of the abbreviations and symbols used in the text and explains the codes used for references. The latter was not quite clear to me at the start, but after working with it for a while it proved easier than it first seemed.

The introduction gives an overview regarding the historic development of the use of the name Discoaster, and the confusion surrounding it. The author chooses for the name Discoaster (although invalid) because of common use. We then continue with the introduction of a number of morphological terms, which are descriptive and well illustrated, which helps to make the following discussions clear and easy to follow. A section on the crystallography and diagenesis is followed by a section on phylogeny and origin of the discoasters. This section gives a summary of the current ideas, and presents the overall development without going in too much detail. This is followed by a short section on paleoecology. The next section is on taxonomy, giving an overview of the different genera and subgenera that have been introduced over the years to subdivide the discoasters. The chapter ends with a key to the groups distinguished by the author, each group subdivided into several units.

The rest of the book consists of 11 chapters, one for each group, separated by blue dividers. The dividers are the same size as the pages, and in my copy I have immediately attached some labels sticking out of the margin, to make it easier to find the correct section. This may be an idea for the following volumes. The lay-out of these chapters is as follows: The pages are turned 90 degrees, so that the original left side of the page is now the top. This page is then subdivided into up to four columns. At the top of the page an indication of the unit, then at the top of each column the

name and author of the species. Species names are given in bold face, except for those that are not accepted by the author (junior synonyms). Below the names are pictures of the species. These are usually (or always?) the original photographs or drawings, as seen in light microscope. Each picture has a code number. The next page is subdivided in columns corresponding to the photo-page. This page contains the text, with relevant information. The reference code at the bottom of each column refers to the publications from which these pictures and any additional electron micrographs are taken. These additional micrographs, when present, are given on the following pages. At the end of each chapter is a list with references to which the reference codes refer. Each reference is followed by a list of the code numbers of the pictures, showing the original plate and figure number (actually it is less confusing than it sounds).

The subdivision into groups is fairly clear, and following the key I found it was usually possible to arrive at the correct determination. As my own experience is mainly in the Mesozoic, I was not hampered by a detailed knowledge of the taxonomy of discoasters, and quite pleased with the result. The only problems I encountered were with highly variable species and with poorly preserved specimen. Of course there are always species that are difficult to classify, and here opinions may vary as to in which group they belong. The subdivision into units is not explained, and a certain characteristic mentioned in the key may be referred to e.g. units 1-3. At first I was puzzled by this, until I realised that the units are artificial, each page with accompanying figure-pages consisting of one unit. All in all, the system seems to work for most species as long as preservation is fairly reasonable.

The following groups are used:

D1 : Rosette-shaped discoasters; 41 species (including synonyms). Representatives are forms as D. multiradiatus, D. kuepperi, and less typically D. lodoensis.

D2 ; Star-shaped discoasters with sharp tips, no nodes, mainly or strictly six-rayed; 37 species, including D. formosus, D. neohamatus, and less typically D. triradiatus (considered a variaty of D. brouweri).

D3 : As D2, but five-rayed; 12 species, including D. sublodoensis, D. asymmetricus, and less typical D. berggrenii (see D5).

D4 : As D2, but four-rayed; 5 species, including D. tamalis.

D5 : Star-shaped discoasters characterised by a sharp differentiation of their arms from the central area; 8 species, including D. mediosus and D. molaris.

D6 : Star-shaped discoasters with bifurcated rays, no nodes, mainly or strictly six-rayed; 32 species, including D. deflandrei, D. variabilis, and D. druggi. This group may cause problems, as the bifurcations are not always present/visible.

D7 : As D6, but five-rayed; 3 species, including D. pentaradiatus.

D8 : As D6, but five- or six-rayed, with a protrusion in the center of the bifurcation; 4 species, including D. surculus.

D9 : Star-shaped discoasters with lateral nodes on the arms; 12 species including D. binodosus.

D10: Star-shaped discoasters with terminal nodes on the arms; 13 species, including D. bronnimanni and D. gemmifer. Difference with D6 and D7 is not always clear, as in some variations of D. gemmifer.

D11: Flower-shaped discoasters; 25 species, including D. obtusus, D. adamanteus and less typically D. clavatus.

The book ends with an index to the species, which is very helpfull.

All in all, I feel the book was worth waiting for. Although some slight improvements can still be made (such as protruding lables on the dividers) it serves it purpose well. I would not recommend it to the absolute beginner, but it should be most usefull to those who have a general experience with nannoplankton and who will appreciate the variability of the group, without being familiar with it on a species-level. I am looking forward to the next volumes.

S.v.H.

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REVIEW

CHI,W.R., 1981 : Nannofossils. 407 pp.
Publisher: Exploration Research Centre, Petroleum Company of China (Taiwan).

I was a bit at a loss when I received this book, because it is written entirely in Chinese. There was no English abstract or subtitle, and even the author's name was only given in Chinese characters. However, I got a pretty good idea what it was all about by looking at the names of taxa and authors and by studying the pictures. Mr. Li Qianyu of University College London provided me with a brief summary of the contents, confirming my first impressions.

The first thing that was evident was that most of the pictures are taken from other publications. In fact, the book is a recapitulation of the literature, and many publications dealing with general stratigraphy or evolutionary developments are covered. One could run a 'know your literature' quiz trying to guess the source of the illustrations. It must be a valuable book for Chinese nannoplankton students who may have problems with English or simply problems in trying to get hold of literature.

Chapter 1 is a brief introduction, with chapter 2 an historical overview (evident from names such as Ehrenberg, Huxley, Wallich, Lohmann, etc).

Chapters 3 and 4 deal with recent nannofossils, and more particularly with biology, ecology and biogeography.

Chapter 5 discusses different preparation techniques, illustrated by a neat set of cartoons.

Chapter 6 discusses morphology and systematics in some 130 pages, with 53 plates and 17 figures, largely consisting of line drawings in part copied from literature (Verbeek 1977, Farinacci 1971, Perch-Nielsen 1970). I was happy to see that no new taxa were introduced, for that would have caused problems indeed!

Chapter 7 consists of almost a hundred pages on stratigraphy. This chapter in particular would be handy for anyone, as reading a rangechart does not require any knowledge of Chinese. Nineteen rangecharts and eight photoplates are reproduced from publications such as Hay 1977, Martini 1971, Bukry 1978,1973, Müller 1974, Okada & Bukry 1980, Gartner 1977, Thierstein 1976, Sissingh 1977.

Chapter 8 also seems to deal with stratigraphy, possibly with correlation to other tools, although no figures are included.

Chapter 9 treats paleogeography and paleoecology, with illustrations from McIntyre 1972, Haq 1976, 1980, Haq & Lohman 1976, Roth 1978, Gartner 1973, e.a. Some illustrations are given to show the application of these subjects, as in the reconstruction of the traject Taiwan has travelled over the past 12 million years.

Chapter 10, consisting of 56 pages, is another chapter I found very interesting, as it summarises evolutionary trends of various nannofossil groups. Amongst the illustrations are those of Prins 1969, 1971, Rood & Barnard 1972, Lauer 1974, Perch-Nielsen 1978, Roth 1978, Gartner 1969, Romein 1979, Haq 1973, Gartner & Bukry 1975, Rade 1978.

Chapter 11 apparently contains some more general remarks on biostratigraphical applications.

Chapter 12 finally, deals with the nannoplankton of Taiwan, describing the occurrence of different assemblages in the different areas, the local zonations and lithostratigraphic units, and their correlation based on nannoplankton, followed by six more plates.

Because of the language I do not expect a high demand for this volume outside the Chinese community, but I suggest to everyone who is interested to obtain further information from the author (Dept. of Geol. and Geoph. Sciences, Princeton, New Jersey 08544, USA).

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Please send your reprints of publications on calcareous nannoplankton to:

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And please send reprints of publications on silicoflagellates to:

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or a cheque for $ 15.- to John Steinmetz.

BIBLIOGRAPHY AND TAXA OF CALCAREOUS NANNOPLANKTON-VII

Compiled by John C. Steinmetz

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1 **AGUIRRE, E., & PASINI, G.** **1985** — strat. QUAT TERT.U. Europe.W.
The Pliocene-Pleistocene boundary.
-Episodes, 8(2): 116-120, 4 figs.

2 **BARRON, J.A.** **1985** — abstr. strat. TERT.U. Pacific
A multiple microfossil biochronology for the Miocene.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 90-91, 1 fig.

3 **BARRON, J.A., NIGRINI, C.A., PUJOS, A., SAITO, T., THEYER, F., THOMAS, E., & WEINREICH, N.** **1985** — strat. QUAT TERT Pacific.C.
Synthesis of biostratigraphy, central equatorial Pacific, Deep Sea Drilling Project Leg 85: refinement of Oligocene to Quaternary biochronology.
-In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 905-934, 15 figs., 8 tbs.

4 **BELLION, Y., AUSSEIL, J., et al.** **1985** — strat. TERT.L. Africa.N.
Age paléocène de la Formation des Madeleines de la region de Dakar (Sénégal). (On the Palaeocene age of the Madeleines Formation of Dakar (Senegal).)
-C.R. Acad. Sc. Paris, 301 (13): 937-940, 1 tb.
[Nannofossils by K. Perch-Nielsen.]
(In French with English abstract.)

5 **BERGEN, T.F.W., SBLENDORIO-LEVY, J., TWINING, J.T., & CASEY, R.E.** **1986** — strat. TERT.U. America.N. Pacific.N.
Middle Miocene planktonic microfossils and lower bathyal foraminifera from offshore southern California.
-J. Paleont., 60(2): 249-267, 12 figs., 2 tbs.

6 **BOHN-HAVAS, M., & NAGYMAROSY, A.** **1985** — abstr. strat. TERT.U. Europe.E.
Fossil nannoplankton and molluscs from the Ottnangian of the Borsod Basin (N-Hungary).
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 112-115, 1 fig.

7 **BOLLI, H.M., SAUNDERS, J.B., & PERCH-NIELSEN, K.(eds.)** **1985** — strat.syst. Overview
Plankton Stratigraphy.
-Cambridge Univ. Press, Cambridge, 1032 pp.

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1 **BOOTH, B.C.** **1985** — abstr. RECENT ECOL. Pacific.N.
Vertical distribution of biomass of phytoplankton species and heterotrophic nanoplankton species at St. P in the subarctic Pacific during May and August, 1984 (SUPER cruises).
-Transa., Amer. Geophys. Union, 66(51): 1273-1274.

2 **BORZA, K., MICHALÍK, J., GAŠPARÍKOV, V., & VAŠÍČEK, Z. 1984** — strat. CRET.L. Europe.E.
The biostratigraphy of the Hauterivian/Barremian boundary beds in the Krížna Nappe, Western Carpathians (Czechoslovakia).
-Cret. Res., 5(4): 349-356, 3 figs.

3 **BRASSELL, S.C., EGLINTON, G., MARLOWE, I.T., PFLAUMANN, U., & SARNTHEIN, M.** **1986** — strat. QUAT Atlantic.C. TECH.
Molecular stratigraphy: a new tool for climatic assessment.
-Nature, 320(6058): 129-133, 5 figs., 1 tb.

4 **CIVIS, J., DE PORTA, J., SIERRO, F., & FLOREZ, A.** **1985** — abstr. strat. TERT.U. Europe.W.
Biostratigraphical aspects of the marine Miocene in the Catalan prelittoral depression (N.E. Spain).
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 144-145.

5 **COLE, J.J., & HONJO, S.** **1985** — abstr. RECENT Pacific.C. SEDIM.
Particulate flux and benthic decomposition at a deep-water site in the Pacific Basin.
-Transa., Amer. Geophys. Union, 66(51): 1302.

6 **DANIELS, C.H.v., CICHA, I., & SPIEGLER, D.** **1985** — abstr. strat. TERT.U. Europe.E. Europe.W.
Correlation of Neogene regional stages between the boreal Tertiary of NW Germany and the Paratethys using Uvigerina (Foram.).
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 163-165, 1 fig.

7 **DePAOLO, D.J.** **1986** — (strat) QUAT TERT.U. Pacific.S.
Detailed record of the Neogene Sr isotopic evolution of seawater from DSDP Site 590B.
-Geology, 14(2): 103-106, 2 figs., 2 tbs.
[Nannofossils by W.H. Lohman.]

8 **DOYLE, L.J., & WALKER, S.T.** **1984** — abstr. RECENT SEDIM. Atlantic.C.
Sediments and sedimentary processes of the west Florida upper slope: a contemporary chalk deposit.
-SEPM, First Annual Midyear Mtg., Abstracts, p.27.

A257

1 **DUAN.W.** **1985**
Calcareous nannofossils from two deep-sea cores in the northern South China Sea.
-Acta Micropal. Sinica, 2(1): 92-102, 3 pls., 1 fig.
(In Chinese with English abstract.)
strat.syst.
QUAT
Pacific.C.

2 **DUAN, W.** **1985**
Neogene calcareous nannofossils from the Zhoujiang Basin.
-Acta Paleont. Sinica, 24(1): 94-110, 3 pls., 2 figs., 2 text-figs., 1 tb.
(In Chinese with English abstract, new species description, and plate captions.)
strat.syst.
TERT.U.
Asia.E.
Pacific.C.

3 **DUAN, W., & LEI, Z.** **1984**
Tertiary stratigraphy of Zhujiangkou Basin.
-Oil & Gas Geology, 5(2): 102-112, 2 figs., 2 tbs.
(In Chinese with English abstract.)
strat.
TERT.U.
Asia.E.
Pacific.C.

4 **DUDLEY, W.C., BLACKWELDER, P., BRAND, L., & DUPLESSY, J.C.** **1986**
Stable isotopic composition of coccoliths.
-Mar. Micropal., 10(1-3): 1-8, 2 figs., 1 tb.
RECENT
BIOL.
ISOT.

5 **FARIS, M., ABD EL-HAMEED, A.T.** **1986**
Contribution to the late Maastrichtian-Paleocene chalk at Jiran el Ful area, Abu Roash, west of Cairo, Egypt.
-Newsl. Stratigr., 15(3): 139-149, 1 pl., 4 figs.
strat.(syst)
TERT.L.
CRET.U.
CRET-TERT boundary
Africa.N.

6 **FLEXER, A., & HONIGSTEIN, A.** **1984**
The Senonian succession in Israel -- lithostratigraphy, biostratigraphy, and sea level changes.
-Cret. Res., 5(4): 303-312, 4 figs., 1 tb.
strat.
CRET.U.
Asia.SW.

7 **GARTNER, S., CHOW, J.** **1985**
Calcareous nannofossil biostratigraphy, Deep Sea Drilling Project Leg 85, eastern equatorial Pacific.
-In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 609-619, 1 fig., 9 tbs.
strat.
QUAT
TERT
Pacific.C.

8 **GARTNER, S., & JIANG, M.J.** **1985**
The Cretaceous/Tertiary boundary in east-central Texas.
-Gulf Coast Assn. Geol. Soc., Transa., 35: 373-380, 4 figs.
strat.
CRET-TERT boundary
America.N.

A258

1 **GAŹDZICKA, E., & GAŹDICKI, A.** **1985**
Oligocene coccoliths of the Pecten Conglomerate, West Antarctica.
-N. Jb. Geol. Paläont. Mh., 1985(12): 727-735, 4 figs.
strat.(syst)
TERT.L.
Antarctic

2 **GOURINARD, Y., MAGNÉ, J., RINGEADE, M., & WALLEZ, M.-J.** **1985**
Chronologie numérique de l'étage Burdigalien. (Numeric chronology of the Burdigalian Stage.)
-C.R. Acad. Sc. Paris, 301(10): 715-720, 2 tbs.
(In French with English abstract and table captions.)
(strat)
TERT.U.
Europe.W.

3 **GRADSTEIN, F.M.** **1985**
Ranking and scaling in exploration micropaleontology.
-In: Gradstein, F.M., et al., Quantitative Stratigraphy. D. Reidel Publ. Co., Dordrecht, Holland, pp. 109-160, 19 figs., 9 tbs.
[Section on Late Cretaceous nannofossil zonation: pp. 151-159.]
strat.
CRET.U.
Atlantic.N.
TECH.num.

4 **HÁMOR, G., BÁLDI, T., BOHN-HAVAS, M., et al.** **1985**
The biostratigraphy of the Hungarian Miocene.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 252-256, 1 fig.
abstr.
strat.
TERT.U.
Europe.E.

5 **HASSON, P.F., & FISCHER, A.G.** **1986**
Observations on the Neogene of northwestern Ecuador.
-Micropal., 32(1): 32-42, 1 pl., 1 fig., 9 tbs.
strat.
TERT.U.
America.S.
Pacific.C.

6 **HAY, B.J., & HONJO, S.** **1985**
Annual particle flux in the Black Sea.
-Transa., Amer. Geophys. Union, 66(51): 1275.
abstr.
RECENT
Mediterr.
SEDIM.

7 **HEATH, G.R., BURCKLE, L.H., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 576. [East of Shatsky Rise, northwest Pacific]
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 51-90, 14 figs., 7 tbs.
[Nannofossils by S. Monechi.]
strat.
QUAT
TERT
CRET.U.
Pacific.N.

8 **HEATH, G.R., BURCKLE, L.H., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 577. [Western flank of the Shatsky Rise, northwest Pacific]
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 91-137, 10 figs., 5 tbs.
[Nannofossils by S. Monechi.]
strat.
QUAT
TERT
CRET.U.
CRET-TERT boundary
Pacific.N.

A259

1 **HEATH, G.R., BURCKLE, L.H., & SHIPBOARD SCIENTIFIC PARTY.** **1985** | strat. QUAT TERT CRET.U. Pacific.N.
Site 578. [West of Shatsky Rise, northwest Pacific]
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 139-173, 10 figs., 6 tbs.
[Nannofossils by S. Monechi.]

2 **HEATH, G.R., BURCKLE, L.H., & SHIPBOARD SCIENTIFIC PARTY.** **1985** | strat. QUAT TERT.U. Pacific.N.
Site 579. [Northwest Pacific]
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 175-207, 10 figs., 5 tbs.
[Nannofossils by S. Monechi.]

3 **HEATH, G.R., BURCKLE, L.H., & SHIPBOARD SCIENTIFIC PARTY.** **1985** | strat. QUAT TERT.U. Pacific.N.
Site 580. [Northwest Pacific]
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 209-239, 10 figs., 5 tbs.
[Nannofossils by S. Monechi.]

4 **HEATH, G.R., BURCKLE, L.H., & SHIPBOARD SCIENTIFIC PARTY.** **1985** | strat. QUAT TERT.U. Pacific.N.
Site 581. [Northwest Pacific]
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 241-266, 10 figs., 4 tbs.
[Nannofossils by S. Monechi.]

5 **HITCHCOCK, G.L., LANGDON, C., & SMAYDA, T.J.** **1985** | RECENT Atlantic.N. ECOL.
Seasonal variations in the phytoplankton biomass and productivity of a warm-core Gulf Stream ring.
-Deep-Sea Res., 32(11): 1287-1300, 4 figs., 1 tb.

6 **HOLLIGAN, P., & SPINRAD, R.W.** **1985** | abstr. RECENT TECH.obs. BIOL.
Flow cytometric analysis of coccolithophore light scatter characteristics.
-Transa., Amer. Geophys. Union, 66(51): 1305.

7 **HUDSON, R.J.M., & MOREL, F.M.M.** **1985** | abstr. RECENT BIOL.
The role of light and cell surfaces in the uptake of iron by phytoplankton.
-Transa., Amer. Geophys. Union, 66(51): 1266.

A260

1 **JANIN, M.-C.** **1985**
Les empreintes de Nannofossiles calcaires cénozoiques des concrétions polymétalliques du Pacifique central (Archipel des Touamotou. (The Cenozoic calcareous nannofossil imprints of the polymetallic concretions from the central Pacific (Tuamotu Archipelago).)
-Rev. Micropal., 28(2): 125-137, 3 pls., 5 figs., 1 tb.
(In French with English abstract and plate, figure, and table captions.)

strat.syst.
QUAT
TERT
Pacific.C.
SEDIM.
DIAG.

2 **KAISER-WEIDICH, B., & WEIDICH, K.F.** **1985**
Nannoconus, kalkiges Nannoplankton incertae sedis, aus der Kreide des (Ultra-) Helvetikums Süddeutschlands. (Nannoconus, calcareous nannofossils incertae sedis, from the Cretaceous of the (Ultra-) Helvetikum of Southern Germany.)
-N. Jb. Geol. Paläont. Mh., 1985(12): 717-726, 5 figs.
(In German with English abstract and figure captions.)

strat.(syst)
CRET
Europe.W.

3 **KENNETT, J.P., & VON DER BORCH, C.C.** **1986**
Southwest Pacific Cenozoic paleoceanography.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt.2, pp. 1493-1517, 8 figs., 2 tbs.

strat.
QUAT
TERT
Pacific.C.
Pacific.S.
ECOL.

4 **KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986**
Site 586: western equatorial Pacific.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 19-114, 15 figs., 7 tbs.
[Nannofossils by W.H. Lohman & E. Martini.]

strat.
QUAT
TERT
Pacific.C.

5 **KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986**
Site 587: Lansdowne Bank, southwest Pacific.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 115-138, 9 figs., 1 tb.
[Nannofossils by W.H. Lohman & E. Martini.]

strat.
QUAT
TERT.U.
Pacific.S.

6 **KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986**
Site 588: Lord Howe Rise, 26°S.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 139-252, 12 figs., 4 tbs.
[Nannofossils by W.H. Lohman & E. Martini.]

strat.
QUAT
TERT
Pacific.S.

A261		
1	**KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986** Site 589: Lord Howe Rise, 30°S. -In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 253-262, 6 figs., 1 tb. [Nannofossils by W.H. Lohman & E. Martini.]	strat. QUAT Pacific.S.
2	**KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986** Site 590: Lord Howe Rise, 31°S. -In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 263-376, 11 figs., 4 tbs. [Nannofossils by W.H. Lohman & E. Martini.]	strat. QUAT TERT.U. Pacific.S.
3	**KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986** Site 591: Lord Howe Rise, 31°S. -In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 377-486, 12 figs., 2 tbs. [Nannofossils by W.H. Lohman & E. Martini.]	strat. QUAT TERT.U. Pacific.S.
4	**KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986** Site 592: Lord Howe Rise, 36°S. -In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 487-550, 11 figs., 4 tbs. [Nannofossils by W.H. Lohman & E. Martini.]	strat. QUAT TERT Pacific.S.
5	**KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986** Site 593: Challenger Plateau. -In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 551-651, 13 figs., 3 tbs. [Nannofossils by W.H. Lohman & E. Martini.]	strat. QUAT TERT Pacific.S.
6	**KENNETT, J.P., VON DER BORCH, C.C., & SHIPBOARD SCIENTIFIC PARTY.** **1986** Site 594: Chatham Rise. -In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 1, pp. 653-744, 12 figs., 6 tbs. [Nannofossils by W.H. Lohman & E. Martini.]	strat. QUAT TERT.U. Pacific.S.
7	**KRHOVSHÝ, J.** **1985** Central Paratethys ecostratigraphic correlations in relation to the Oligocene sea-level changes. -Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 333-335, 1 fig.	abstr. strat. TERT.L. Europe.E.

A262

1 **LIN, M.** **1985**
History of the research of calcareous nannofossils [in China].
-Mar. Geol. & Quat. Geol., 5(1): 109-114, 2 figs.
(In Chinese with English abstract and figure captions.)

(syst)
REVIEW
Asia.E.

2 **LOHMAN, W.H.** **1986**
Calcareous nannoplankton biostratigraphy of the southern Coral Sea, Tasman Sea, and southwestern Pacific Ocean, Deep Sea Drilling Project Leg 90; Neogene and Quaternary.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 2, pp. 763-793, 5 figs., 10 tbs.

strat.
QUAT
TERT
Pacific.C.
Pacific.S.

3 **MAGARITZ, M., MOSHKOVITZ, S., BENJAMINI, C., HANSEN, H.J., HAKANSSON, E., & RASMUSSEN, K.L.** **1985**
Carbon isotope-, bio- and magnetostratigraphy across the Cretaceous-Tertiary boundary in the Zin Valley, Negev, Israel.
-Newsl. Stratigr., 15(2): 100-113, 4 figs.

strat.
CRET-TERT
boundary
Asia.SW.
ISOT.

4 **MANTON, I., & OATES, K.** **1985**
Calciosoleniaceae (coccolithophorids) from the Galapagos Islands: mineralized components and coccolith morphology in Anoplosolenia and Calciosolenia, with a comparative analysis of equivalents in the unmineralized genus Navisolenia (Haptophyceae = Prymnesiophyceae).
-Phil. Trans. R. Soc. Lond., B309(1140): 461-477, 20 figs., 1 tb.

syst.
RECENT
Pacific.C.
BIOL.

5 **MARTINI, E.** **1986**
Paleogene calcareous nannoplankton from the southwest Pacific Ocean, Deep Sea Drilling Project, Leg 90.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 2, pp. 747-761, 2 pls., 2 figs., 4 tbs., 1 app.
[Nannofossils by W.H. Lohman & E. Martini.]

strat.syst.
TERT.L.
Pacific.S.

6 **MARTINI, E., & JENKINS, D.G.** **1986**
Biostratigraphic synthesis, Deep Sea Drilling Project Leg 90 in the southwest Pacific Ocean.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 2, pp. 1459-1470, 8 figs., 1 tb.
[Nannofossils by W.H. Lohman and E. Martini.]

strat.
QUAT
TERT
Pacific.S.

A263

1	**MATEU, G.** **1985** Nanoplancton calcáreo pliocuaternario del Mar Balear (Mediterráneo Occidental: Implicaciones cronoestratigráficas y paleobiográficas. (Plio-Quaternary calcareous nannoplankton of the Balearic Sea (Western Mediterranean): Implications for chronostratigraphy and paleobiogeography.) -Revista. Esp. Micropal., 17(2): 167-200, 12 pls., 1 fig., 2 tbs. (In Spanish with English abstract.)	strat.syst. QUAT TERT.U. Mediterr. Europe.W.
2	**MAYER, L., THEYER, F., & SHIPBOARD SCIENTIFIC PARTY.** **1985** Introduction: background and explanatory notes, Deep Sea Drilling Project Leg 85, central equatorial Pacific. -In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 5-22, 12 figs., 1 tb. [Nannofossils by A. Pujos.]	strat. QUAT TERT Pacific.C.
3	**MAYER, L., THEYER, F., & SHIPBOARD SCIENTIFIC PARTY.** **1985** Site 571. [central equatorial Pacific] -In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 23-32, 7 figs., 2 tbs. [Nannofossils by A. Pujos.]	strat. QUAT Pacific.C.
4	**MAYER, L., THEYER, F., & SHIPBOARD SCIENTIFIC PARTY.** **1985** Site 572. [central equatorial Pacific] -In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 33-135, 18 figs., 3 tbs. [Nannofossils by A. Pujos.]	strat. QUAT TERT.U. Pacific.C.
5	**MAYER, L., THEYER, F., & SHIPBOARD SCIENTIFIC PARTY.** **1985** Site 573. [central equatorial Pacific] -In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 137-221, 16 figs., 3 tbs. [Nannofossils by A. Pujos.]	strat. QUAT TERT Pacific.C.
6	**MAYER, L., THEYER, F., & SHIPBOARD SCIENTIFIC PARTY.** **1985** Site 574. [central equatorial Pacific] -In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 225-329, 16 figs., 3 tbs. [Nannofossils by A. Pujos.]	strat. QUAT TERT Pacific.C.
7	**MAYER, L., THEYER, F., & SHIPBOARD SCIENTIFIC PARTY.** **1985** Site 575. [central equatorial Pacific] -In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 331-404, 17 figs., 3 tbs. [Nannofossils by A. Pujos.]	strat. QUAT TERT Pacific.C.

A264

1 **MEIN, P.** 1985
A new direct correlation between marine and continental scales in Rhodanian Miocene.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 377-379, 1 fig.

abstr.
strat.
TERT.U.
Europe.W.

2 **MÉSZÁROS, N.** 1985
Nannoplankton zones in the Miocene deposits of the Transylvanian Basin.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 380-382, 1 fig.

abstr.
strat.
TERT.U.
Europe.E.

3 **MONECHI, S.** 1985
Campanian to Pleistocene calcareous nannofossil stratigraphy from the northwest Pacific Ocean, Deep Sea Drilling Project Leg 86.
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 301-336, 14 pls., 10 tbs., 1 app.

strat.syst.
QUAT
TERT
CRET.U.
CRET-TERT boundary
Pacific.N.

4 **MONECHI, S., BLEIL, U., & BACKMAN, J.** 1985
Magnetobiochronology of Late Cretaceous - Paleogene and Late Cenozoic pelagic sedimentary sequences from the northwest Pacific (Deep Sea Drilling Project, Leg 86, Site 577).
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 787-797, 5 figs., 3 tbs.

strat.
QUAT
TERT
CRET.U.
CRET-TERT boundary
Pacific.N.

5 **MOREAU, M.G., FEINBERG, H., & POZZI, J.P.** 1985
Magnetobiostratigraphy of a Late Miocene section from the Moroccan Atlantic margin.
-Earth & Planet. Sci. Lett., 76(1/2):167-175,8 figs.,1 tb.

strat.
TERT.U.
Africa.N.

6 **MOSTAJO, E.L.** 1985
Nanoplancton calcáreo del Océano Atlántico Sur.
(Calcareous nannoplankton of the South Atlantic Ocean.)
-Revista Esp. Micropal., 17(2): 261-280, 4 pls., 6 figs.
(In Spanish with English abstract.)

syst.
RECENT
Atlantic.C.
Atlantic.S.
ECOL.

7 **MURRAY, D., & DYMOND, J.** 1985
The seasonal rain of microfossils and organic carbon to the deep sea in the equatorial Pacific.
-Transa., Amer. Geophys. Union, 66(51): 1275.

abstr.
RECENT
Pacific.C.
SEDIM.

A265

1 **NELSON, C.S., HENDY, C.H., & DUDLEY, W.C.** **1986** — strat. QUAT Pacific.S. ISOT.
Quaternary isotope stratigraphy of Hole 593, Challenger Plateau, South Tasman Sea: preliminary observations based on foraminifers and calcareous nannofossils.
-In: Kennett, J.P., von der Borch, C.C., et al., Init. Rep. DSDP, vol. 90, pt. 2, pp. 1413-1424, 5 figs., 3 tbs.

2 **NELSON, D.M., DUCKLOW, H.W., HITCHCOCK, G.L., ET AL.** **1985** — RECENT Atlantic.N. ECOL.
Distribution and composition of biogenic particulate matter in a Gulf Stream warm-core ring.
-Deep-Sea Res., 32(11): 1347-1369, 8 figs., 3 tbs.

3 **NOSOVSKY, M.F.** **1985** — abstr. strat. TERT.U. Europe.E. Russia
Correlation of the USSR south Neogene and Carpathian-Balcan region.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 424-426, 1 fig.

4 **NOWAK, W., GEROCH, S., & GASIŃSKI, A.** **1985** — abstr. strat. TERT Europe.E.
Oligocene/Miocene boundary in the Carpathians.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 427-429, 1 fig.

5 **OBERHÄNSLI, H.** **1986** — strat. TERT CRET.U. CRET-TERT boundary Indian.Oc. ISOT.
Latest Cretaceous-Early Neogene oxygen and carbon isotopic record at DSDP sites in the Indian Ocean.
-Mar. Micropal., 10(1-3): 91-115, 4 figs., 5 tbs.

6 **OWENS, J.P., & GOHN, G.S.** **1985** — strat. CRET.L. America.N. Atlantic.N.
Depositional history of the Cretaceous Series in the U.S. Atlantic Coastal Plain: stratigraphy, paleoenvironments, and tectonic controls of sedimentation.
-In: Poag, C.W., (ed.), Geologic Evolution of the United States Atlantic Margin. Van Nostrand Reinhold, New York, pp. 25-86, 22 figs., 1 tb.

7 **PALENIK, B., & MOREL, F.M.M.** **1985** — abstr. RECENT BIOL.
Hydrogen peroxide production by marine phytoplankton.
-Transa., Amer. Geophys. Union, 66(51): 1266.

8 **PALMER, A.A.** **1986** — (strat) TERT.U. America.N.
Miocene radiolarian biostratigraphy, U.S. mid-Atlantic Coastal Plain.
-Micropal., 32(1): 19-31, 1 pl., 4 figs., 2 tbs., 1 app.

A266

1 **PERCH-NIELSEN, K.** **1985**
Cenozoic calcareous nannofossils.
-In: Bolli, H.M., Saunders, J.B., & Perch-Nielsen, K., (eds.), Plankton Stratigraphy. Cambridge Univ. Press, Cambridge, pp. 427-554, 91 figs., 1 app., index.

strat.syst.
RECENT
QUAT
TERT
Overview

2 **PERCH-NIELSEN, K.** **1985**
Mesozoic calcareous nannofossils.
-In: Bolli, H.M., Saunders, J.B., & Perch-Nielsen, K., (eds.), Plankton Stratigraphy, Cambridge Univ. Press, Cambridge, pp. 329-426, 92 figs., 1 app., index.

strat.syst.
CRET
JURA
Overview

3 **PERYT, D.** **1985**
Calcareous nannoplankton of the Middle Miocene of the Roztocze Region (SE Poland).
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, p. 454.

abstr.
strat.
TERT.U.
Europe.E.

4 **PEVEAR, D.R., & GRABOWSKI, G.J., JR.** **1985**
Geology and geochemistry of the Toolebuc Formation, an organic-rich chalk from the lower Cretaceous of Queensland, Australia.
-In: Crevello, P.D., & Harris, P.M., (eds.), Deep-Water Carbonates: Buildups, Turbidites, Debris Flows and Chalks --A Core Workshop. SEPM Core Workshop no. 6, pp. 303-341, 17 figs., 4 tbs.
[The Toolebuc Formation is Late Albian.]

(syst)
CRET.M.
Australasia
SEDIM.
DIAG.

5 **PEVZNER, M.A.** **1985**
The Pontian of East Paratethys: duration and position in the magnetochronological scale.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 459-460.

abstr.
strat.
TERT.U.
Europe.E.

6 **PEVZNER, M.A., & VANGENGEIM, E.A.** **1985**
Magnetostratigraphy and correlation of biostratigraphic subdivisions of the Paratethian and Mediterranean Neogene.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 461-462, 1 fig.

abstr.
strat.
TERT.U.
Europe.E.
Medit.Area.

7 **PILSKALN, C.H., NEUMANN, A.C., & BANE, J.M.** **1985**
Periplatform carbonate flux in Northwest Providence Channel, Bahamas: results from a 2-month sediment trap experiment.
-Transa., Amer. Geophys. Union, 66(51): 1293.

abstr.
RECENT
Atlantic.C.
SEDIM.

A267

1 **POPESCU, G.** **1985** abstr. strat. TERT.U. Europe.E.
Microbiostratigraphic correlation of marine Middle Miocene in Central Paratethys.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 478-480, 2 figs.

2 **PROTHERO, D.R., & RENSBERGER, J.M.** **1985** (strat) TERT America.N.
Preliminary magnetostratigraphy of the John Day Formation, Oregon, and the North American Oligocene-Miocene boundary.
-Newsl. Stratigr., 15(2): 59-70, 7 figs., 1 tb.

3 **PUJOS, A.** **1985** strat.syst. TERT Pacific.C.
Cenozoic nannofossils, central equatorial Pacific, Deep Sea Drilling Project Leg 85.
-In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 581-607, 3 pls., 4 figs., 5 tbs., 1 app.

4 **PUJOS, A.** **1985** strat.syst. QUAT Pacific.C.
Nannofossils from Quaternary deposits in the high-productivity area of the central equatorial Pacific, Deep Sea Drilling Project Leg 85.
-In: Mayer, L., Theyer, F., et al., Init. Rep. DSDP, vol. 85, pp. 553-579, 3 pls., 11 figs., 2 tbs., 1 app.

5 **REIMERS, D.D.** **1985** Bibl. syst.
Index and bibliography of the genus Discoaster.
-INA Newsl., 7(3): 146-171.

6 **REIMERS, D.D., & DAIGRE, D.O.** **1985** syst. TERT.L.
Discoaster orbis nom. nov. pro Discoaster circularis FURRAZOLA-BERMUDEZ and KREISEL, 1972, non HOFFMANN, 1970.
-INA Newsl., 7(3): 172.

7 **RENARD, M.** **1986** strat. QUAT TERT CRET JURA.U. ECOL. Worldwide
Pelagic carbonate chemostratigraphy (Sr, Mg, ^{18}O, ^{13}C).
-Mar. Micropal., 10(1-3): 117-164, 23 figs., 1 tb.

8 **ROTH, P.H., & KRUMBACH, K.R.** **1986** strat. CRET.M. Atlantic Indian.Oc. ECOL. DIAG.
Middle Cretaceous calcareous nannofossil biogeography and preservation in the Atlantic and Indian oceans: implications for paleoceanography.
-Mar. Micropal., 10(1-3): 235-266, 28 figs., 14 tbs.

A268

1 **SCHATZINGER, R.A., FEAZEL, C.T., & HENRY, W.E.** **1985**
Evidence of resedimentation in chalk from the Central Graben, North Sea.
-In: Crevello, P.D., & Harris, P.M., (eds.), Deep-Water Carbonates: Buildups, Turbidites, Debris Flows and Chalks --A Core Workshop. SEPM Core Workshop no. 6, pp. 342-385, 16 figs.
strat. TERT.L. CRET.U. Atlantic.N. SEDIM.

2 **SCHRANK, E., & PERCH-NIELSEN, K.** **1985**
Late Cretaceous palynostratigraphy in Egypt with comments on Maastrichtian and Early Tertiary calcareous nannofossils.
-Newsl. Stratigr., 15(2): 81-99, 2 pls., 4 figs.
strat. CRET-TERT boundary Africa.N.

3 **SEMENENKO, V.N., & LULIEVA, S.A.** **1985**
About the Miocene-Pliocene boundary in Paratethys.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 507-508.
abstr. strat. TERT.U. Europe.E.

4 **SHAFIK, S.** **1985**
Cretaceous coccoliths in the middle Eocene of the western and southern margins of Australia: evidence of a significant reworking episode.
-BMR Jour. Austral. Geol. & Geophys., 9(4): 353-359, 6 figs., 1 app.
strat. TERT.L. CRET.U. Australasia

5 **SHOWERS, W.J., & MARGOLIS, S.V.** **1985**
Evidence for a tropical freshwater spike during the last glacial/interglacial transition in the Venezuela Basin: $\delta^{18}O$ and $\delta^{13}C$ of calcareous plankton.
-Mar. Geol., 68(1/4): 145-165, 4 figs., 4 tbs., 1 app.
strat.(syst) QUAT Atlantic.C. ISOT.

6 **SIERACKI, M.E., & WEBB, K.L.** **1985**
A color video analysis system for studying pico- and nanoplankton populations.
-Transa., Amer. Geophys. Union, 66(51): 1298.
abstr. RECENT TECH.obs.

7 **SIERRO,F.J., FLORES,J.A., CIVIS,J., & GONZALEZ DELGADO,J.A.** **1985**
New criteria for the establishment of a correlation between the Andalusian and the Messinian stages.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 514-516, 1 fig.
abstr. strat. TERT.U. Europe.W.

8 **STEINMETZ, J.C.** **1985**
Bibliography and taxa of calcareous nannoplankton-VI.
-INA Newsl., 7(3): 122-145.
Bibl. syst.

A269

1 **SUJITNO, T., & TAUPITZ, K.C.** **1985** | abstr. strat. TERT.U. Europe.E. Mediterr. Asia.E.
Middle-Upper Miocene coal deposits in Greece and Turkey (Aegean Sea) and Sumatra (Indonesia), a comparison.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 535-538, 1 fig.

2 **TAKAYAMA, T., SATO, T., & CLEMENT, B.M.** **1985** | abstr. strat. TERT.U. Atlantic.N.
Coccolith datum planes and their calibration to magneto-stratigraphy.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, p. 547.

3 **THUNELL, R., WILLIAMS, D., TAPPA, E., HOWELL, M., RAFFI, I., RIO, D., & SPROVIERI, R.** **1985** | abstr. strat. TERT.U. Mediterr. Medit.Area.
Late Neogene paleoenvironment of the Mediterranean: micro-paleontological and geochemical studies of deep sea and land-based marine records.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, pp. 558-559.

4 **TOKER, V.** **1985** | strat.(syst) TERT.U. Europe.E.
Korkuteli Yöresi Miyosen Nannoplankton Biyastratigrafisi. (Miocene nannoplankton biostratigraphy of the Korkuteli region.)
-Black Sea Univ. Bull., Geol., 4(1-2): 9-21, 2 pls., 8 figs., 1 tb.
(In Turkish with English abstract and plate, figure, and table captions.)

5 **TOKER, V., & ERKAN, E.** **1985** | strat.(syst) TERT.L. Europe.E.
Nannoplankton biostratigraphy of Eocene formation in the Gelibolu Peninsula.
-Bull. Min. Res. & Explor. Inst. Turkey, no. 101/102, pp. 25-44, 2 pls., 4 figs., 1 tb.

6 **VINCENT, E.** **1985** | strat. QUAT TERT.U. Pacific
Distribution stratigraphique de la teneur en carbonate dans les sédiments néogènes et quaternaires de l'océan Pacifique. (Carbonate stratigraphy of Neogene and Quaternary deep-sea sediments from the Pacific.)
-Bull. Soc. géol. France, (8), 1(6): 915-924, 7 figs., 1 tb.
(In French with English abstract, figure, and table captions.)

A270

1 **VON HUENE, R., AUBOUIN, J., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 565. [Costa Rica margin]
-In: von Huene, R., Aubouin, J., et al., Init. Rep. DSDP, vol. 84, pp. 21-77, 16 figs., 2 tbs.
[Nannofossils by M. Filewicz.]
strat. QUAT TERT.U. Pacific.C.

2 **VON HUENE, R., AUBOUIN, J., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 566. [Guatemala margin]
-In: von Huene, R., Aubouin, J., et al., Init. Rep. DSDP, vol. 84, pp. 79-109, 16 figs., 5 tbs.
[Nannofossils by M. Filewicz.]
strat. QUAT TERT.U. Pacific.C.

3 **VON HUENE, R., AUBOUIN, J., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 567. [Guatemala margin]
-In: von Huene, R., Aubouin, J., et al., Init. Rep. DSDP, vol. 84, pp. 111-166, 24 figs., 5 tbs.
[Nannofossils by M. Filewicz.]
strat. QUAT TERT CRET.U. Atlantic.C.

4 **VON HUENE, R., AUBOUIN, J., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 568. [Guatemala margin]
-In: von Huene, R., Aubouin, J., et al., Init. Rep. DSDP, vol. 84, pp. 167-232, 17 figs., 5 tbs.
[Nannofossils by M. Filewicz.]
strat. QUAT TERT.U. Pacific.C.

5 **VON HUENE, R., AUBOUIN, J., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 569. [Guatemala margin]
-In: von Huene, R., Aubouin, J., et al., Init. Rep. DSDP, vol. 84, pp. 233-281, 15 figs., 4 tbs.
[Nannofossils by M. Filewicz.]
strat. QUAT TERT Pacific.C.

6 **VON HUENE, R., AUBOUIN, J., & SHIPBOARD SCIENTIFIC PARTY.** **1985**
Site 570. [Guatemala margin]
-In: von Huene, R., Aubouin, J., et al., Init. Rep. DSDP, vol. 84, pp. 283-336, 16 figs., 6 tbs.
[Nannofossils by M. Filewicz.]
strat. QUAT TERT Pacific.C.

7 **WANG, P., & CHENG, X.** **1985**
Distribution of calcareous nannoplankton in the East China Sea.
-In: Wang, P., et al., Marine Micropaleontology of China. China Ocean Press, Beijing [or Springer-Verlag, Berlin], pp. 218-228, 3 pls., 4 figs., 3 tbs.
syst. RECENT Pacific.N. SEDIM.

A271

1 **WANG, P., MIN, Q., & BIAN, Y.** **1984** (syst) RECENT Pacific.C. ECOL. SEDIM.
Bathymetric distribution of planktonic calcareous microfossils in bottom sediments of the East China Sea and its geological significance.
-Acta Micropal. Sinica, 1(2): 105-118, 1 pl., 6 figs., 5 tbs.
[In Chinese with English abstract and plate captions.]

2 **WANG, P., XIA, L., & CHEN, X.** **1985** strat.syst. TERT.U. Pacific.N.
Neogene biostratigraphy in the northern shelf of the South China Sea.
-In: Wang, P., et al., Marine Micropaleontology of China. China Ocean Press, Beijing [or Springer-Verlag, Berlin], pp. 291-303, 1 pl., 3 figs., 2 tbs.

3 **WANG, P., ET AL.** **1985** strat.syst. RECENT QUAT TERT Asia.E. Pacific.N. Pacific.C. SEDIM.
Marine Micropaleontology of China.
-China Ocean Press, Beijing [or Springer-Verlag, Berlin], 377 pp., 38 pls., 256 figs.

4 **WEEDON, G.P.** **1986** JURA.L. Europe.W. SEDIM.
Hemipelagic shelf sedimentation and climatic cycles: the basal Jurassic (Blue Lias) of South Britain.
-Earth & Planet. Sci. Lett., 76(3/4): 321-335, 7 figs.

5 **WEFER, G., & HONJO, S.** **1985** abstr. RECENT Arctic SEDIM.
Material flux under MIZ in the Fram Strait.
-Transa., Amer. Geophys. Union, 66(51): 1271.
[MIZ is an abbreviation for Marginal Ice Zone.]

6 **WELSCHMEYER, N.** **1985** abstr. RECENT Pacific.N. BIOL. ECOL.
A pigment-based analysis of phytoplankton growth rates and abundances in the subarctic Pacific: Project SUPER.
-Transa., Amer. Geophys. Union, 66(51): 1273.

7 **WRAY, J.L.** **1985** abstr. strat. TERT.U. Africa.N.
Miocene subsidence history and depositional facies, Nile Delta, Egypt.
-Reg. Comm. Medit. Neogene Strat., 8th Congress, Budapest, Abstracts, p. 618.

A272

1 **WRIGHT, A.A., BLEIL, U., MONECHI, S., MICHEL, H.V., SHACKLETON, N.J., SIMONEIT, B.R.T., & ZACHOS, J.C.** **1985**
Summary of Cretaceous/Tertiary boundary studies, Deep Sea Drilling Project Site 577, Shatsky Rise.
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 799-804, 2 figs.

strat.
CRET-TERT
boundary
Pacific.N.
ISOT.

2 **ZACHOS, J.C., ARTHUR, M.A., THUNELL, R.C., WILLIAMS, D.F., & TAPPA, E.J.** **1985**
Stable isotope and trace element geochemistry of carbonate sediments across the Cretaceous/Tertiary boundary at Deep Sea Drilling Project Hole 577, Leg 86.
-In: Heath, G.R., Burckle, L.H., et al., Init. Rep. DSDP, vol. 86, pp. 513-532, 4 pls., 9 figs., 4 tbs.
[Nannofossils by S. Monechi.]

strat.(syst)
CRET-TERT
boundary
Pacific.N.
ISOT.

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Other Titles

3 **LOWRIE, W., & OGG, J.G.** **1986**
A magnetic polarity time scale for the Early Cretaceous and Late Jurassic.
-Earth & Planet. Sci. Lett., 76(3/4): 341-349, 3 figs., 1 tb.

strat.
CRET.L.
JURA.U.
Worldwide

4 **GRADSTEIN, F.M., AGTERBERG, F.P., BROWER, J.C., & SCHWARZACHER, W.S.** **1985**
Quantitative Stratigraphy.
-D. Reidel Publ. Co., Dordrecht, Holland, 598 pp., 1 app.

strat.
TECH.num.

5 **ODIN, G.S., & CURRY, D.** **1985**
The Palaeogene time-scale: radiometric dating versus magnetostratigraphic approach.
-J. geol. Soc. London, 142(6): 1179-1188, 5 figs.

strat.
TERT.L.
Worldwide

6 **SCOTT, G.H.** **1985**
Homotaxy and biostratigraphic theory.
-Palaeontol., 28(4): 777-782, 1 fig.

strat.

7 **THUNELL, R.** **1986**
Review of Elements of Micropalaeontology, by G. Bignot (1985). [A234-7]
-AAPG Bull., 70(1): 95.

Review

B133

<u>Discoaster mirabilis</u> DUAN 1985; pp. 99-100 (Chinese), p. 109 (English), pl. 1, figs. 11-12, text-fig. 2, Zhoujiangkou Basin, South China Sea, Late Miocene. A257-2

<u>Discoaster orbis</u> REIMERS & DAIGRE 1985; p. 172; (ex <u>Discoaster circularis</u> FURRAZOLA-BERMUDEZ & KREISEL 1972). A267-6

<u>Helicosphaera wallichii</u> (LOHMANN 1902) DUAN 1985; p.98; (ex <u>Coccosphaera</u>). Invalid ICBN, Art. 11.3, by reason of priority. This combination was published by OKADA & McINTYRE 1977, A5-8. A257-1

<u>Pseudoemiliania? regularis</u> DUAN 1985; p. 97, pl. 2, fig.5; northern South China Sea, Quaternary. [Description in Chinese.] A257-1

<u>Reticulofenestra doronicoides</u> (BLACK & BARNES 1961) PUJOS 1985; p. 594. Invalid ICBN, Art. 33.2, basionym of the new combination is not clearly indicated. A267-3

"<u>Reticulofenestra</u>" <u>tagana</u> (FONSECA 1976) PUJOS 1985; pp. 594-595; (ex <u>Coccolithus</u>). A267-3

<u>Sphenolithus elongatus</u> MARTINI 1986; pp. 753-754, pl. 2, figs. 7-8, Lord Howe Rise, southwest Pacific Ocean, upper Oligocene, Zone NP 25 <u>Sphenolithus ciperoensis</u> Zone). A262-5

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<u>Species names in alphabetical order</u>.

doronicoides, Reticulofenestra *
elongatus, Sphenolithus
mirabilis, Discoaster
orbis, Discoaster
regularis, Pseudoemiliania?
tagana, "Reticulofenestra"
wallichii, Helicosphaera *

* = Invalid.

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Clarifications

The following abstracts were distributed at the INA meeting in Vienna in September 1985, but they were not published. They were referenced in INA Newsletter 7(3) without page numbers. Simultaneously, they were published in the same edition of the Newsletter, so the complete references for each abstract follow:

A241-7	INA Newsl., 7(3): 175, 1 fig.
A243-5	INA Newsl., 7(3): 173.
A244-7	INA Newsl., 7(3): 176-178, 3 figs.
A250-8	INA Newsl., 7(3): 174.
A251-1	INA Newsl., 7(3): 174.

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Effective Publication Dates of DSDP Init. Reps.

According to the International Code of Botanical Nomenclature (Art. 30), the effective publication date is that on which the printed matter became available (i.e., the date it was mailed or placed on sale). Mailing dates are, hence, more appropriate than publication dates in matters of establishing priority.

The following publication dates and mailing dates are supplied for the respective DSDP volumes (data for previous volumes were listed in INA Newsl., 2(2), 3(1), 3(2), 4(1), and 5(1)):

Volume	Publication date	Mailing date
70	Apr 1983	Apr 1983
71	Sep 1983	Sep 1983
72	Dec 1983	Dec 1983
73	Jan 1984	Jan 1984
74	Mar 1984	Mar 1984
75	Jun 1984	Jun 1984
76	Nov 1983	Nov 1983
77	Sep 1984	Sep 1984
78	Aug 1984	Aug 1984
79	Nov 1984	Nov 1984
80	Mar 1985	Mar 1985
81	Dec 1984	Jan 1985
82	Jun 1985	Jun 1985
83	Apr 1985	Apr 1985
84	May 1985	May 1985

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Corrections

A163-3 & B105: Bipodorhabdus brooksii (BUKRY 1969) CRUX 1982; Invalid ICBN, Art. 11.3, by reason of priority. Amphizygus BUKRY 1969 has priority over Bipodorhabdus NOEL 1970.

A233-2: Nannolankton is, of course, spelled Nannoplankton!!

A239-7: CRET.E. should be CRET.L. in the keywords.

A240-8: Add Europe.W. to the keywords.

A241-8: An unintended duplication of reference A241-7.

A242-9, A251-4, & A252-5: Correct reference is: Meded. Rijks Geol. Dienst, 38(2).

A245-6: Correct reference is: INA Newsl., 7(2): 78-79.

A254-1: Pays-Bays should be spelled Pays-Bas.

A254-7: Correct title is: Book review: International Code of Botanical Nomenclature, Sydney 1981; Stafleu, F.A., (ed.), 1983.

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Reprints, comments, and corrections are always welcome. Please send them to:

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NEW COMBINATION OF THREE SPECIES OF ASTEROLITHS ORIGINALLY ADSCRIBED TO *Discoaster* TAN, 1927

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THEODORIDIS (1983) presents an interesting work, broadened and detailed in the later paper of 1984, in which in agreement with previous designations and other modified descriptions, this author concludes that the genus *Discoaster* TAN (extensively employed in the literature) may be separated into *Eu-discoaster* and *Helio-discoaster*. It is the structural characteristics which permit such a differentiation; in particular the rectilinear or curved trace of the sutures of the central area (see THEODORIDIS, 1984; pp.136-139) together with the general form of the asteroliths. To these determinant features, readily observable in most taxons, should be added the difference in chronostratigraphic distribution of the two Genera. In this sense, authors such as BUKRY (1971), although no explicit mention is made of this new terminology, point to these differences. THEODORIDIS (1984) refers literally to the realm of *Helio-discoaster* in the Paleogene and *Eu-discoaster* in the Neogene (pp. 135).

According to these premises, with reference to a large number of observations of samples taken from Neogene Sediments of the Guadalquivir Basin (SW Spain) and from some D.S.D.P. sites (135-3 and 2, 136-1, 416A-1, 118-4 and 5, and 415-2), FLORES (1985) considers it of convenience to recombine the following species*

Eu-discoaster adamanteus (BRAMLETTE & WILCOXON, 1967) n. comb.

Basionym: *Discoaster adamanteus* BRAMLETTE & WILCOXON, 1967: Tul. Stud. Geol. Paleont., 5(3); pp. 108, pl. 7, fig. 6

Eu-discoaster challengeri (BRAMLETTE & RIEDEL, 1954) n. comb.

Basionym: *Discoaster challengeri* BRAMLETTE & RIEDEL, 1954: J. Paleont., 28(4); pp. 401, pl. 39, fig. 10

Eu-discoaster icarus (STRADNER, 1973) n. comb.

Basionym: *Discoaster icarus* STRADNER, 1973: Init. Rep. DSDP, 13 (II); pp.1138-1139, tex. fig. 1; pl. 41, fig. 10

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*) *Recombination presented in the author's Ph. D. Thesis. This work constitutes a review and summary of the new combinations presented in the Thesis.*

According to articles 29 and 33 of the ICBN, the present note may be considered official (for the purposes of publication and publicity) of the new term.

In the case of *Eu-discoaster adamanteus*, the regularity of recordings in the different cores and sections with different conservation states, together with the practically invariable morphology, have promted us to accept the term as valid and it is not merely a product of diagenesis. However, we are aware that this point requires further confirmation using other types of exhaustive analyses which would offer better guarantees.

In the case of *Eu-discoaster challengeri* and *Eu-discoaster icarus*, similar to *Eu-discoaster exilis* and/or *Eu-discoaster variabilis* and *Eu-discoaster parsus* and/or *Eu-discoaster variabilis*, respectively, we have observed evident differences which have previously been reported in the works of, MARTINI & BRAMLETTE (1963), COHEN (1964), BUKRY & PERCIVAL (1971), CLOCCHIATTI (1971), MARTINI & WORSLEY (1971), ELLIS et al. (1972), STRADNER (1973), LEHOTAYOVA (1975), SAN MIGUEL (1976, 1977) and HOJJATZEDEH (1978), among others, with which in general terms we concord.

CITED REFERENCES.-

BRAMLETTE, M.N. & RIEDEL, W.R.(1954).- Stratigraphic value of Discoasters and some other microfossils related to recent Coccolithophores. J.Paleont., 28, 385-403

BRAMLETTE; M.N. & WILCOXON, J.A.(1967).- Middle Tertiary calcareous nannoplakton of the Cipero section, Trinidad, W.I. Tul. Stud. Geol. Paleont. 5, 93-131

BUKRY, D.(1971).- Discoaster evolutionary trends. Micropaleontology, 17, 43-52

BUKRY, D. & PERCIVAL, S.F.(1971).- New Tertiary calcareous nannofossils. Tul. Stud. Geol. Paleont., 8, 123-146

CLOCCHIATTI, M.(1971).- Contribution a l'etude du nannoplancton calcaire du Neogene d'Afrique du Nord. Mem. Mus. Nat. Hist. Nat. Ser. C,23, 7-135

COHEN, D.(1964).- Coccolithophorids and Discoasters from Adriatic botton sediments. Leds. Geol. Medid. 35, 1-44

ELLIS, C.H., LOHMAN, W.H. & WRAY, J.L.(1972).- Upper Cenozoic calcareous nannofossils from the Gulf of Mexico (Deep Sea Drilling Project,Leg 1, site 3). Quart. Colorado Sch. Mines, 67(3), 1-103

FLORES, J.A. (1985).- Nanoplancton calcáreo en el Neógeno del borde norocciden tal de la Cuenca del Guadalquivir (S.O. de España). Tes. Doct. Un. Salamanca. 1-714. Resumen. Ed. Un. Salamanca,1-37

HOJJATZADEH, M.(1978).- Discoasters of the Blue Clay (Middle Miocene) of Malta and Gozo. Geol. Mag. 115(1), 1-19

MARTINI, E. & BRAMLETTE, M.N.(1963).- Calcareous nannoplankton from the experimental Mohole drilling. J. Paleont. 37, 845-856

MARTINI, E. & WORSLEY, T.(1971).- Tertiary calcareous nannoplankton from the Western Ecuatorial Pacific. In. E.L. Winterer et al. Init. Rep. DSDP, 7(II), 1471-1507

SAN MIGUEL, M.(1976).- Estudio del nanoplancton calcáreo del Estrecho Nort-Bético. Mem. Tes. Doc. Un. Complutense Madrid, 1-334

SAN MIGUEL, M.(1977).- Contribución al estudio de los Discoastéridos. Bol.R. Soc.Esp.Hist.Nat. 75(1-4), 115-165

STRADNER, H.(1973).- Catalogue of Calcareous Nannoplankton from sediments of Neogene age in the Eastern North Atlantic and Mediterranean Sea. In: W.B.F. RYAN, K.J. HSU, et al. Init. Rep. DSDP, 13(II), 1137-1199

THEODORIDIS, S.A.(1983).- On the legitimacy of the generic name Discoaster TAN, 1927 ex TAN, 1931. INA newsl. 5(1), 15-21

-- (1984).- Calcareous nannofossil biozonation of the Miocene and revision of the Helicoliths and Discoasters. Utrecht Micropal. Bull. 32, 1-271

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UFO 3: A nannofossil found in the middle Eocene from the Aquitaine Basin, S.W. France.

by Catherine Mancion
6, Square Léon Blum, 92800 Puteaux, France.

Tiny nannofossil, possibly barrel-shaped, with a circular, 5.3u wide basal disc consisting of 24 elements arranged in a subradial manner. The disc is gently depressed over 2/3 of its area. The structure of its center is unclear due to preservation. The side view was not observed but the lateral wall appears to be formed of overlapping plates.

Location: Found in middle Eocene blue marls exposed in the Miretrain Quarry (Aquitaine basin). The nannofossil assemblage found in these marls includes *Chiasmolithus gigas, Discoaster martinii, Nannotetrina cristata, N. fulgens* and *Rhabdosphaera gladius* and is diagnostic of Zone NP 15. The planctonic foraminifera indicate the *Globigerinatheka subconglobata subconglobata* Zone of Bolli (1957, 1966).

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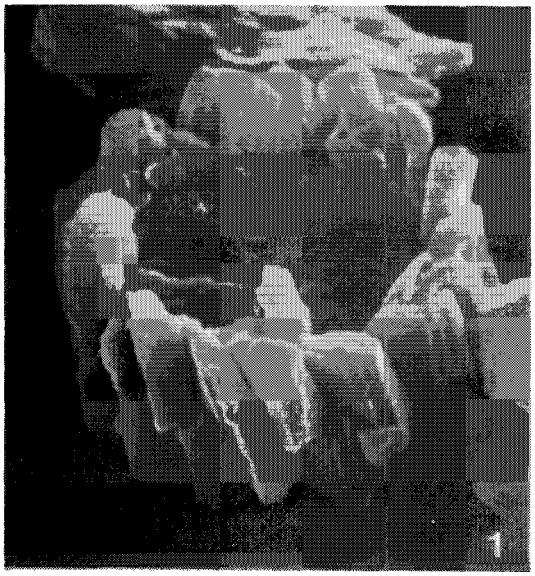
PLATE 1

M. Jakubowski: New calcareous nannofossil taxa from the Lower Cretaceous of the North Sea.

Figs. 1, 10-11: *Eprolithus varolii* JAKUBOWSKI nov. sp.
Fig. 1: Holotype, B.P./Pal 2891; side view, x 10000; Sample OG 57, Otto Gott.
Figs. 10-11: Paratype, MJ/06/85/14-15; Fig.10, phase contrast. Fig.11, cross-polarized light, x 2400; Sample Sun Oil 20/7-A1, 6720'.

Figs. 2-3, 12-13: *Gartnerago praeobliquum* JAKUBOWSKI nov. sp.
Figs. 2-3: Holotype, MJ/N2/18-19; Fig.2, phase contrast, Fig.3, cross-polarized light, x 2400; Sample Occidental 13/28-1, 4780'.
Figs. 12-13: Paratype, MJ/06/85/8-9; Fig.12, phase contrast, Fig. 13, cross-polarized light, x 2400; Sample Sun Oil 20/7-A1, 7040'.

PLATE I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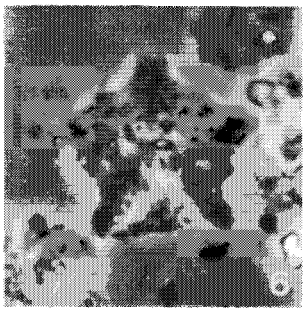
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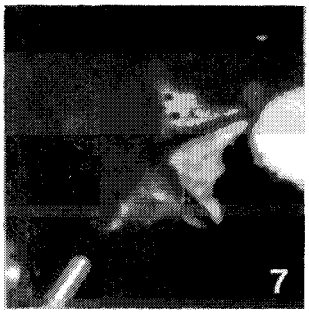
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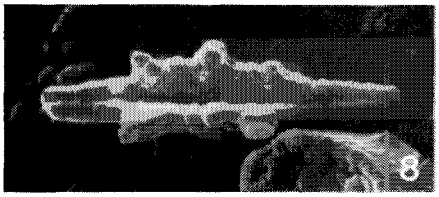
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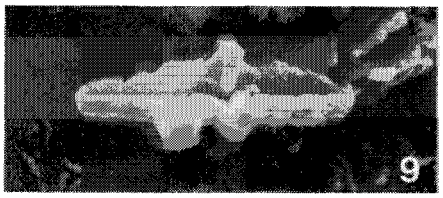
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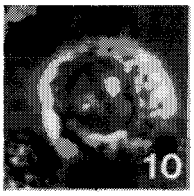
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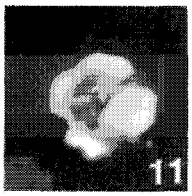
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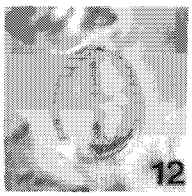
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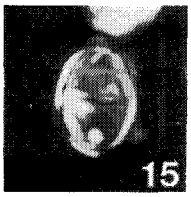
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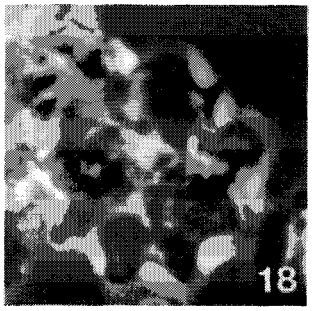
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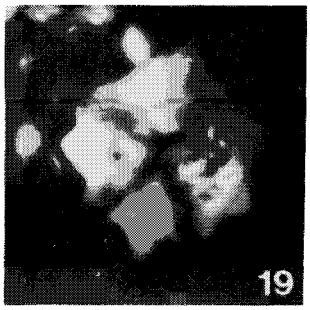
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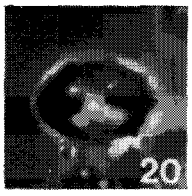
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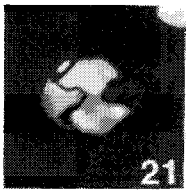
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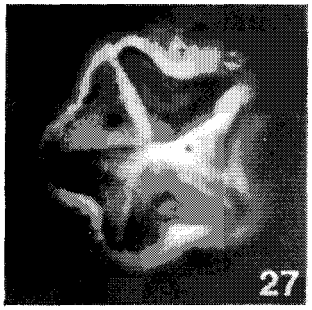
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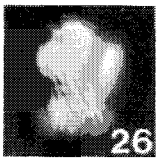
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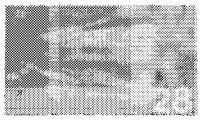
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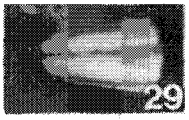
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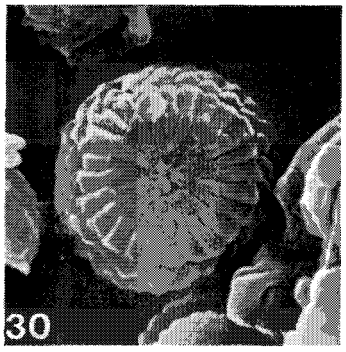
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(PLATE 1, cont.)

Figs. 4-5, 8-9: *Lithraphidites moray-firthensis* JAKUBOWSKI nov. sp.
Fig. 8: Holotype, MJ/S2/21; side view, x 5800; Sample B.P. 14/4-1, 1320m.
Fig. 9: Paratype, MJ/S2?15; side view, x 5800; Sample B.P. 14/4-1, 1320m.
Figs. 4-5: Paratype, MJ/06/85/24-25; Fig.4, phase contrast, Fig.5, cross-polarized light, x 2400; Sample B.P. 14/4-1, 1320m.

Figs. 6-7: *Micrantholithus brevis* JAKUBOWSKI nov. sp.
Holotype, MJ/08/85/35-36, Sample B.P. 14/4-1, 1685.5m, x 2400; Fig.6, phase contrast, Fig.7, cross-polarized light.

Figs. 14-15: *Gartnerago theta* (BLACK, 1959) JAKUBOWSKI nov. comb.
Sample Sun Oil 20/7-A1, 5990', x 2400; Fig.14, phase contrast, Fig.15, cross-polarized light.

Figs. 16-17: *Crucibiscutum salebrosum* (BLACK, 1971) JAKUBOWSKI nov. comb.
Sample S-19, x 2400; Fig.16, phse contrast, Fig.17, cross-polarized light.

Figs. 18-19: *Micrantholithus speetonensis* PERCH-NIELSEN 1979; Sample B.P. 14/4-1, 1660m, x 2400; Fig.18, phase contrast, Fig.15, cross-polarized light.

Figs. 20-23: *Phanulithus anfractus* JAKUBOWSKI nov. sp.
Figs. 20-21: Holotype, MJ/04/85/30-31; Fig.20, phase contrast, Fig.21, cross-polarized light, x 2400; Sample Texaco 15/16-5, 11420'.
Figs. 22-23: Paratype, MJ/01/85/11-12; Fig.22, phase contrast, Fig.23, cross-polarized light, x 2400; Sample Sun Oil 20/7-A1, 6200'.

Figs. 24-26: *Conusphaera rothii* (THIERSTEIN, 1971) JAKUBOWSKI nov. comb.
Sample Sun Oil 20/7-A1, 7400', x 2400; Fig.24, phase contrast, Figs.25-26, cross-polarized light.

Fig. 27: *Micrantholithus obtusus* STRADNER, 1963; Sample Nettleton AF-1, x 2400, phase contrast.

Figs. 28-29: *Conusphaera mexicana* TREJO, 1969; Sample East Madagascar well, x 2400; Fig.28, phase contrast, Fig.29 cross-polarized light.

C. Mancion: UFO 3: A nannofossil found in the middle Eocene from the Aquitaine Basin, S.W. France.

Fig. 30: UFO 3, 4500 x.

NEW CALCAREOUS NANNOFOSSIL TAXA FROM THE LOWER CRETACEOUS OF THE NORTH SEA

Martin Jakubowski, Robertson Research International Ltd., Llandudno, Gwynedd North Wales, U.K.

During the investigation of several well sections from the Moray Firth Basin of the North Sea a number of new species were discovered. A new genus, five new species and four new combinations are described. The samples were examined from released well sections under light and scanning electron microscopes. All holotypes and paratypes are light and electron microscope negatives and are deposited at Robertson Research (Llandudno), except for the holotype of *Eprolithus varolii* which is deposited at British Petroleum's Research Laboratory.

GENUS: *Crucibiscutum* gen. nov.

Type species: *Cruciplacolithus salebrosus* BLACK (1971)

Diagnosis: Small elliptical coccoliths consisting of two shields made up of imbricating elements. The central area is spanned by a cross which is orientated along the principal axes of the ellipse. The distal shield, which is slightly larger, is connected to the proximal shield via a central tube.

Remarks: This new genus has been erected to accommodate the species *Cruciplacolithus salebrosus* BLACK (1971) and *Cruciplacolithus hayi* BLACK (1973) which cannot easily be placed into any existing genera. The Tertiary genus *Cruciplacolithus* HAY and MOHLER (1967) has two cycles in the proximal shield whereas *Crucibiscutum* has only one. *Crucibiscutum* differs from *Biscutum* BLACK (1959) by having an axial cross in the central area instead of an imperforate central area filled with granules. It can be separated from *Palaeopontosphaera* NOEL (1965), which possesses only a transverse bar in the central area, through which passes an axial canal. Finally, it differs from *Sollasites* BLACK (1967) which has a crossbar in the short axis but also has several crossbars parallel or subparallel to the long axis of the ellipse. The following new combinations are introduced.

Crucibiscutum salebrosum (BLACK, 1971) JAKUBOWSKI, nov. comb. plate 1, figs. 16-17.

1971 *Cruciplacolithus salebrosus* BLACK, 1971, p. 379; plate 30, fig. 4.

Crucibiscutum hayi (BLACK, 1973) JAKUBOWSKI, nov. comb.

1973 *Cruciplacolithus hayi* BLACK, 1973 p. 66; plate 23, figs. 9-10.

GENUS: *Eprolithus* STOVER (1966).

Eprolithus varolii JAKUBOWSKI nov. sp., plate 1, figs. 1, 10-11.

Diagnosis: A species of *Eprolithus* with a thin wall composed of 16-20 segments and a broad central diaphragm. The segments of the wall are twisted and separated into two halves by the disc shaped diaphragm, which consists of 16-20 thin, wedge shaped, non-imbricating elements. These elements do not meet at the centre due to the presence of a small circular aperture.

Remarks: This species differs from *Lithastrinus septentrionalis* STRADNER (1963)

by the presence of a wide diaphragm, two layers of twisted wall segments and, in cross-section, by the H-shaped outline. It differs from *Eprolithus antiquus* PERCH-NIELSEN (1979) which has 10 wall segments and from *Eprolithus apertior* BLACK (1973) and *Eprolithus floralis* (STRADNER, 1962) STOVER (1966) which have only 9 wall segments.

Holotype: Neg. no. B.P./Pal. 2891; plate 1, fig. 1.
Paratype: Neg. no. MJ/06/85/14-15; plate 1, figs. 10-11.

Type locality: Otto Gott, near Hamburg, West Germany.

Type level: *nutfieldensis* ammonite Zone, upper Aptian.

Range: Upper Barremian to Aptian.

GENUS: *Gartnerago* BUKRY (1969).

Gartnerago praeobliquum JAKUBOWSKI nov. sp., plate 1, figs. 2-3, 12-13.

Diagnosis: A species of *Gartnerago* in which the central area is divided into 4 quadrants by an axial cross. Each of the 4 bars making up the axial cross terminates at the margin of the central area in a flaring 'arrowhead' and is divided into 2 halves by a central suture. Under the light microscope the species has a characteristic bright, outer cycle visible under both phase contrast and cross-polarized light, as is typical of the genus *Gartnerago*.

Remarks: This species is distinguished from other members of the genus *Gartnerago* by possessing flaring, 'arrowhead' terminations to the axial cross and a central area with four open quadrants.

Holotype: Neg. no. MJ/N2/18-19; plate 1, figs. 2-3
Paratype: Neg. no. MJ/06/85/8-9; plate 1, figs. 12-13.

Type locality: Moray Firth Basin, North Sea.

Type level: *Gartnerago praeobliquum* Zone, upper Albian.

Range: Lower - upper Albian.

Gartnerago theta (BLACK, 1959) JAKUBOWSKI nov. comb., plate 1, figs. 14-15.

1959 *Discolithus theta* BLACK *in* BLACK AND BARNES, 1959, p. 327; plate 12, fig. 1.

Remarks: This species possesses a characteristic *Gartnerago* shield structure including the bright outer cycle of elements visible under the light microscope. The central area is divided into 2 halves by a single transverse bar. In well preserved specimens the central area either side of the transverse bar displays perforations and a suture parallel to the long axis.

Range: Albian to Cenomanian.

GENUS: *Lithraphidites* DEFLANDRE (1963).

Lithraphidites moray-firthensis JAKUBOWSKI nov. sp., plate 1, figs. 4-5, 8-9.

Diagnosis: A species of *Lithraphidites* which is characterised by four keels which are truncated at both ends and taper inwards toward a central tooth which appears bright under cross-polarized light.

Remarks: The distinctive tapering of each keel towards a single central tooth distinguishes *Lithraphidites moray-firthensis* from other keeled species of *Lithraphidites*, such as *Lithraphidites grossopectinatus* BUKRY (1969) which has a row of four teeth and from *Lithraphidites quadratus* BRAMLETTE AND MARTINI (1964) and *Lithraphidites praequadratus* ROTH (1978) which do not possess any teeth.

Holotype: Neg. no. MJ/S2/21; plate 1, fig. 8.
Paratypes: Neg. no. MJ/S2/15; plate 1, fig. 9.
Neg. no. MJ/06/85/24-25; plate 1, figs. 4-5.

Type locality: Moray Firth Basin, North Sea.

Type level: *Lithraphidites moray-firthensis* Zone, lower Aptian.

Range: Upper Barremian to lower Aptian.

GENUS: *Micrantholithus* DEFLANDRE (1954)

Micrantholithus brevis JAKUBOWSKI nov. sp., plate 1, figs. 6-7.

Diagnosis: A species of *Micrantholithus* where the free side of each segment tapers inwards, very slightly, to form one positive angle and two shallow negative angles.

Remarks: *Micrantholithus brevis* differs from the closely related *Micrantholithus speetonensis* PERCH-NIELSEN (1979) by possessing much shallower negative angles and a much lower positive angle. It also does not possess the very wide black bands that run parallel to the sutures separating the segments, which are visible in *Micrantholithus speetonensis* under cross-polarized light. *Micrantholithus brevis* provides an obvious evolutionary link between *Micrantholithus speetonensis* and *Micrantholithus obtusus* STRADNER (1963) (see plate 1, fig. 27).

Holotype: Neg. no. MJ/08/85/35-36; plate 1, figs. 6-7.

Type locality: Moray Firth Basin, North Sea.

Type level: *Micrantholithus speetonensis* Zone, lower Valanginian.

Range: Lower Valanginian.

GENUS: *Phanulithus* WIND AND WISE (1977).

Phanulithus anfractus JAKUBOWSKI nov. sp., plate 1, figs. 20-23.

Diagnosis: An elliptical coccolith constructed of four segments in different crystallographic orientation exhibiting a moderately high birefringence. A short, shallow, S-shaped suture separates the 2 segments which lie about the short axis. The two remaining segments, which are positioned at the ends of the ellipse, are separated from those on the short axis by deeply incised, zigzag sutures.

Remarks: *Phanulithus anfractus* differs from all previously described species of *Phanulithus* by possessing curved and zigzag sutures.

Holotype: Neg. no. MJ/04/85/30-31; plate 1, figs. 20-21.
Paratype: Neg. no. MJ/01/85/11-12; plate 1, figs. 22-23.

Type locality: Moray Firth Basin, North Sea.

Type level: *Phanulithus anfractus* Zone, upper Albian to lower Cenomanian.

Range: Upper Albian to lower Cenomanian.

GENUS: *Conusphaera* TREJO (1969).

Conusphaera rothii (THIERSTEIN, 1971) JAKUBOWSKI nov. comb., plate 1, figs. 24-26.

1971 *Cretaturbella rothii* THIERSTEIN, 1971, p. 483; plate 3, figs. 1-5.

Remarks: This species has often been placed in synonymy with *Conusphaera mexicana* TREJO (1969) (plate 1, figs. 28-29). However, it differs markedly in possessing a shorter cone, consisting of inclined twisted plates which, in the light microscope, produce a characteristic cross-hatching along the long axis. *Conusphaera mexicana* has a much longer cone which does not possess any twisted plates; they are straight and parallel to the sides of the cone.

ACKNOWLEDGEMENTS

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REFERENCES

BLACK, M., 1967. New names for some coccolith taxa. *Proc. geol. Soc.*, no. 1640, 139-45.

BLACK, M., 1971. Coccoliths of the Speeton Clay and Sutterby Marl. *Proc. Yorkshire geol. Soc.*, 38(3), 381-424.

BLACK, M., 1972, 1973, 1975. British Lower Cretaceous coccoliths. I. Gault Clay. 1,2,3. *Monogr. palaeontogr. Soc. London*, 126, 1-48; 127, 49-112; 129, 113-42.

BLACK, M. and BARNES, 1959. The structure of coccoliths from the English Chalk. *Geol. Mag.*, 96, 321-8.

BRAMLETTE, M.N. and MARTINI, E., 1964. The great change in calcareous nannoplankton fossils between the Maestrichtian and Danian. *Micropalaeontology*, 10, 291-322.

BUKRY, D., 1969. Upper Cretaceous coccoliths from Texas and Europe. *Univ. Kansas Paleontol. Contrib.*, 51 (Protista 2), 1-79.

DEFLANDRE, G., 1959. Sur les nannofossiles calcaires et leur systématique. *Rev. Micropaleontol.*, 2, 127-52.

DEFLANDRE, G., 1963. Sur les Microrhabdulidés, famille nouvelle de nannofossiles calcaires. *C.r. Seances Acad. Sci. Paris*, 256, 3484-6.

DEFLANDRE, G. and FERT, C., 1954. Observations sur les Cocclithophoridés actuels et fossiles en microscopie ordinaire et électronique. *Ann. Paleontol.*, 40, 115-76.

HAY, W.W. and MOHLER, H.P., 1967. Calcareous nannoplankton from early Tertiary rocks at Pont Labau, France, and Paleocene - Eocene correlations. *J. Paleontol.*, 41, 1505-41.

JAKUBOWSKI, M. (in press). A proposed Lower Cretaceous nannofossil zonation scheme for the Moray Firth area of the North Sea. *Jb. Geol. B.-A.*

NOEL, D., 1965. Sur les Coccolithes de Jurassique Européen et d'Afrique de Nord. *Edition du CNRS Paris*, 209 pp.

PERCH-NIELSEN, K., 1979. Calcareous nannofossils from the Cretaceous between the North Sea and the Mediterranean. *IUGS Series A*, 6, 223-72.

ROTH, P.H., 1978. Cretaceous nannoplankton biostratigraphy and oceanography of the Northwestern Atlantic Ocean. *Initial. Rep. Deep Sea drill. Proj.*, 44, 731-59.

SISSINGH, W., 1977. Biostratigraphy of Cretaceous calcareous nannoplankton. *Geol. Mijnbouw.*, 56(1), 37-65.

STOVER, L.E., 1966. Cretaceous coccoliths and associated nannofossils from France and the Netherlands. *Micropaleontology*, 12, 133-67.

STRADNER, H., 1962. Uber neue und wenig bekannte Nannofossilien aus Kreide und Alttertiär. *Verh. geol. Bundesanst. (Wien)*, 1962, 363-77.

STRADNER, H., 1963. New contributions to Mesozoic stratigraphy by means of nannofossils. *Proceedings of the 6th World Petrol. congr. Sect.* 1, paper 4 (preprint), 1-16.

THIERSTEIN, H.R., 1971. Tentative Lower Cretaceous nannoplankton zonation. *Eclog. geol. Helv.*, 64, 459-88.

TREJO, M., 1969. *Conusphaera mexicana*, un nuevo coccolitoforido del Jurassico Superior de Mexico. *Revista Inst. Mexicano Petrol.*, 1(4), 5-15.

WISE, S.W. Jr. and WIND, F.H., 1977. Mesozoic and Cenozoic calcareous nannofossils recovered by DSDP Leg 36 drilling on the Falkland Plateau, SW Atlantic sector of the Southern Ocean. *Initial Rep. Deep Sea drill. Proj.*, 36, 296-309.

Bibliography and taxa of silicoflagellates II
by Rene Almekinders

E6

1 ABBOTT, W.H. and ERNISSEE, J.J. 1983 strat.
Biostratigraphy and paleoecology of a diatomaceous clay unit in the Miocene Pungo River Formation of Beaufort County, North Carolina. TERT. U.
-Smithsonian contributions to paleobiology, no. 53: pp. 287-353, 4 figs., 1 tb., 26 pls. America. N.

2 BUKRY, D. 1986 strat.
Miocene silicoflagellates from Chatham Rise, DSDP Site 594. syst.
-In: Kennett, J.P., von der Borch, C.C., et al. TERT.U.
Init. Rep. DSDP.: v. 90, pp. 925-37, 1 fig., Pacific. S.
4 tbs., 5 pls. ECOL

3 BUKRY, D. AND MONECHI, S. 1985 strat.
Late Cenozoic silicoflagellates from the Northwest Pacific, DSDP Leg 86: paleotemperature trends and texture classification. syst.
-In: Heath, G.R., and Burckle, L.H., et al. Init. TERT. U.
Rep. DSDP.: v. 86, pp. 367-397, 6. figs., 8 tbs., Pacific. N.
17 pls. ECOL

4 ERNISSEE, J.J., et al. 1977 strat.
Microfossil correlation of the Coosawatchie Clay (Hawthorn Formation, Miocene) of South Carolina, TERT. U.
and its equivalent in Georgia. America. N.
-Marine Micropal, v. 2: pp. 105-119, 3 figs., 1 tb.

5 HAQ, B.U. and RILEY, A. 1976 strat.
Antarctic silicoflagellates from the Southeast Pacific, DSDP Leg 35. syst.
-In: Hollister, C.D., Craddock, C., et al. Init. TERT. U.
Rep. DSDP, v. 35: pp. 673-691, 1 fig., 5 tbs., Pacific. S.
4 pls.

6 LOCKER, S. 1974 syst.
Revision der silicoflagellaten aus der Mikrogeologischen sammlung von C.G. Ehrenberg.
-Eclogae geol. Helv., v. 67/3: pp. 631-646, 4 pls.

7 MARTINI, E. 1979 strat.
Calcareous nannoplankton and silicoflagellate biostratigraphy at Reykjanes Ridge, northeastern North TERT. U.
Atlantic (DSDP Leg 49, sites 407 and 409). QUAT.
-In: Luyendyk, B.P., Cann, J.R. Init. Rep. DSDP, Atlantic. N.
v. 49: pp. 533-549, 4 figs., 3 tbs., 3 pls.

E7

1	PERCH-NIELSEN, K. Late Cretaceous to Pleistocene silicoflagellates from the southern Southwest Pacific, DSDP, Leg 29. -In: Kennett, J.P., Houtz, R.E., et al. Init. Rep. DSDP, v. 29: pp. 677-721, 3 figs., 9 tbs., 15 pls.	1975	strat. syst. CRET. U. TERT. QUAT. Pacific. S. ECOL.
2	RUITER, R.S.C. de, et al. Middle and Late Quaternary silicoflagellates from the Angola Basin. -Netherlands Journal of Sea Research, 17 (2-4): pp. 293-8, 3 figs.	1984	strat. QUAT. Atlantic. C. ECOL
3	RUITER, R.S.C. de & JANSEN, F.J.H. Two Pleistocene silicoflagellate biohorizons from the Angola Basin (SE Atlantic). -Marine Micropal., 9: pp. 365-8, 3 figs., 1 tb.	1985	strat. QUAT. Atlantic. C.

F5
Bachmannocena Locker, 1974, p. 635 E6-6

Bachmannocena circulus (Ehrenberg, 1841) Locker, 1974; p. 636 (ex Mesocena circulus) E6-6

F14
Bachmannocena diodon (Ehrenberg, 1845) Locker, 1974; p. 636 (ex Mesocena diodon) E6-6

Bachmannocena triangula (Ehrenberg, 1840) Locker, 1974; p. 636 (exMesocena triangula) E6-6

Cannopilus depressus (Ehrenberg, 1854) Perch-Nielsen, 1975; p. 685 (ex Halicalyptra depressa) E7-1

Cannopilus major (Frenguelli, 1951) Bukry and Foster, 1973; p. 826 (ex Dictyocha boliviensis var. major) E5-2

Cannopilus quintus Bukry and Foster, 1973, p. 826, pl. 1, figs. 8,9; Carnegie Ridge, Panama Basin (DSDP site 157), U. Pliocene E5-2

Caryocha Bukry & Monechi, 1985, p. 378; type species: Halicalyptra depressa Ehrenberg, 1854. E6-3

Caryocha depressa (Ehrenberg, 1854) Bukry & Monechi, 1985: p. 378 (ex Halicalyptra depressa) E6-3

Caryocha ernestinae (Bachmann, 1962) Bukry & Monechi, 1985: p. 378 (ex Cannopilus ernestinae) E6-3

Caryocha ichikawai (Bachmann, 1964) Bukry & Monechi, 1985: p. 378 (ex Cannopilus ichikawai) E6-3

Caryocha jouseae (Bachmann, 1964) Bukry & Monechi, 1985: p. 378 (ex Cannopilus jouseae) E6-3

Caryocha latifenestrata (Bachmann, 1964) Bukry & Monechi, 1985: p. 378 (ex Cannopilus latifenestratus) E6-3

Caryocha picassoi (Stradner, 1961) Bukry & Monechi, 1985: p. 378 (ex Cannopilus picassoi) E6-3

Corbisemaceae fam. nov. Locker, 1974, p. 633 E6-6

Corbisema bimucronata Deflandre, 1950 ssp. rotatoria Bukry, 1978, p. 696, pl. 1, fig. 6; Eastern North Atlantic Ocean (DSDP site 369), Oligocene E3-3

F6

Corbisema disymmetrica (Dumitrica, 1973) Bukry, 1976 ssp. angulata Bukry, 1976, p. 891, pl. 1, fig. 4; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), U. Paleocene — E2-6

Corbisema disymmetrica (Dumitrica, 1973) Bukry, 1976, ssp. communis Bukry, 1976,p. 891, pl. 1, fig. 8; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), U. Paleocene — E2-6

Corbisema disymmetrica (Dumitrica, 1973) Bukry, 1976 ssp. disymmetrica Bukry, 1976; p. 891 (ex Corbisema inermis ssp. disymmetrica) — E2-6

Corbisema falklandensis Bukry, 1976, p. 891, pl. 2, figs. 8,9; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), U. Paleocene — E2-6

Corbisema flexuosa (Stradner, 1961) Perch-Nielsen, 1975; p. 685 (ex Corbisema triacantha var. flexuosa) — E7-1

Corbisema flexuosa (Stradner, 1961) Bukry, 1975; p. 853 (ex Corbisema triacantha ssp. flexuosa) — E2-1
invalid: junior synonym; based on page number priority

Corbisema geometrica Hanna, 1928 ssp. lateradiata (Schulz, 1928) Bukry, 1975; p. 853 (ex Dictyocha triacantha apiculata late-radiata) — E2-1

Corbisema glezerae Bukry, 1976, p. 892, pl. 3, fig. 3; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), U. Paleocene — E2-6

Corbisema hastata (Lemmermann, 1901) Bukry, 1973 ssp. minor (Schulz, 1928) Bukry, 1975; p. 854 (ex Dictyocha triacantha apiculata minor) — E2-1

Corbisema hastata (Lemmermann, 1901) ssp. cunicula Bukry, 1976, p. 892, pl. 3, fig. 15; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), U. Paleocene — E2-6

Corbisema hastata (Lemmermann, 1901) ssp. globulata Bukry, 1976, p. 892, pl. 4, fig. 2; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), U. Paleocene — E2-6

Corbisema inermis (Glezer, 1966) Bukry, 1975; p. 854 (ex Dictyocha triacantha inermis inermis) — E2-1

F7

Corbesima inermis (Lemmermann, 1901) Dumitrica, 1973 ssp. crenulata Bukry, 1976, p. 892, pl. 12, fig. 9 of Dumitrica, 1973; Southwestern Pacific Ocean (DSDP site 208), Paleocene — E2-6

Corbisema inermis (Lemmermann, 1901) Dumitrica, 1973 ssp. minor (Glezer, 1966) Bukry, 1976; p. 892 (ex Dictyocha triacantha var. inermis fa. minor) — E2-6

Corbisema katharinae Bukry, 1976, p. 848, pl. 1, fig. 4; Norwegian-Greenland Sea (DSDP site 337), U. Eocene or Oligocene — E2-7

Corbisema lamellifera (Glezer,1964) ssp. hastata (Glezer, 1964) Perch-Nielsen, 1975; p. 685 (ex Dictyocha lamellifera var. hastata) — E7-1

Corbisema lateradiata (Schulz, 1928) Perch-Nielsen, 1975; p. 686 (ex Dictyocha triacantha var. apiculata fa. late-radiata) — E7-1

Corbisema media (Glezer, 1964) Perch-Nielsen, 1975; p. 686 (ex Dictyocha elata var. media) — E7-1

Corbisema minor (Schulz, 1928) Perch-Nielsen, 1975; p. 686 (ex Dictyocha triacantha fa. minor) — E7-1

Corbisema neoparallela Bukry, 1976, p. 893, pl. 5, fig. 9; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), U. Paleocene — E2-6

Corbisema toxeuma Bukry, 1978, p. 815, pl. 1, fig. 11; Blake Plateau, western North Atlantic Ocean (DSDP Hole 390A), L. Eocene (Naviculopsis foliacea Zone) — E3-5

Corbisema triacantha (Bukry & Foster, 1974) ssp. convexa Bukry, 1978, p. 815, pl. 1, figs. 16,17; Blake Plateau, western North Atlantic Ocean (DSDP Hole 390A), L. Eocene (Naviculopsis foliacea Zone) — E3-5

Corbisema triacantha ssp. mediana Bukry, 1978, p. 696, pl. 1, fig. 12; Eastern North Atlantic Ocean (DSDP site 369), L. Oligocene — E3-3

Corbisema? xenica Bukry, 1978, p. 816, pl. 2, figs. 1,2; Blake Plateau, western North Atlantic Ocean (DSDP Hole 390A), L. Eocene (Naviculopsis foliacea Zone) — E3-5

F8

Dictyocha aculeata (Lemmermann, 1901) Bukry, 1979a ssp. subaculeata Bukry, 1980; p. 552, pl. 1, fig. 8; Equatorial eastern Pacific Ocean (DSDP site 425), Quaternary. E4-2

Dictyocha aspera (Lemmermann, 1901) Bukry and Foster, 1973; p. 826 (ex Dictyocha fibula var. aspera) E5-2

Dictyocha aspera (Lemmermann, 1901) Bukry & Foster, 1973 ssp. clinata Bukry, 1975, p. 687, pl. 1, fig. 2; Northwest Pacific Ocean (DSDP site 303), U. Miocene E2-2

Dictyocha aspera (Lemmermann, 1901) Bukry & Foster, 1973 ssp. martinii Bukry, 1975, p. 854, pl. 2, fig. 6; South Tasman Sea (DSDP site 283), M. and U. Eocene E2-1

Dictyocha bojadorina Bukry, 1979, p. 982, pl. 1, figs. 10, 11; Offshore northwest Africa (DSDP site 397), Quaternary (Mesocena quadrangula Zone). E3-6

Dictyocha brevispina (Lemmermann, 1901) Bukry, 1976; p. 723 (ex Dictyocha fibula var. brevispina) E2-4

Dictyocha brevispina (Lemmermann, 1901) Bukry, 1976 ssp. ausonia (Deflandre, 1950) Bukry, 1978; p. 697 (ex Dictyocha ausonia) E3-3

Dictyocha calida (Poelchau, 1976) ssp. ampliata Bukry, 1979, p. 982,pl. 2, fig. 1; Offshore northwest Africa (DSDP site 397), U. Pliocene to L. Quaternary. E3-6

Dictyocha carentis (Glezer, 1964) Perch-Nielsen, 1975; p. 686 (ex Dictyocha frenguelli var. carentis fa. carentis) E7-1

Dictyocha constricta (Schulz, 1928) Bukry, 1979 p. 983 (ex Dictyocha fibula fa. constricta) E3-6

Dictyocha deflandrei Frenguelli, 1940 ssp lobata Bukry, 1978, p. 785, pl. 1, fig. 13; Northwest Atlantic Ocean (DSDP site 385), Eocene (Dictyocha spinosa Subzone) E3-4

Dictyocha deflandrei Frenguelli, 1940 ssp. producta (Glezer, 1966) Bukry, 1978; p. 785 (ex Dictyocha deflandrei completa producta) E3-4

F9

Dictyocha fibula Ehrenberg, 1839 ssp. augusta Bukry, 1976, p. 893, pl. 6, figs. 1-3; Falkland Plateau, South Atlantic Ocean (DSDP site 329), U. Miocene — E2-6

Dictyocha fibula Ehrenberg, 1839 ssp. formicata Bukry, 1975, p. 854, pl. 3, fig. 8; South Tasman Sea (DSDP site 283), M. or U. Eocene — E2-1

Dictyocha fibula Ehrenberg, 1839 ssp. perlaevis (Frenguelli, 1951) Bukry, 1975; p. 855 (ex Dictyocha perlaevis) — E2-1

Dictyocha fischeri Bukry, 1976, p. 894, pl. 1, figs. 11,12 of Bukry, 1975b; Southern Ocean (DSDP sites 274, 278, 328), L. or U. Oligocene — E2-6

Dictyocha hessii Bukry, 1978, p. 642, pl. 7; holotype: fig. 6 of Dumitrica, 1973, DSDP vol. 13; Mediterranean Sea (DSDP site 128), L. Quaternary — E3-2

Dictyocha longispina (Lemmermann, 1901) Bukry, 1979, p. 983 (ex Dictyocha fibula var. longispina). — E3-6

Dictyocha pentagona (Schulz, 1928) Bukry and Foster, 1973; p. 827 (ex Dictyocha fibula var. pentagona) — E5-2

Dictyocha pentagonalis (Aurivillius, 1898) Perch-Nielsen, 1975; p. 687 (ex Dictyocha fibula var. pentagonalis) — E7-1

Dictyocha perlaevis Frenguelli, 1951 ssp. delicata Bukry, 1976, p. 724, pl. 1, figs. 5,6; southeastern Pacific Ocean (DSDP site 321), L. Quaternary — E2-4

Dictyocha perlaevis (Frenguelli, 1951) ssp. flexatella Bukry, 1979, p. 984, pl. 3, fig. 3; Offshore northwest Africa (DSDP site 397), U. Pliocene. — E3-6

Dictyocha perlaevis Frenguelli, 1951 ssp. ornata Bukry, 1977, p. 922, pl. 1, fig. 1; central North Atlantic Ocean(DSDP site 335), U. Pliocene — E2-8

Dictyocha precarentis Bukry, 1976, p. 894, pl. 6, figs. 10,11; Falkland Plateau, South Atlantic Ocean (DSDP hole 327A), L. Paleocene — E2-6

Dictyocha pulchella Bukry, 1975, p. 687, pl. 4, fig. 1; South Pacific Ocean (DSDP site 285), M. and U. Miocene — E2-2

F10

Dictyocha pumila (Ciesielski, 1975) Bukry, 1978; p. 642 (ex Dictyocha fibula var. pumila) E3-2

Dictyocha quadrangula (Bachmann, 1971) Bukry, 1978; p. 697 (ex Distephanus staurodon fa. quadrangula) E3-3

Dictyocha stapedia Haeckel, 1887 ssp. aspinosa Bukry, 1976, p. 724, pl. 2, figs 7,8; southeastern Pacific Ocean (DSDP site 321), U. Quaternary E2-4

Dictyocha vanandelii Bukry and Foster, 1973, p. 827, pl. 7, fig. 1; Carnegie Ridge, Panama Basin (DSDP site 157), U. Pliocene E5-2

Dictyocha vexativa Bukry, 1978, p. 642, pl. 1, fig. 12,13; Southeastern Atlantic Ocean (DSDP site 362), Quaternary E3-2

Distephanaceae fam. nov. Locker, 1974, p. 637 E6-6

Distephanus? acanthicus Bukry, 1978, p. 816, pl. 3, figs. 1,2; Blake Plateau, western North Atlantic Ocean (DSDP Hole 390A), L. Eocene (Naviculopsis foliacea Zone) E3-5

Distephanus boliviensis (Frenguelli, 1940) Bukry and Foster, 1973; p. 827 (ex Dictyocha boliviensis) E5-2

Distephanus boliviensis (Frenguelli, 1940) Bukry & Foster, 1973 ssp. frugalis Bukry, 1975, p. 688, pl. 2, fig. 6; Northwest Pacific Ocean (DSDP site 304), U. Miocene and L. Pliocene E2-2

Distephanus boliviensis (Frenguelli, 1940) Bukry & Foster, 1973 ssp. jimlingii Bukry, 1975, p. 688, pl. 1, fig. 6; Northwest Pacific Ocean (DSDP site 303), U. Miocene or L. PLiocene E2-2

Distephanus boliviensis (Frenguelli, 1940) Bukry & Foster, 1973 ssp. major (Frenguelli, 1951) Bukry, 1975; p. 688 (ex Dictyocha boliviensis ssp. major) E2-2

Distephanus crux (Ehrenberg, 1840) Haeckel, 1887 ssp. darwinii Bukry, 1976, p. 895, pl. 7, figs. 6,7; Falkland outer basin, South Atlantic Ocean (DSDP hole 328B), U. Oligocene E2-6

Distephanus crux (Ehrenberg, 1840) Haeckel, 1887 ssp. hannai Bukry, 1975, p. 855, pl. 4, fig. 5; Southern California Borderland, L. Miocene E2-1

F11

Distephanus crux (Ehrenberg, 1840) Haeckel, 1887 ssp. loeblichii Bukry, 1978, p. 817, pl. 3, figs. 12,13; Argentine Basin, South Atlantic Ocean (DSDP site 328), Oligocene. E3-5

Distephanus frugalis (Bukry, 1975a) Bukry, 1979, p. 561 (ex Distephanus boliviensis ssp. frugalis). E3-7

Distephanus hannai (Bukry, 1975b) Bukry, 1979; p. 561 (ex Distephanus crux ssp. hannai). E3-7

Distephanus jimlingii (Bukry, 1975a) Bukry, 1979, p. 561-2 (ex Distephanus boliviensis ssp. jimlingii). E3-7

Distephanus longispinus (Schulz, 1928) Bukry and Foster, 1973; p. 828 (ex Distephanus crux fa. longispina) E5-2

Distephanus longispinus (Schulz, 1928) Perch-Nielsen, 1975; p. 687 (ex Distephanus crux fa. longispina) E7-1
invalid: junior synonym

Distephanus macilentus (Deflandre, 1950) Perch-Nielsen, 1975; p. 687 (ex Dictyocha macilenta) E7-1

Distephanus minutus (Bachmann, 1967) Bukry and Foster, 1973; p. 828 (ex Distephanus speculum fa. minuta) E5-2

Distephanus octacanthus (Desikachary and Maheshwari, 1956) Bukry and Foster, 1973; p. 828 (ex Distephanus crux var. octacanthus) E5-2

Distephanus octonarius (Ehrenberg, 1844) Perch-Nielsen, 1975; p. 687 (ex Dictyochia octonaria) E7-1

Distephanus paradistephanus (Tsumura, 1963) Bukry & Monechi, 1985: p. 379 (ex Dictyocha paradistephanus) E6-3

Distephanus parvus (Bachmann, 1967) Bukry and Foster, 1973; p. 828 (ex Distephanus crux fa. parva) E5-2

Distephanus polyactis (Ehrenberg) Dumitrica, 1973 ssp. crassus Bukry, 1977, p. 922, pl. 1, fig. 11,12; central North Atlantic Ocean (DSDP site 334), U. Miocene (Dictyocha aspera Zone) E2-8

Distephanus pseudocrux (Schulz, 1928) Bukry, 1979, p. 562 (ex Distephanus speculum forma pseudocrux). E3-7

F12

Distephanus pseudofibula (Schulz, 1928) Bukry, 1976; p. 848 (ex Dictyocha speculum fa. pseudofibula) — E2-7

Distephanus quinquangellus Bukry and Foster, 1973, p. 828.
Nomen novum pro Distephanus pentagonus (Lemmermann, 1901) ,ex Distephanus speculum var. pentagonus Lemmermann, 1901, p. 264, pl. 11, fig. 19)
Non: Distephanus pentagonus Wailes, 1939. — E5-2

Distephanus raupii Bukry, 1976, p. 895, pl. 7, figs. 14,15; Falkland outer basin, South Atlantic Ocean (DSDP site 328), U. Oligocene and L. Miocene — E2-6

Distephanus septenarius (Ehrenberg, 1844) Perch-Nielsen, 1975; p. 688 (ex Dictyocha septenaria) — E7-1

Distephanus speculum (Ehrenberg, 1839) Haeckel, 1887 ssp. binoculus (Ehrenberg, 1844) Bukry, 1975; p. 855 (ex Dictyocha binoculus) — E2-1

Distephanus speculum diommata (Ehrenberg, 1854) Bukry, 1979, p. 562 (ex Dictyocha diommata) — E3-7

Distephanus speculum (Ehrenberg, 1839) Haeckel, 1887 ssp. elongatus Bukry, 1975, p. 688, pl. 2, figs. 8,9; Northwest Pacific Ocean (DSDP site 303), Neogene — E2-2

Distephanus speculum (Ehrenberg, 1839) Haeckel 1887 ssp. giganteus Bukry, 1976, p. 848, pl. 2, fig. 1; Norwegian-Greenland Sea (DSDP site 338), M. Miocene — E2-7

Distephanus speculum (Ehrenberg, 1839) Haeckel, 1887 haliomma (Ehrenberg, 1844) Bukry, 1978; p. 697 (ex Dictyocha haliomma) — E3-3

Distephanus speculum (Ehrenberg, 1839) Haeckel, 1887 ssp. hemisphaericus (Ehrenberg, 1844) Bukry, 1975; p. 855 (ex Dictyocha hemisphaerica) — E2-1

Distephanus speculum (Ehrenberg, 1839) Haeckel, 1887 ssp. polyommata (Schulz, 1928) Bukry, 1978; p. 818 (ex Cannopilus hemisphericus f. polyommata) — E3-5

Distephanus speculum (Ehrenberg, 1839) Haeckel, 1887 ssp. quintus (Bukry and Foster, 1973) Bukry, 1975; p. 855 (ex Cannopilus quintus) — E2-1

F13

Distephanus speculum (Ehrenberg, 1839) Haeckel, 1887 ssp. triommata (Ehrenberg, 1845) Bukry, 1976; p. 896 (ex Dictyocha triommata) — E2-6

Distephanus staurodon (Ehrenberg, 1844) Bukry, 1978; p. 697 (ex Dictyocha staurodon) — E3-3

Distephanus stradneri (Jerkovic, 1965) Bukry, 1978; p. 698 (ex Dictyocha schaunslandii var. stradneri) — E3-3

Distephanus sulcatus Bukry, 1979, p. 562, pl. 4, figs. 4,5; North Atlantic Ocean (DSDP site 407), U. Pliocene. — E3-7

Distephanus trioctus Bukry, 1978, p. 818, pl. 5, figs. 2,3; Southern California Borderland, M. or L. Miocene (Corbisema triacantha Zone) — E3-5

Distephanus varians (Gran and Braarud, 1935) Bukry, 1976; p. 849 (ex Distephanus speclum fa. varians) — E2-7

Lyramula deflandrei Perch-Nielsen and Edwards, 1975, p. 688, pl. 8, fig. 9; southwest Pacific (DSDP site 275), U. Cretaceous — E7-1

Mesocena apiculata Schulz, 1928 ssp. curvata Bukry, 1976, p. 849, pl. 2, fig. 15; Norwegian-Greenland Sea, L. and M. Miocene — E2-7

Mesocena apiculata Schulz, 1928 ssp. glabra (Schulz, 1928) Bukry, 1978; p. 698 (ex Mesocena polymorpha var. triangula fa. glabra) — E3-3

Mesocena apiculata (Schulz, 1928) Ling, 1972 ssp. inflata Bukry, 1978, p. 786, pl. 3, fig. 3; Northwest Atlantic Ocean (DSDP site 385), L. or M. Eocene — E3-4

Mesocena? connudata Bukry, 1978, p. 786, pl. 3, fig. 4; Northwest Atlantic Ocean (DSDP site 384), U. Paleocene (Naviculopsis constricta Zone) — E3-4

Mesocena diodon Ehrenberg, 1844 ssp. nodosa Bukry, 1978, p. 818, pl. 5, figs. 14,15; Meiji Guyot, Emperor Seamounts, northwestern North Pacific Ocean, U. Miocene and L. Pliocene — E3-5

Mesocena dumitricae (Perch-Nielsen, 1975) Bukry, 1986: p. 930 (ex Paradictyocha dumitricae) — E6-2

F14

Mesocena ovata Bukry, 1978, p. 786, pl.3, fig. 6; Northwest Atlantic Ocean (DSDP site 384), U. Paleocene and M. Eocene — E3-4

Mesocena venusta Bukry, 1978, p. 832, pl. 1, fig. 11; South Atlantic Ocean (DSDP site 356), M. Eocene — E3-1

Naviculopsis eobiapiculata Bukry, 1978, p. 787, pl. 4, fig. 9; Northwest Atlantic Ocean (DSDP site 385), Eocene and Oligocene — E3-4

Naviculopsis foliacea Deflandre, 1950 ssp. tumida Bukry, 1978, p. 820 pl. 8, figs. 1,2; Blake Plateau, western North Atlantic Ocean (DSDP site 390), L. Eocene (Naviculopsis foliacea Zone) — E3-5

Naviculopsis nordica Bukry, 1976, p. 849, pl. 2, fig. 12; Norwegian-Greenland Sea (DSDP site 340), M. or U. Eocene — E2-7

Naviculopsis nordica Bukry, 1976 ssp. hyalina Bukry, 1976, p. 849, pl. 2, fig. 10; Norwegian-Greenland Sea (DSDP site 340), M. or U. Eocene — E2-7

Naviculopsis obtusarca Bukry, 1978, p. 821; holotype: pl. 3, fig. 4 of Bukry, 1977b; Eastern North Atlantic Ocean (DSDP site 370), U. Oligocene or L. Miocene — E3-5

Naviculopsis ponticula (Ehrenberg, 1844b) Bukry, 1976; p. 897 (ex Dictyocha ponticulus) — E2-6

Naviculopsis punctilia Perch-Nielsen, 1976 ssp. taenia Bukry, 1976, p. 894, pl. 2, fig. 5; Norwegian-Greenland Sea (DSDP site 340), M. or U. Eocene — E2-7

Paradictyocha dumitricae Perch-Nielsen, 1975, p. 689, pl. 11, fig. 7; DSDP site 278, U. Miocene to Pliocene — E7-1

Septomesocena quadrangula (Schulz, 1928) Perch-Nielsen, 1975; p. 690 (ex Mesocena oamaruensis var. quadrangula) — E7-1

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** PLEASE NOTE THAT MEMBERSHIP FEES FOR 1986 ARE NOW **
** DUE. MEMBERS WHO HAVE NOT PAID THEIR FEES FOR THIS **
** YEAR WILL NOT RECIEVE THE NEXT ISSUE OF THE NEWSLETTER **
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