MRC program, representative sets of samples are identified for each site and multiple preparations are made for foraminifera, radiolaria, diatoms and calcareous nannofossils. For more information see:
http://www-odp.tamu.edu/mrc/mrcpage.HTML

Which are the full MRC sites?
The following five sites have collections of both nannofossils and the other three microfossil groups.
US East Coast - Smithsonian Institute. Contact Dr. Brian Huber (*huber.brian@nmnh.si.edu*)
US Gulf Coast - ODP. Contact Dr. John Firth (*john_firth@odp.tamu.edu*)
Western Europe - Natural History Museum, Basel. Contact Dr. Michael Knappertsbusch (*knappertsbus@ubaclu.unibas.ch*)
Japan - National Science Museum, Tokyo. Contact Dr. Yoshihiro Tanimura (*tanimura@kahaku.go.jp*)
New Zealand - Institute of Geological & Nuclear Sciences, Ltd., Lower Hutt. Contact Dr. Percy Strong (*p.strong@gns.cri.nz*)

Which are the satellite MRCs with nannofossil collections?
The nannofossil MRCs will only have nannofossil collections and will play roles in developing the nannofossil collection. This is intended to include: preparation of further sample sets (both FSU and Parma have made commitments in this area); enhancement of database information on the MRC sample-sets (in particular adding information on the nannofossil assemblages in the slides); identifying and preparing additional sample sets of special value for nannofossil research (*e.g.* topotype samples and samples with exceptional nannofossil preservation); promotion of use of the nannofossil MRCs. The Nebraska and FSU sites both have diatom MRC collections as well as the nannofossils.
University of Nebraska, USA - contact Dr. David Watkins (*dwatkins@unl.edu*)
Universitá degli Studi di Parma, Italy - contact Dr. Giuliana Villa (*geol01@ipruniv.cce.unipr.it*)
Florida State University, Tallahassee, USA - contact Dr. Sherwood W. Wise or Dr. Thomas Janacek (*wise@gly.fsu.edu*)
The Natural History Museum, London - contact Dr. Jeremy Young (*jy@nhm.ac.uk*)

Who can use the collections?
Anyone. A basic condition of ODP providing MRC collections is that they should be freely available to the scientific community. Obviously, though, the relevant host scientists should be contacted before visiting the centres. Also, note that the collections cannot be loaned, only studied at the host institutes. For the MRC at the NHM, financial support for visits by European workers can currently be applied for via the EU Large Scale Facility (LSF) scheme (see **http://www.nhm.ac.uk/science/science_marketing/bioresource/**).

What material is in the nannofossil MRCs?
The following sets of slides:
1. 3000 slides from DSDP Legs 1-36, Sites 1-329. This sample set has been entirely prepared, and is held in all nannofossil MRCs. A listing of samples is available on the WWW.
2. ~600 nannofossil preparations from ODP Legs 132 to 138 - not at all nannofossil MRCs, but nearly completed.

Jeremy Young
jy@nhm.ac.uk

STILL AVAILABLE

Duplicate copies of some reprints from the Loeblich & Tappan collection are still available, while supplies last. A list of available reprints is posted on the UCMP website at:
http://www.ucmp.berkeley.edu/collections/micreps.html

Subjects covered include foraminifera, calcareous nannoplankton, acritarchs and tintinnids. For more information see the website or contact me.

Karen L. Wetmore, Museum of Paleontology,
1101 VLSB #4780,
University of California, Berkeley, CA 94720-4780
karenw@ucmp1.berkeley.edu

NEW BOOK NEWS

As you may be aware, there have been a few problems associated with getting hold of copies of *Calcareous Nannofossil Biostratigraphy* (Ed. P.R. Bown), a review of which appears in this issue. This situation arose because Chapman & Hall were taken over by Kluwer Academic around the time the book went to press. If you want a copy, then the following information may help. The book is part of the British Micropalaeontology Society Series and is published by Kluwer Academic Publishers, Dordrecht who have a website giving more information at:
http://www.wkap.nl/book.htm/0-412-78970-1

Ordering can be done via the Web, or through the following:

The Americas: Kluwer Academic Publishers, Order Dept., PO Box 358, Accord Station, Hingham, MA 02018-0358, USA. Tel.: (781) 871-6600; fax: (781) 871-6528; e-mail: *kluwer@wkap.com*

Rest of the World: Kluwer Academic Publishers, Book Dept., PO Box 322, 3300 AH Dordrecht, The Netherlands. Tel.: (+31) 78 639 23 92; fax: (+31) 78 654 64 74; e-mail: *services@wkap.nl*

BOOK REVIEW #1

Calcareous Nannofossil Biostratigraphy
Edited by Paul R. Bown (1998)
Published by Chapman & Hall/Kluwer Academic Publishers
British Micropalaeontological Society Publication Series: 328pp.
Printed by Cambridge University Press
Hardbound ISBN 0-412-78970-1
NLG 235.00 / GBP £79.00 / USD $127.00

Reviewed by Katharina von Salis, Geological Institute, ETH-Z, CH-8092 Zürich, Switzerland

The successor to A.R. Lord's (Ed., 1982) *A Stratigraphical Index of Calcareous Nannofossils* has appeared in 1998 under the new title, *Calcareous Nannofossil Biostratigraphy*, as part of the publication series of the British Micropalaeontological Society, from Chapman &

Hall (recently taken over by Kluwer Academic Publishers), with Paul R. Bown as the new editor. Where the old book was blue, the new is black, the new being only slightly larger but considerably thicker. What was included on 192 pages in 1982, now takes up 316 pages.

The book is clearly structured and starts, after **CONTENTS, PREFACE, ACKNOWLEDGEMENTS** and a **TECHNICAL NOTE AND ABBREVIATIONS**, with an **INTRODUCTION** by Bown & Young. We here learn about what calcareous nannofossils are and read about haptophyte algae cytology, scales as diagnostic features, coccolith morphology and formation, life cycles, coccolith function, as well as coccolithophore ecology and distribution. The outline of calcareous nannofossil taxonomy and classification is illustrated on an ordinal level, and a phylogenetic model (families) based on the two authors' recent publications on the theme is given. Not surprisingly, the authors here come to the conclusion (p.15), that "the integration of the order-level classification between living and fossil material is a problem which needs to be addressed". This first chapter is rounded off with a short outline of the geological history of calcareous nannofossils and half a page on their use in biostratigraphy with the conclusion than "the large volume of subsequent work [to Lord, 1982; Haq, 1983; Perch-Nielsen, 1985a, b; Siesser, 1993] means that the comprehensive reviews and new data presented here should be of great value, for both nannofossil specialists and end users of nannofossil data". How right they are.

The second chapter is entitled **TECHNIQUES** and also was written by Bown & Young. Here they give sound and very useful advice for sample collection, preparation techniques, means of observation, data collection and presentation.

Both chapters are very helpful for all who want to update their outdated knowledge about coccolithophorids and their significance, treatment and applications.

Bown wrote the short chapter about the **TRIASSIC**, giving a comprehensive overview, including a threefold subdivision, and the necessary illustrations both as drawings, LM and SEM photomicrographs. This chapter, and most of the following ones, are built up along the same pattern with an introduction, important references, nannofossil succession, biostratigraphy, biogeography and an atlas of species with the plates. Some chapters have additional sections on global correlation, magnetobiochronology, or notes on taxonomic problems and conclusions.

The **JURASSIC** chapter was written by Bown & Cooper and features mainly the description of the boreal zones and subzones following mainly Bown (1987) and Bown *et al.* (1988; NJ1-NJ18) and those from Italy/S France and Portugal. These descriptions are accompanied by zonal schemes that show the correlation between the areas, and with the boreal ammonite zones and the Jurassic stages. For the tethyan Upper Jurassic, the zones NJ19(T), NJ20(T) and NJK are discussed and correlated to the magnetostratigraphy in the Tithonian and Jurassic/ Cretaceous boundary interval. Here I have to make a note as to the statement on p.35: "...latest Jurassic (Tithonian) by which time nannoplankton were producing biogenic carbonate in rock-forming proportions". According to Noël *et al.* (1994, and papers cited therein), already the limestones of the Lias consisted mainly of calcareous nannofossils, namely *Schizosphaerella,* and small coccoliths were rock-building during the Middle Jurassic.

The range of nearly 80 species is given in a figure and correlated with the stages and the boreal ammonite zones.

A short paper on ‚Calcareous nannofossils from the Upper Kimmeridgian-Volgian of Gorodische, Russia' by Bown is included as an appendix in this chapter. It features distribution charts and a discussion on the stratigraphic problems of the uppermost Jurassic, as well as the discussion about *Stephanolithion* species and the description of a new species, *Staurolithites lumina.*

The atlas of species features SEM and LM photomicrographs, most of them of excellent quality, and the ranges of the species where illustrated by SEM.

The **LOWER CRETACEOUS** chapter was composed by Bown, Rutledge, Crux & Gallagher. Also this chapter concentrates on the zonal subdivision, using a BC system (after Rutledge & Bown, in prep.: for comments, see below). The correlation of calcareous nannofossil events with both stages, CC and NK/NC coccolith zones, boreal and tethyan ammonite zones and magnetostratigraphy are given in two very useful figures including also Indian Ocean nannofossil events. For the Barremian-Aptian interval, a high-resolution subdivision of the BC zones is given for the northern North Sea. The stratigraphic ranges of nearly 70 selected species, both general, endemic boreal and predominantly tethyan forms , are correlated to stages and boreal ammonite zones in a figure. The atlas of species consists of high quality SEM and LM pictures - a joy to study - and gives the ranges of the species where illustrated by SEM.

Burnett wrote the **UPPER CRETACEOUS** chapter with contributions from Gallagher & Hampton. Since she is very much involved in the work for new definitions of the Cretaceous stage boundaries, the historical part of the chapter is longer than in the previous chapters. The Cretaceous nannofossil succession is described and the changes in dominance of genera/families through the Late Cretaceous and across the Cretaceous/Tertiary boundary is illustrated. Five nannofloral palaeobiogeographic provinces are distinguished: boreal, intermediate N, tethyan, intermediate S and austral. For the description of the zonal system, the author discontinues the use of "taxonomic epithets" for the „formally-described alphanumeric biozones ", and uses a new system of UC (Upper Cretaceous) zones extending from UC0 starting in the Upper Albian and ending with UC20 at the top of the Maastrichtian. Some subzones and marker events are additionally given a combination of two letters for the province in which they are valid. The thus assembled figures will be very useful in stratigraphic work worldwide. Equally useful are the remarks about diachronous occurrences in the different provinces of many of the markers generally used. In ten often very fully packed pages with figures, the marker events are shown for the different

provinces and correlated to stages, ammonite/macrofaunal zones as well as the traditional CC and NC zones, among others. The correlation to the planktonic foraminiferal marker events is given together with the magnetostratigraphy by including the integrated zonation of Bralower *et al.* (1995). The summary figure of the Upper Cretaceous nannofossil biozonation acts as an anchor for us oldies to the ‚good old times' when we hoped that one set of coccolith zones - unlike planktonic foraminifera zones - would be applicable worldwide.

The K/T boundary is discussed at the end of the Cretaceous chapter which, thus, also includes illustrations of Tertiary species in its atlas of species, not counted in the count below.

The claim by the author, that "Most of the Upper Cretaceous calcareous nannofossils are listed and illustrated in Plates 6.1 to 6.15" is no exaggeration. I counted some 400 species names, of which 65 were indicated not to be figured. Most of the mainly LM photographs are of very good quality, the fossils often shown at different angles to the polarisers. The ranges of the figured species are given in terms of stages.

After all of the data and illustrations presented in this chapter, one wonders and rejoices about the author's statement on p.134: "...further biostratigraphic refinement is still possible". I am sure we will, eventually, ‚beat the ammonites', and not only in the Upper Cretaceous.

Varol assembled the chapter on the **PALAEOGENE**, concentrating on the economically important North Sea area, and sharing with the readers the impressive results of his findings from this region. The correlation schemes between the various existing zonations and the old stage stratotypes do not contain the zonal definitions. On the other hand, the three figures with the nannofossil zones and events for the North Sea area show a sequence of events and the 36 partly new NNTp/e/o-zones based on them, correlated with the timescale, the NPs and the stages. This overview lacks, for the obvious reason that this part of the section is not developed in a suitable facies in the North Sea area, the calcareous nannofossil biostratigraphy for most of the Upper Paleocene and the presently much-debated Paleocene/Eocene boundary interval. It will, however, be very helpful for all those having the privilege of working in the North Sea area.

The specimens illustrated in the atlas of species by excellent LM photographs all stem from North Sea well-sections, but no ranges are given.

Young wrote the **NEOGENE** chapter with the objective to "provide an up-to-date guide to Neogene nannofossil taxonomy and biostratigraphy in a succinct [I had to look up this word in the dictionary...] and useful format". For the discussion he "subdivided [the Neogene] into eight intervals (A-H) of 1-5Ma duration, based on the most important events". These intervals, which should be recognisable also in poorly fossiliferous materials, are then correlated to the classical NN and CN zonations and the magnetostratigraphy, age and stages (but not the planktonic foraminifera zonation(s)) in a very useful summary figure which will entice a few older colleagues to invest in new and stronger glasses.

Instead of a simple range-chart, Young presents us with figures including both ranges and simple line-drawings of the species of the Helicosphaeraceae, Syracosphaeraceae, Pontosphaeraceae, Calcidiscaceae, Coccolithaceae, Noelaerhabdaceae, Discoasteraceae, Sphenolithaceae, Triquetrorhabdulaceae, and some other forms. All ranges are correlated to the zonal schemes and his A-H intervals. The need for new glasses becomes even more urgent here.

In the notes on taxonomic problems, we learn that Wallich's original slides (1877!) have been relocated at the Natural History Museum in London and that we now use *Helicosphaera carteri* (instead of the younger *H. kamptneri*), that the genus ‚*Pyrocyclus*' represents specimens of abraded *Reticulofenestra* species, and several additional interesting and important observations.

The atlas of species includes not only a wealth of LM photographs - including many showing different levels of focus of the same specimen - but also very welcome notes for the identification/differentiation of the shown genera and species and their ranges in terms of NN-zones. An appendix gives the origin of the specimens illustrated in a novel and space-saving manner. The quality of the illustrations is partly very good but many pictures seem to lack contrast and appear rather grey. Most of us will definitely need the new glasses (see above) to read the names under the photographs.

Hine & Weaver illustrate the **QUATERNARY** biostratigraphy with reports on DSDP Site 610 in the Rockall Trough and three piston-cores from the flank of Kings Trough, from where a sequence of seven acme-intervals (QAZ7 to 1 - here the numbering starts at the top) is described. They stress the possibility of high-resolution stratigraphy through a combination of isotope- and magnetostratigraphy and semi-quantitative analysis of nannofossil assemblages, leading to the recognition of acme intervals. In two figures, the ranges of selected species are given and correlated to the Gartner, NN and CN zonal schemes, time and magnetostratigraphy. The authors conclude that high-resolution stratigraphy can be accomplished up to ~65°N, while it is hampered by barren intervals reflecting ice-cover or suppressed productivity during deglaciation at higher latitudes.

Selected species (20) are well illustrated both by LM and SEM on the two plates, their ranges being given in a figure in the text and with the SEM pictures. I have some doubts, however, about the correctness of some magnifications, though. *P. lacunosa* larger than *C. leptoporus* and nearly as large as *C. pelagicus* (Pl.9.1) make me wonder just as much as an *E. huxleyi* of the same size as *G. caribbeanica* (Pl.9.2).

Hine & Weaver report that "apart from the Noelaerhabdaceae, more than 30 accessory taxa are regularly recorded in standard smear slides". We can only regret the fact that so few of the over 200 described living species fossilise at all!

The **REFERENCES** are many and I have not checked if they are all referred to in the text. I did, however, notice that at least one reference in the text of a chapter did not occur here (de Kaenel, in press: p.35). Also, I missed a

reference or two to the work by van Niel (1992a, b, 1994), who studied the nannoconids in the North Sea area and contributed much to our understanding of this genus and its wider than previously/usually advertised distribution in the North Sea area.

The **TAXONOMIC INDEX** is a very useful feature. The genera are listed in alphabetical order and with the species they contain, indicating also the author(s) of both. Family names are arranged in between, and references are made to the chapters, pages and plates where the units are treated/illustrated. Personally, I would have liked also to have an index where all species are arranged in alphabetical order - the brain of a long-time nannofossil specialist does not always remember the actual genus assignment of a species that has changed its genus-assignment several times over the past 30 years. Also, the taxonomic index is not completely reliable. *Calcicalathina alta*, for example, is indexed as shown on Plate 6.3, while it is printed on 6.4.

Also, the one-page **SUBJECT INDEX** is a nice service to the reader looking for certain themes and gives a quick overview of all the themes treated in this splendid volume other than what it promises, the calcareous nannofossil biostratigraphy. We here find reference to, for example, image-capture, the use of the gypsum plate, or to organic scales in Haptophyte algae and the Ypresian Stage. But why not to the Aptian, Barremian or all other stages? Actually, also an index of abbreviations would have been appreciated - it sometimes takes much imagination and time to find the various abbreviations somewhere in the text of the chapter where they are used. (*Editor's note - most abbreviations appear at the front of the book*).

The book features three empty, white pages and two grey ones at the end. What a nice service for the readers to have space to add their own observations right there and to communicate them to the authors or the editor in order to be included into the next edition of the 'black book'. Since there is no indication as to the magnitude of this first edition, it is only my guess that there will be further editions and that some of such remarks will be included in them.

Further remarks:

Mostly it was a pleasure to review this book, but there were some frustrations, too. The most important is the fact, that only in one chapter did an author write the names of the fossils right under the illustration. This practical feature, which was pioneered in the calcareous nannofossil and some other chapters in Bolli *et al.* (1985), has since only been taken up by very few brave colleagues who could convince their editor(s), that, yes, it was possible to print such plates.

For many of us, the title of the book suggests its content to cover the whole biostratigraphy of calcareous nannofossils, from the Triassic to the Recent and for the whole world. Those of us who remember the title and content of its predecessor by Lord (1982) are cautious and positively surprised that the new book does, in fact, include more about the worldwide calcareous nannofossil biostratigraphy than the old one. Some bias on northern Europe is, however, still present but this differs from one chapter to the other.

Range-charts of the most important species, but also of any other species, are a very practical feature - some chapters contain one, others not. After having read, on p.27: "given a good distribution chart there is no need for detailed text description of assemblages, instead this part of a report can concentrate on outlining general results, problems and areas of uncertainty", I had expected many comprehensive range-charts with indications for the ranges of the marker species instead of the 'classical' definition and description of zones. I would have wished for all chapters to include range-charts but realise that, given the different ranges in different regions and environments, the book probably would not have appeared still in this century.

The possibility to compose figures by computer are wonderful and have been used to good avail in the present book. The relatively small format of the printed pages led, however, to strong reductions , especially to figures with a lot of information, which rendered the letters so small that they cannot be read without a magnifying glass or after mechanical magnification by a copy-machine. I have no solution for this problem, since I want all the information given and also appreciate to have it in one figure.

There are some things that could have been standardised in all chapters. Imagine that all the signs used in figures to mark a FO or LO were the same? Dream that the authors had met and decided to invent a new 'standard' zonal system with a logical combination of letters and numbers, small or large letters for the subdivisions? Many will wish that more authors would have added taxonomic remarks to their illustrations, so that one would not need another source in order to learn about the differences between the different species of a genus. Others will long for consistent mention of the known range of each illustrated species. Colleagues working for the oil industry will miss an 'upside-down' zonal system based on LOs, as it had been proposed by previous authors for the Cretaceous over a decade ago. Others again will not always understand the numbering system applied on some plates - once they have found out which plate they are actually looking at. Obviously, some technical editing process missed the lack of numbers on each plate.

In publications such as this, where most authors include personal, not yet published results into their chapter(s), or use not yet published information from colleagues, it is always a problem to know whether a planned paper (in prep.) will be published in time or not. Strategies for how to deal with this vary, but it certainly is a no-no in any reviewed journal. Too many authors here used an 'in prep.' reference (Bergen in the Jurassic; Rutledge & Bown in the Lower Cretaceous; Burnett *et al.* in the Upper Cretaceous ; Varol & Young in the Cenozoic chapter - sorry if I missed any...). Since there is no guarantee that 'in prep.' papers will ever materialise, I assume we should consider Bown *et al.* (Chapter 5) as authors for the many new BC zones and subzones, and not the 'pre-cited' Rutledge & Bown.

Small irritations occurred when reading *Reticulofenestra umbilica* instead of *R. umbilicus* (the

Latin word means navel and does not follow the gender of the genus; many of us have made this mistake for decades). Or when the FO of *Scapholithus fossilis* is given as Hauterivian on p.104 but with an illustrated specimen shown from the Valanginian on p.118. Or when the ranges are only indicated for those species which are illustrated with the SEM, but not next to their LM equivalents. Since most people are doing stratigraphy work with the LM, this may be an educational trick that forces stratigraphers also to look at the splendid SEM-pictures of the species they use? Or when several authors followed after the template that read 'author'. And when, on p.47, Hallam (1975) should be more recent than Hallam (1975). I take the latter as British humour, which non-British people have little chance of understanding. William Smith may have been the father of Historical Geology (p.34 - who was William Smith, and when did he live? Not all of us know our history of geology). But some of us learned that Nikolaus Steno from Denmark was the father of the law of superposition in the 17th century.

After these minor negative points, I would like to continue with some of the many very positive items. The electronically-produced plates in the Neogene chapter are a revelation and will, I assume, serve as models in many future publications - hopefully with somewhat larger letters used for the fossil names. The use of the same magnification for LM illustrations at 2300x must be considered a major break-through for the UCL-school of calcareous nannofossil specialists. They have resisted for many years to give up unequal magnifications for LM photographs as used in Lord (1982) and other papers by the UCL school. The high quality of most illustrations is partly due to the well-preserved material the authors had at hand - I would like to join my thanks to those the authors already bestowed on the providers of such material. It seems not fair that the positive points fill much less space than the negative ones. Yet it is a sign that there is still work out there to do and be presented as papers, books and, I predict, on the WWW. The list of WWW-addresses given on p.28 will be longer next time and hopefully also include the INA-site at **http://gs.ucsd.edu/ina/** and the possibility of publishing in *Paleontologia Electronica* (**http://www-odp.tamu.edu/paleo/**).

Some statistics...

In the **PREFACE**, there is a statement that I wanted to check: "...including over 2000 individual photographs, and as such we believe this to be the most comprehensive atlas of calcareous nannofossils ever produced". In fact, the different chapters dealing with actual calcareous nannofossils are all well illustrated. Some more than others, some including only LM or only SEM illustrations, most including a fair number of both. I have counted them (sorry if I made a small mistake here or there) in order to know how many there are. Then I divided this number with the million years of the geological interval they represent in order to choose the king or queen of illustrations/m.y. Out of curiosity, I did the same for Lord (1982) and for the nanno-chapters in Bolli *et al.* (1985). Here are the results:

In conclusion, Jeremy Young, the author of the Neogene chapter, has presented the most views of calcareous nannofossils per m.y. He used only LM pictures and „the plates were produced using NIH-Image, an image analysis program written by Wayne Rasband of the National Institute of Health". This program allowed Young to get around the physical cutting and pasting and also motivated him to follow Perch-Nielsen (1985) by putting the name of the fossil directly below its illustration. Congratulations and THANK YOU!

		LORD (1982)				BOLLI *et al.* (1985)		BOWN (1998)			
CHAPTER	m.y.*	LM	SEM	TOTAL	ILLUST./m.y.	TOTAL	ILLUST./m.y.	LM	SEM	TOTAL	ILLUST./m.y.
Introduction									12	12	
Triassic	20**					28	1.4	12	11	23	1.1
Jurassic	68	30	60	90†	1.0			234	159	393	5.8
Lr. Cretaceous	39	60	120	180	4.6	1039	7.5	265	120	385	9.9
Up. Cretaceous	31	90	140	230	7.4			646	38	684	22.1
Palaeogene	41							159		159	3.9
Neogene	22							660		660	**30.0**
Quaternary	2							29	9	38	19.0
Cenozoic	65	60	60	120	**1.8**	1456	**22.4**			857	**13.2**
TOTAL	**230**	**240**	**380**	**620**	**2.7**	**2523**	**11.0**	**2005**	**349**	**2354**	**10.2**

Table 1: Number of illustrations in Lord (1982), Bolli *et al.* (1985) and this book. *Duration according to International Stratigraphic Chart, IUGS, preliminary edition, 1998. **For the Triassic, an estimate of 20m.y. was assumed for the time of existence of calcareous nannofossils. † = including also illustrations of Triassic forms.

As for "the most comprehensive atlas of calcareous nannofossils ever produced", this statement does not hold, since Perch-Nielsen (*in* Bolli *et al.*, 1985) produced ~180 photographs more than are included in the 'black book' (Table 1). There are other differences, too. While Bolli *et al.* (1985) mixed LM, TEM and SEM in the same 'plate/figure', and spread them throughout the text between the relevant words, all plates are arranged at the end of the various chapters in Bown (1998), a trait taken over from Lord (1982).

A look at the text shows major differences in the way the various time-intervals were treated. An overview is given in Table 2.

The printed pages are of different surface area, especially between Lord and Bown on one side and Bolli *et al.* on the other: 286.16cm^2 and 291.56cm^2 , against 365.50cm^2 in the latter. We thus have to correct the Bolli pages with a factor of 1.26 to get an equivalent page/m.y. value.

It is surprising how similar the values are when comparing the number of pages/m.y. for the different time-intervals for the Mesozoic. It increased from 0.7p/m.y. in 1982, to 0.8p/m.y. in 1985, to 1.1p/m.y. in 1998. The increase happened both for the various parts of the Mesozoic and for the Mesozoic as a whole, and represents the increase in knowledge that has occurred over the years. This is most pronounced for the Triassic/Jurassic, where progress was most conspicuous. For the Cenozoic the changes were dramatic, leading from 0.5p/m.y. to 2.5p/m.y. in 1985 and back to 1.3p/m.y. in 1998. This is understandable when one considers that the title of the 1982 chapter read: "Cenozoic calcareous nannofossils - a reconnaissance". This was due to the fact that pre-Quaternary Cenozoic sediments are less well-represented in Great Britain and by

		LORD (1982)		BOLLI *et al.* * (1985)			BOWN (1998)	
CHAPTER	m.y.	PAGES	P/m.y.	PAGES	Px1.26	P/m.y.	PAGES	P/m.y.
INTRO./TECH.		**10**					**28**	
Triassic	20#						5	0.25
Jurassic	68						52	0.76
TRIASSIC+JURASSIC	88	13	0.15				57	0.65
Lr. Cretaceous	39	41	1.05				46	1.18
Up. Cretaceous	31	55	1.77				68	2.19
MESOZOIC#	**158**	**109**	**0.70**	**98**	**123†**	**0.8**	**171**	**1.10**
Palaeogene	41						25	0.61
Neogene	22						41	1.86
Quaternary	2						18	9.00
CENOZOIC	**65**	**31**	**0.50**	**127**	**160†**	**2.5**	**84**	**1.30**
REFERENCES		**8**					**19**	
INDEXES		**9**		**17**	**21†**		**13**	
TOTAL	**223**	**167**		**242**		**305.0**	**315**	

Table 2: Comparison of number of pages and pages per million years represented in the three works discussed. *Only the pages of the calcareous nannofossil chapters. #Only that part of the Triassic/ Mesozoic containing calcareous nannofossils. †Number of pages when the size of the pages is taken into consideration.

the fact that very few British nannopalaeontologists at the time were involved in consulting for oil exploration firms or engaged in the Deep Sea Drilling Project. The many pages on the Cenozoic in 1985 were due to the personal experience and preference of its author.

The total number of pages has nearly doubled from 1982 to 1998, but is only a little higher than in the Bolli *et al.* (1985) volume.

In conclusion:

Bown's (1998) 'black book' is an absolute 'must' for all who perform biostratigraphy with calcareous nannofossils. It replaces completely its predecessor (Lord, 1982) and to a very large extent the nanno-chapters in Bolli *et al.* (1985). The editor and authors are to be congratulated to have undertaken the task of giving us again an overview of the 'state of the art'.

THANK YOU.

References

Bolli, H.M., Saunders, J.B. & Perch-Nielsen, K. (Eds). 1985. *Plankton Stratigraphy*. Cambridge University Press. Calcareous nannofossils on pages 329-554, 1006-1022.

Bown, P.R. 1987. Taxonomy, biostratigraphy, and evolution of late Triassic-Early Jurassic calcareous nannofossils. *Spec. Papers in Palaeont.*, **38**: 1-118.

Bown, P.R. (Ed.). 1998. *Calcareous Nannofossil Biostratigraphy*. Chapman & Hall: 1-315.

Bown, P.R., Cooper, M.K.E. & Lord, A.R. 1988. A calcareous nannofossil biozonation scheme for the early to mid Mesozoic. *Newsletters on Stratigraphy*, **20**: 91-114.

Bralower, T.J., Leckie, R.M., Sliter, W.V. & Thierstein, H.R. 1995. Geochronology, time scales and global stratigraphic correlation. *SEPM Spec. Publ.*, **54**: 65-79.

Lord, A.R. (Ed.). 1982. *A Stratigraphical Index of Calcareous Nannofossils*. Ellis Horwood Ltd.: 1-192.

Niel, B.E. van 1992a. New observations on the morphology of *Nannoconus*. *Knihovnička Zemní plyn Nafta, Misc.* **14a**/1: 73-85.

Niel, B.E. van 1992b. Early Cretaceous *Nannoconus* (calcareous nannofossil, *incertae sedis*) in NW Europe. University College London. Unpublished thesis: 378pp.

Niel, B.E. van 1994. A review of the terminology used to describe the genus *Nannoconus* (calcareous nannofossil, *incertae sedis*). *Cah. de Micropal.*, **9/3**: 29-48.

Noël, D., Busson, G., Cornée, A. & Mangin, A.-M. 1994. Le nannoplancton calcaire et la formation des alternances calcaires-marnes dans le Lias des bassins de Marches-Ombrie (Italie). *Riv. It. Paleont. Strat.*, **99/4**: 515-550.

BOOK REVIEW #2

Calcareous Nannofossil Biostratigraphy - a book review with a gender perspective and a retrospection on who was running INA

Reviewed by Katharina von Salis, Geological Institute, ETH-Z, CH-8092 Zürich, Switzerland

For the past seven years I have, besides my work as a geologist/nannopalaeontologist, been involved in work for equal opportunities for men and women at the Swiss Federal Institute of Technology in Zürich (ETH-Z). Here, of the ~12 000 students, some 25% are female while ~10% of the lecturers and 5% of the professors are female. The fact that the number of women has increased in many fields of natural sciences over the past decades also in Switzerland, is a positive development from the times, in the early ‚sixties, when I was the only female student in the Geology Department of the University of Berne. Unfortunately, however, over the past 35 years, women often have not been able to get permanent positions in their profession and they only rarely became professors.

Also, for some time now, I have tried to find the gender aspect, the women's view, in earth sciences and have not found much. I have, however, lived in this environment with open eyes through the past nearly 40 years and have experienced discrimination and encouragement as a woman that men did not experience in the same way. On the occasion of the ‚*International Conference on the History of Geology*' being held in Switzerland in September, 1998, I boldly prepared an abstract and presented, together with a female colleague who had studied in the early 1960s in Zürich, a poster with the title ‚*Women in Earth Sciences in Zürich/Switzerland: why women did not contribute much to earth sciences until recently*' (von Salis & Franks-Dollfus, 1998). I decided to give this aspect some consideration as soon as I had read the acknowledgements in Paul Bown's (Ed., 1998) ‚*Calcareous Nannofossil Biostratigraphy*', the ‚black book', when reviewing it. I eventually decided to do this in two contributions - a normal review (von Salis, this volume) and in the present essay. Since this would have been very short had I restricted my comments to the ‚black book', I decided to add some remarks about women and men in INA and present some preliminary conclusions.

A look at the acknowledgements:

Maybe I have found myself a new sport: ‚acknowledgement-scrutinising with a gender perspective'. The idea is to find out who thanks whom, and why, and if the work of women thereby is hidden in acknowledgements instead of paying credit by including them as co-authors. There are very famous precedents for such cases. Albert Einstein's wife, herself a mathematician, contributed much of the mathematics to his papers - later,