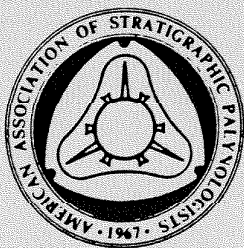


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AASP NEWSLETTER

DEPT. GEOLOGY AND GEOGRAPHY
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Attn: F. Rich





AASP NEWSLETTER

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ISSN 0732-6041 F. J. RICH, EDITOR



Charles F. Upshaw, colleague and friend
(photo courtesy of Mrs. Marge Upshaw).
See the memorial to Charlie by R.W.
Hedlund later in the Newsletter.

PRESIDENTIAL MESSAGE

In my first two messages, I discussed in detail two of four goals to revitalize palynology with suggestions of some appropriate actions to be taken. I will devote this column to ideas on how to achieve the third goal: better communication with fellow geoscientists.

We all recognize the special capabilities of palynology: to correlate from marine to nonmarine sections; to determine facies of fine-grained rocks; to estimate the thermal history of the host rock; to determine climatic fluctuations; to estimate the source potential of a rock; to obtain precise stratigraphic control to record the mode and tempo of evolution; and the nature of boundary and other significant geologic events, etc. Why then are our numbers in decline, when new disciplines such as sequence stratigraphy require more paleontological input, not less? The reason, I maintain, is that we have done a poor job of selling our discipline. How can we do better? Top help answer that question, Ray Christopheher wrote a thoughtful letter from his perspective as a geological manager; Bert Van Helden also addressed this subject in the Canadian Association of Palynologists Newsletter. Both have given their permission to reprint their communications elsewhere in this issue.

We can achieve the most immediate impact by more frequent and more effective contributions to the geoscience "mass media": technical meetings and journals. Furthermore, these contributions must focus on solving significant geological and/or geophysical problems using palynology. Unocal has taken an initial step in providing funding for a travel grant to enable the author of the best applications paper at our annual meeting to present that paper to an appropriate geological society's regional or national meeting. Eventually, I would like AASP to have a reserved spot in the annual AAPG Meeting for "The Best in Palynology," similar to AAPG's current practice of sponsoring "The Best of SEG". This fund could be expanded by broader

participation of other organizations to support additional presentations and/or page charges for publications.

Another strategy is to participate in joint meetings with geological societies. We have scheduled our 1991 Annual Meeting to run concurrently with the GSA in San Diego, and the Southern California Committee will be innovative in enticing GSA members to attend our meeting. A committee chaired by Martin Farley is exploring future joint meeting opportunities, and a separate committee, headed by Steve Jacobsen, has been established to formulate interdisciplinary symposia for the NAPC (North American Paleontological Congress) meeting in Chicago in 1992.

We also can be effective in promoting palynology by becoming active in local, regional and national geological societies, their technical programs and field trips. We need to publicize through our Newsletter, with sufficient lead time, symposia to which we could contribute. AASP recently joined AGI, and now contributes a yearly article to Geotimes reviewing the year's highlights in palynology. We also exchange our Newsletter with the other 19 societies comprising the AGI Member Council. A committee has been formed to assure responsible AASP representation to the AGI Council. Our participation showcases palynology's concern for some of the larger issues of the geological community, as well as publicizing our discipline. At council meetings, each representative highlights the present activities and concerns of his/her organization.

I also believe we underestimate the influence we have as individuals. Fellow scientists may pause to explore a publication about palynology because he has a close colleague who is a palynologist. The personal connection can be the "hook"; hopefully, the substance of the article will sustain the interest.

The other major area requiring better communication is in the workplace, whether it be industrial, academic, or governmental surveys. We need to

increase palynological presentations; collaborate in joint or multidisciplinary projects; and increase personal contacts with other geoscientists. Good science is not enough; we need to be able to sell it. We are competing for limited resources.

AASP is establishing a network of local palynological groups; this network can be the most effective means of communicating with each other and initiating programs and ideas to revitalize palynology. If these groups agree a problem exists and are willing to participate in solving it, then the infrastructure will be there to organize an effective "grass-roots" effort. Communication between groups and with the Board of Directors can be catalyst for success. The stakes are high, and the rewards can be exhilarating, if we are willing to participate!

Harry Leffingwell

PRESIDENT'S MESSAGE

Those readers who feel content to merely check the CAP - Newsletter for spelling mistakes will be disappointed to learn that this heading contains no errors!

I must equally disappoint (?) those readers who would indeed like to receive a massage, by hastily adding that my type of massage involves no physical contact!

My concept of a massage includes the gentle prodding and rubbing of sore and stiff muscles in order to relieve tension and to obtain a soothing and healing effect: for years I have suspected that many of us are indeed very needy of a palynological massage to revive our palynological well-being. Let me further explain:

The effects of falling oil prices in a sometimes overextended oil industry left deep scars in the professional world of earth scientists and their allies: tighter budgets (at best!) and staff reductions were some of the consequences of the imbalance in this economically very sensitive world, caused by reduced

revenues. Most, if not all of us, have directly or indirectly felt the results of this reality.

Of course our palynological community extends much beyond those individuals employed in the industry, but I assume that by now most of us have realized that the impact of tight industry budgets has shown its sometimes devastating effect everywhere. Universities have to cope with it, Government institutions are not exempt, indeed there are perhaps only few spots which remained relatively "safe" and "calm" havens for palynologists.

Concerns about the present and future economic status of palynology have been expressed frequently in the recent past. (R. Christopher, AASP forum, 1986, Benson, AASP: President's Retirement Speech, 1987, Brideaux, CAP Speech, 1988, AASP forum, 1988).

At the CAP Annual Meeting (Houston, 1988) a mandate was given to the CAP executive to pursue this theme and to invite opinions and suggestions from concerned members, and I am but too eager to oblige. Elsewhere in this Newsletter you will find a questionnaire which I would urge you to complete and return to the new CAP - Newsletter Editor, as it may act as a basis for problem-analysis and, hopefully for problem-solving!

It would be appreciated if you could forward a copy of this questionnaire to colleagues you know who are no longer involved in palynology.

I am strongly convinced of the vast potential of palynology as a support - science in many aspects of geology, geophysics, geomorphology, geochemistry, climatology, etc. Palynofacies analysis, maturation studies and kerogen description are "fringe-benefits" in the study of the data concentrated in one single palynological preparation.

I would like to pose two related questions, which in my opinion are very crucial:

Question 1: Are palynologists aware of, and familiar with technological

developments in the field of earth science and have they updated their equipment (with fluorescence, reflectance, photometry, comparison microscopes, etc.) to meet the demands imposed by earth-scientists?

Detailed palynostratigraphic zonation is very useful in frontier areas of exploration, but its significance is much reduced in the more mature areas (which indeed include most of Canada's current exploration targets). Although the stratigraphy of such areas is relatively well understood, there remain other geological questions and problems where palynologists can provide answers through simple, fast and relatively inexpensive studies such as kerogen analysis and palynofacies studies.

In short, the question is: are we prepared to meet the demand?

Question 2: How well do palynologists understand and appreciate the needs of other earth scientists in solving complex and detailed problems other than biostratigraphic correlations? And, inherently, how well are other earth scientists aware of the information which can be so readily obtained from palynological (SL) studies?

In short: how well do palynologists communicate with other earth scientists, and how successful are palynologists in "selling" their wares?

As I have stated before, the science of palynology with all its aspects is in my opinion a very powerful, efficient and relatively inexpensive support-tool in solving many geological (SL) problems. This, however, can only be fully appreciated by those who are taking full advantage of these benefits.

Are we, palynologists, making the best possible efforts to use our tools to their fullest extent and in the interest of those who can use the information?

From my experience I sometimes sincerely doubt that all possible efforts have always been made: all too often I have seen palynological reports, albeit of very high quality, in which geophysical or geological information contradictory to palynological results was totally

ignored or unaccounted for. Or, valuable palynological information often disappeared unnoticed into the files (forever!) because the scientific language spoken by the palynologist was not compatible with the geologists' language!

Call it "Ivory Towers", if you wish.

Time (or rather, economy!) has demonstrated that even these Ivory Towers can tumble with often disastrous consequences for their occupant(s): These towers have thus become Faulty Towers!

We, as palynologists, can not entirely blame the economy, or the management in the oil industry for these painful mishaps: we have locked ourselves up; our brains have become dull and stuffy, no longer sensitive to the new demands of earth scientists around us; we do have vast resources, we do have extremely useful tools, but our muscles are too stiffened to take them up and demonstrate to others how these tools can be used; we need a massage to wake up, to obtain new energy, and we need to show our fellow scientists how useful our beloved science can be!

Bert van Helden
President, Canadian Assoc. of
Palynologists
November, 1988.

* * *

I am sorry that I missed last years AASP meeting, but I was on a six-week assignment at the time, and couldn't break away. I am especially sorry that I missed the general discussion, as the write-up in the Newsletter indicates that some of the issues raised were ones we have discussed many times during the past several years. In fact, my purpose in writing is to share with you my thoughts regarding one of these issues: the future of palynology.

From my perspective, the future of palynology is not so much in the hands of palynologists as it is in the hands of the managers who hire staff, fund projects, and support research. In today's climate, these managers have become increasingly business oriented, and their decisions are

now based as much on economic considerations as on technical issues. Every logging run, every coring program, every new hiree, and every project must be justified from a financial as well as a technical standpoint.

Palynology has always been in direct competition with organic geochemistry, engineering geology, petrology, petrophysics, and other disciplines for recognition by management. With the increasing emphasis on economics, that recognition will be gained only by demonstrating the impact palynology has on the organization's bottom line. To demonstrate this impact, it is essential that palynologists apply their talents to solving geological problems, and not view their science as an end in itself.

I am aware that good biostratigraphy is based on sound taxonomic and morphologic studies. I realize that translating palynologic efforts into increased profits is a difficult task. I know that estimating the "rate of return" on an improved biostratigraphic framework is impossible. But, I also know that management is more impressed with geological models than with range charts, with depocenter maps than with lists of fossils, and with the effect unconformities have on producing horizons than with time-line correlations.

If we want to ensure the future of palynology, we need to show management that our science can help them reach their goals. Our job is not finished when we have described fossils, generated range charts, and proposed zonal schemes. It is the application of these endeavors to the overall objectives of the organization that will have meaning to the managers who control our future.

Thanks, Harry for the opportunity to air my views. But remember, they are only one man's opinions.

Raymond A. Christopher
Manager, Geological Resources
ARCO Oil and Gas Company

UPDATE ON AASP REGIONAL GROUPS

One of the new initiatives of the AASP Board of Directors is the organization of Regional Groups in as many areas as possible. These will serve as vehicles to provide feedback on issues which might affect palynology in general and AASP in particular. They will also function as a means by which we can pass on ideas and suggestions which originate within the Groups, and provide a higher profile for AASP and palynology by engaging in one or more of the following activities: providing speakers for educational institutions, participating in joint programs with local geological societies, liaising with other micropaleontologists, printing a local newsletter, and adopting a program of informal technical presentations and local field trips. The extent to which a particular Group pursues items on this agenda will depend on the number of members in the Group, the time they have available, the distances which separate them, the extent to which a local/regional/national society already exists, and the interest of the members. The main objective is to provide feedback to the Board of Directors on issues, and to present the Board with ideas and opinions which might improve AASP's programs.

Initial efforts to organize Regional Groups began in mid-April, and I am pleased to report that, as of the date of this Newsletter, 21 of a potential 36 Regional Groups have formed or are in the process of forming. These 36 potential Regional Groups include the entire AASP membership, and by now every AASP member should have received a letter outlining the objectives of the Regional Groups. A Regional Representative has been designated to organize the activities for each of these 21 Groups, and I eagerly await responses from Regional Representatives in the remaining 15 areas. If you have not been contacted by a Regional Representative, and/or have not received a letter regarding formation of the Regional Groups, please write me at Unocal Research, P.O. Box 76, Brea, CA, USA 92621, or telephone me at (714) 528-7201 X1650 and I will provide you with the details concerning Regional Groups.

The 21 organized/organizing Regional Groups and their Regional Representatives are:

Alberta/Saskatchewan	Jan Ford
Alaska	John Bennett
Argentina	Carlos Azcuay
California North	Nairn Albert
California South	Rip Ford
Central Europe	Miklos Kedves
Colorado	Kent Van Zant
Cosmopolitan	Ken Piel
D.C. Area/MD/NJ/ NY/PA	Lucy Edwards
England South	Mike Boulter
IL/IN/IA/MN/WI/NE/MO	David Dilcher
Intermountain	Owen Davis
Japan	Kazumi Matsuoka
Louisiana	Michael Zavada
Middle East	Volkan Ediger
Nova Scotia/Newf./ Quebec	Rob Fensome
OH/MI/Western PA	Alan Graham
Oklahoma/Kansas	John Wrenn
Southeast U.S.	Pat Gensel
Texas North	Del Potter
Texas South	Gene Border

The enthusiasm with which this initiative has been received has been both exciting and a reaffirmation of the proposition that members welcome the opportunity to participate in the business of the society--and we expect AASP to benefit substantially from this input. In very short order several issues will be presented to the Regional Groups for consideration--items for which the Board seriously desires input as it considers an appropriate course of action. These will be issues which impact both Palynology in general and AASP in particular.

Ken Piel



AMERICAN
GEOLOGICAL
INSTITUTE

In January, 1989, we reported that the Board of Directors of AASP had voted for our society to apply for membership in the American Geological Institute. Our application was successful, as you can see by this news release from the office of Marvin Kauffman, AGI.

Stratigraphic Palynologists Join Geoscience Federation

Alexandria, Va.—The American Association of Stratigraphic Palynologist was accepted as a member society of the American Geological Institute April 24 in San Antonio, Texas, at the semi-annual meeting of AGI's Member Society Council. The council, which met during the annual meeting of the American Association of Petroleum Geologists, reviewed AASP's application and voted unanimously to accept the association as its 20th member.

AASP currently has 950 members and aims to promote the science of palynology, which is the study of both land-derived and marine organic-walled microfossils such as spores, pollen, and dinoflagellates, as it relates to stratigraphic application and biostratigraphy; to support scientific research among its members and other stratigraphic palynologists; and to collect data and disseminate information to AASP members and the general public to educate both groups in this area of science.

The association holds an annual meeting and publishes a quarterly newsletter, proceedings volumes, field-trip guides and other miscellaneous publications relating to palynology.

AASP officers for 1989 are president, Harry A. Leffingwell, Science and Technology Division, Unocal, Brea, Calif.; president-elect, Judith Lentini, L.I.B. Ltd Consultants, Calgary, Alberta; secretary-treasurer, Gordon D. Wood, Amoco Production Co., Houston; managing editor, David K. Goodman, Arco Oil and Gas Co., Plano, Tex. Directors-at-Large are Owen K. Davis, University of Arizona, Tucson; Stephen A. Hall, University of Texas, Austin; George F. Hart, Louisiana State University, Baton

Rouge; and Loretta S. Satchel, Exxon Co. USA, Houston.

The association will hold its next annual meeting Oct. 17-21, 1989, in Tulsa, Okla.

The American Geological Institute is a non-profit federation of 20 member organizations representing geologists, geologists, geophysicists, and other earth scientists.

AGI COMMITTEE EXPANDED

The AGI Committee has been expanded to three members to better represent AASP at AGI Council meetings, which are held semi-annually at the AAPG and GSA annual meetings. Two members will serve staggered three year terms, and the remaining member, as President of AASP, serves for one year during his/her term in office. This structure provides continuity of AASP representation to AGI Council and also ensures that at least one member of the committee is on the Board of Directors. The larger committee also can better share the responsibility of attending two extra meetings a year. Harry Leffingwell will continue as Chair, and will serve the remaining 1 1/2 years of his term, which expires at the 1990 AASP Annual Meeting. Loretta Satchell will serve the other three year term, which expires at the AASP 1992 Mid-year Meeting. Loretta, who is also Chair of the Publicity Committee, will be an effective liaison for various professional and public initiatives being considered by both organizations. Judi Lentini, as President, will serve a one year term, and will provide liaison between the AASP Executive and AGI.

NEW PUBLICATIONS FROM AGI

Two new publications are now available from the American Geological Institute, 4220 King Street, Alexandria, VA., 22302-1570. Telephone 1-(800) 336-4764.

GLOSSARY OF GEOLOGY SPELLING CHECKER

- 22,000 geoscientific words on diskette. Terms are in the ASCII format. The package includes a program to segment the file so that it can be added to a spelling checker. \$39.00.

GEOMEDIA: A GUIDE FOR GEOSCIENTISTS

WHO MEET THE PRESS - by Lisa Rossbacher and Rex Buchanan offers practical advice about the benefits and pitfalls of dealing with the press. 56pp. \$3.95, and \$1.00 for shipping.

See *Geotimes* for descriptions and prices of other publications such as *Glossary of Geology*; *Geowriting*; *Guidelines for Reviewers of Geological Manuscripts*; *Writing in Earth Science*; *AGI Data Sheets*; and *Directory of Geoscience Departments*.

CHARLES F. UPSHAW, 1928-1989 IN MEMORIAM

Charles F. Upshaw - a gentle man with outstanding scientific talent - died quietly in Tulsa, Oklahoma, on February 23, 1989 following emergency surgery. The biostratigraphic community has lost one of its most persuasive spokesmen with his death. Those who knew him well have cherished him as a trusted friend and valued colleague with the highest personal and professional integrity. He will be missed by all of us.

Charlie was born in Maben, Oktibbeha County, Mississippi, on July 7, 1928, the son of an educator in that state's school system. After completing high school, he enlisted in the Navy, working in radio and radar maintenance until 1948. He received a BS degree in petroleum geology from Mississippi State University in 1951, and the MS degree in geology from the same institute in 1953. Although his minor was in physics, Charlie had become interested in biostratigraphy and completed a thesis entitled, "The Age of Chickasawhay Limestone in Mississippi," a study based on smaller foraminifers. While at Mississippi State he taught courses in petroleum geology, subsurface geology,



stratigraphy, micropaleontology, invertebrate paleontology and field geology, inspiring many younger students to continue their geological educations.

Desiring to further pursue his interests in biostratigraphy, Charlie enrolled in the graduate school at the University of Missouri. He became interested in the newly emerging study of stratigraphic palynology and completed a dissertation entitled "Spore Analysis of the Cretaceous Frontier Formation, Wind River Basin, Wyoming," an early venture into post-Paleozoic palynology. He was awarded his PhD in Geology in 1959. His enthusiasm for the subject was contagious within the Department of Geology and he inspired six master's candidates to undertake palynologic theses - all of which he unofficially directed. His love of teaching had not diminished, and between 1954 and 1959 he taught courses at the Missouri campus in principles of geology, subsurface geology and invertebrate paleontology, as well as summer courses at the Wyoming field camp.

Upon completion of his formal studies in 1959, Charlie accepted a position in the newly-formed Geological Research Group at Amoco's Tulsa Research Center. He flourished in this environment and helped to promote the field of palynology within Amoco. By 1960, the company's first Palynological Research Group was formed and by 1962 it was one of the largest of its kind in the industry. Those of us who were part of this new venture learned much from Charlie about the potential application of biostratigraphy in solving chronostratigraphic problems. He had planned to stay in industry for only four or five years and then return to teaching, but opted to remain because he became fascinated with all aspects of the petroleum industry. He was transferred to division offices, first to Oklahoma City in 1966 and then to Fort Worth in 1967. One year later he returned to the Tulsa Research Center to become supervisor of the Palynology Research Group, a position he was to hold for nine years. During this period of time, the field of palynostratigraphy flourished. In

1977, Charlie was appointed a Director within the Geological Research Division, a responsible position in which he excelled until his untimely death.

During all of his industrial career, he found opportunities to teach, to coordinate research efforts and to solve complex stratigraphic problems, thereby making his organization a leader in the field of biostratigraphy.

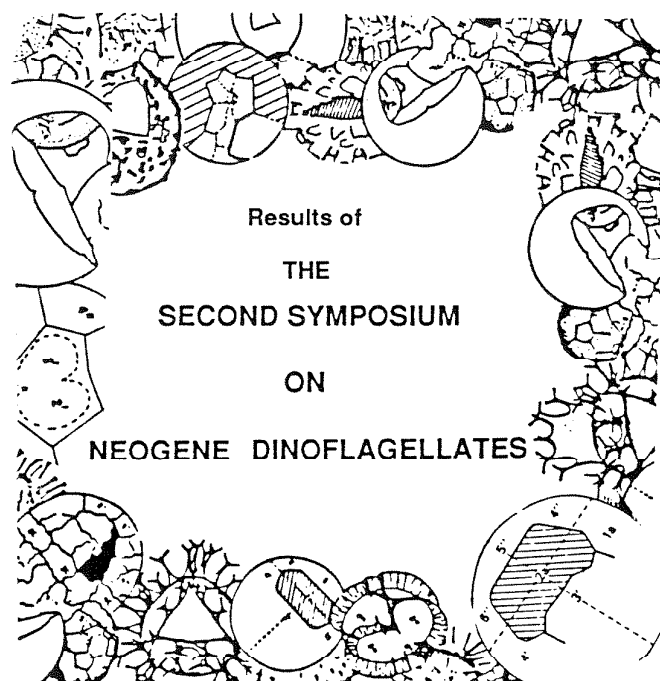
Charlie was a member of numerous societies, including AAPG, GSA, SEPM, AASP, Paleontologic Society of America, Sigma Gamma Epsilon and Gamma Alpha. He was one of the founding members of AASP, having been instrumental in the formative years of our organization. He helped to frame our first constitution and bylaws in 1967, was the second President (1968-69), Councilor (1969-70) and served on numerous committees. He attended all of our Annual Meetings but one and was involved in the organization of AASP's Tenth Annual Meeting in Tulsa.

Each of us has our own special memories of Charlie Upshaw. He will be missed by all who knew him either as a fellow

scientist or personal friend. Charlie is survived by his widow, one son, one daughter, his mother, one brother and a host of friends.

Richard W. Hedlund

Acknowledgement: Mrs. Marge Upshaw was of great help in providing information about Charlie's earlier career.



Once a somewhat neglected area of palynological research, Neogene dinoflagellates have received increasing interest over the past five or so years. Industrial impetus has been instrumental in this upsurge. So, too, has been the Ocean Drilling Program, where Neogene and Quaternary dinocyst stratigraphy and paleoenvironment analysis is now as vital a tool for high latitude drilling as nannofossils and planktonic foraminifera are for the lower latitudes. Perhaps of equal importance has been the realization, in true uniformitarian spirit, that Neogene and Quaternary dinoflagellate research is the means by which we can extrapolate our knowledge of many living dinoflagellate taxa, back into the Paleogene and beyond.

The recent development of Neogene dinoflagellate research has not been

without some growing pains. During discussions among Martin Head, Peta Mudie and Anne de Vernal, at the Canadian Ocean Drilling Workshop in Montreal in September, 1986, it became apparent that important problems of Neogene dinocyst biostratigraphy and paleoecology would be resolved if dinocyst workers shared the same concepts of morphology for the species they used. Thus emerged the idea of a Workshop on Neogene Dinoflagellates, at which colleagues might gather and compare material under the microscope. One month later, at the AASP meeting in New York, this became a reality. Dan Habib willingly offered his laboratory, office and microscopes as a venue for a workshop. The atmosphere was informal, and almost the entire cast of Neogene dinophycologists could have been (and was!) squeezed into New York taxi cabs.

This workshop was so useful that it seemed unthinkable not to include a sequel to this in the program following the Second Symposium on Neogene Dinoflagellates. The Second Workshop on Neogene Dinoflagellates was held at the Loeb Building of the Marine Biological Laboratory on the last day of the Fourth International Conference on Modern and Fossil Dinoflagellates ("Dino 4", April 17-22, 1989), and over sixty palynologists attended. Participants were able to compare holotypes (over 40 being available for inspection) and other materials under the microscope, view 35 mm photo-slide presentations and videotape recordings, and discuss species concepts. Several of the microscopes had camera and video attachments, and video screens for audience viewing of specimens.

A round table discussion, held in the afternoon, focussed on more than 35 dinocyst taxa that were considered problematical with respect to their taxonomy, stratigraphy or inferred paleoecology. The discussion was most cordial and enlightening. It was tape-recorded and an edited transcript, heavily condensed in places, was created. This was then circulated to those who had actively contributed to the discussion, allowing them to verify and elaborate upon (but not refute!) statements where they thought necessary, without changing



Sarah Pierce Damassa and David K. Goodman with Sarah's rendition of *Peridinium limbatum*, the dinoflagellate that was the logo of Dino IV. The dino-pillow was designed and hand sewn for the meeting by Sarah. The Organizing Committee awarded the pillow to Sarah in recognition of her significant contribution to the meeting. (Photo by J.H. Wrenn.)

the spirit of the round table discussion. The final version of this round table transcript will be published in a forthcoming Neogene Dinoflagellate Volume.

The Third(?) Workshop on Neogene Dinoflagellates will be held under the auspices of the Fifth International Conference on Modern and Fossil Dinoflagellates, in Utrecht, The Netherlands, in 1993, and we look forward to seeing both old and new faces there. We also hope to see different problematical species addressed at this Workshop.

ACKNOWLEDGEMENTS

We would like to take this opportunity to thank all those who made the Second Workshop on Neogene Dinoflagellates a worthwhile and enjoyable event. In particular, we are indebted to Phil Presley, the Carl Zeiss representative at the Marine Biological Laboratory, for providing a variety of the new Carl Zeiss Axio-line of research microscope, and for his cheerful and efficient help in their operation. Don Anderson (Woods Hole Oceanographic Institution) provided invaluable assistance in the organization of the Workshop, and Dave Goodman (Arco Oil and Gas Company, and Chairman of the Dino4 Organizing Committee) provided encouragement for its financial support that permitted the Workshop to be held. The Workshop would not have been possible without the enthusiastic participation of colleagues who brought holotype and comparative materials, videotapes, and projector slides for display.

Editor's note: Elsewhere in this issue you will find a rather extensive review of Dino 4 contributed by John Wrenn.

POLLEN PROVIDES ANCIENT WEATHER REPORT

The following item was sent by Vaughn Bryant, and was originally printed in the April 8, 1989 edition of Science News. Granted, this kind of article provides the great unwashed with only a dusting of information, but it's better than nothing!

For allergy sufferers, pollen seems to exist for the sole purpose of making people miserable. But palynologists, who study pollen and spores, say the plant grains are nothing to sneeze at. Since pollen can survive in sediments and rock for thousands and even millions of years, it gives scientists a portrait of the plants that once covered an area. At the forefront of pollen science, a new study shows these tiny reproductive elements can provide a detailed record of climate fluctuations during the last Ice Age cycle. Researchers from the laboratory of Historical Botany and Palynology in Marseilles, France, report in the March 23 Nature that they have compiled a

140,000 year-long climate history for eastern France based on pollen records for that region. They collected the fossil pollen from sediments that have built up over the last 140,000 years in a lake swamp.

The scientists created the climate history through a complex translation process involving several stages and mathematical techniques. First they gathered modern pollen samples from a variety of locales in Europe, North Africa and Siberia. Then, based on the different kinds of vegetation found in each sample, they defined a mathematical relationship between the pollen and the climate conditions for that particular area. Finally they matched the fossil pollen samples against the most similar modern ones. This process gives a continuous measure of temperature and precipitation conditions reaching back in time through the last Ice Age and into the previous interglacial period, which occurred roughly 130,000 to 115,000 years ago.

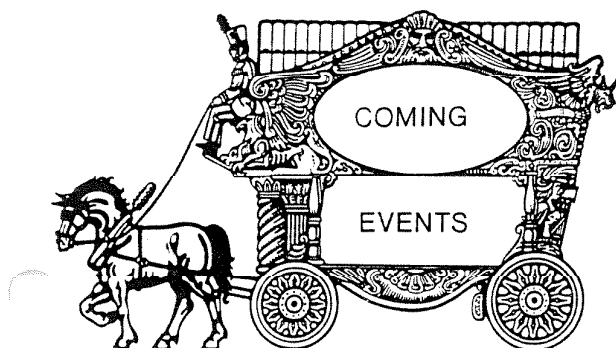
This type of record will aid researchers trying to understand why Earth has swung back and forth between cold and warm periods over the last several hundred thousand years. In the past, investigators have relied mainly on long climate records from deep-sea sediments and more recently from cores of the Antarctic and Greenland ice caps. The continents have provided far less long-term information.

Vera Markgraf, a palynologist from the Institute of Arctic and Alpine Research of the University of Colorado in Boulder, says the French study is important because "it shows that there are other records besides the deep-sea record that can help us understand how the climate has changed."

Palynologists have drawn climate information from pollen for a long time, but this is one of the most detailed continuous records ever made. Still, Markgraf and others caution that the methods used in the new study are so complex they could be problematic. "It becomes acrobatics and a little bit dubious after a while," she says, "because you're going through too many steps."

JOB WANTED

Palynologist/oil explorationist with three years industrial experience is seeking a position upon completion of his doctorate. Educational background includes a masters degree in micropaleontology and palynology specializing in the Mesozoic and Tertiary of Northwest Europe. Presently researching Mesozoic marine palynomorphs from Canada, Europe, and the Arctic. Oil experience in western Canada and the Arctic as a stratigrapher and petroleum geologist. Will consider carefully all offers of employment. For further details please contact the editor.



**AASP SHORT COURSE NEOGENE TO RECENT
DINOFLAGELLATES TULSA, OKLAHOMA,
OCTOBER 15-17, 1989**

An AASP short course on Neogene-Recent dinoflagellates will be held in Tulsa, Oklahoma, during October 15-17, 1989. It is to take place during three days prior to the AASP Annual Meeting which will also be held in Tulsa. The same hotels will be used for both events to provide maximum convenience for registrants. Instructors for the short course are Lucy E. Edwards (U.S. Geological Survey), Martin J. Head (University of Toronto), and Karen A. Steidinger (Florida Marine Research Institute). The organizer is Martin J. Head.

OBJECTIVES

The purpose of this three day short course is to provide a current review of Neogene through Recent dinoflagellate research in what is a rapidly expanding field of interest in palynology. We hope

this course will bridge some of those gaps in understanding between living and fossil dinoflagellates. We hope it will lead palynostratigraphers to be more concerned with living dinoflagellates, and to consider the entire life cycle of their fossil "marker" taxa. It will expose modern dinoflagellate workers to the evolutionary and biostratigraphic significance of dinoflagellate cysts. It will also address the high potential utility of Neogene to Quaternary dinoflagellates in biostratigraphic and paleoecological studies.

CONTENT

The short course will cover:

(1) Holocene dinoflagellates (topics will include the basic morphology of freeliving species, cytology, known life cycles and their corresponding vegetative and sexual stages, and distributional patterns).
Instructor: Karen A. Steidinger

(2) Neogene and Quaternary dinoflagellates (topics will include a morphologic overview of significant taxa together with their biostratigraphic distribution, paleoenvironmental significance, and provincial distribution).
Instructors: Lucy E. Edwards, Martin J. Head.

Other topics may be included and subjects will be generously illustrated with 35 mm photo-slides. Registrations will receive a short course volume and a comprehensive 35 mm photo-slide set.

ATTENDANCE CAPACITY

Registration will be limited to about 30 to 35 people.

COST

The registration fee has not been finalized but will be on the order of \$350 to \$400 for professionals, and significantly less for students. Accommodation is available at very reasonable rates (\$54 per night single occupancy, \$59 double, \$64 treble, \$69 quadruple).

HOW TO REGISTER

As an expression of interest in attending the AASP Short Course on Neogene to Recent Dinoflagellates please write to Martin Head stating whether you are a student or professional and giving brief details of your palynological experience in the areas covered by the short course. Please include your address, phone, FAX, and Telex numbers. We look forward to seeing you in Tulsa.

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Dr. Bernard Owens
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England

CALL FOR PAPERS

XXII - ICCP PALYNOLOGICAL SYMPOSIUM Buenos Aires, 22-27 September 1991

The XII International Congress of Carboniferous-Permian Stratigraphy and Geology, to be held in Buenos Aires, Argentina, during 22-27 September 1991, will incorporate a Symposium devoted to Carboniferous-Permian palynology. A comprehensive programme is envisaged, including: miospores, megaspores, organic-walled microphytoplankton, natural affinities of palynomorphs, plant evolution, palynostratigraphy (including stratigraphic boundary problems relating to Devonian-Carboniferous and Permian-Triassic), palynomorph/lithotope relationships; and applications in phytogeography, palaeoclimatology, palaeoecology, and maturation studies.

Palynologists who are actively engaged in Upper Palaeozoic studies are most cordially invited to participate in the Symposium, and to write to any one of the Conveners listed below, including if possible a provisional title for their contribution. (Copies of the first and subsequent circulars of XII - ICCP can be obtained from Dr. Sergio Archangelsky, XII - ICCP Convener, Museo Argentino de Ciencias Naturales, Av. A. Gallardo 470, Buenos Aires 1405, Argentina.)

The Society for Organic Petrology

invites you to present a paper and participate in the

SIXTH ANNUAL MEETING at
Urbana, Illinois, on
October 29 to 30, 1989.

The meeting will be sponsored by the Illinois State Geological Survey, Southern Illinois University, Carbondale, and Inland Steel Research Laboratories

New research and review papers are called for on the following topics:
Petrographic and chemical properties of macerals and kerogens, Applications of fluorescence microscopy, Petrology and geochemistry of kerogens in shales, Applications for coke making - review and progress.

The meeting will be held in Jumer's Castle Lodge, Lincoln Square, Urbana, IL 61801. Sleeping accommodations are available at Jumer's Lodge. All reservations should be made in advance by telephoning the registration desk (217) 384-8800. Be sure to mention that you are attending the Society for Organic Petrology Meeting. An award will be given for the best student paper.

Registration fee: professional: \$95.00,
Student: \$80.00

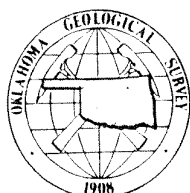
For more information: Dick Harvey, ISGS
(217) 244-0836

Contributions from industries and others
to help make this a successful meeting
are encouraged. For more information
contact Dennis Kaegi (219) 399-6207.

of these topics, and have an interesting
paper or poster to present, we welcome
your contribution toward making this a
highly successful symposium/workshop.

For more information contact Kenneth S.
Johnson, Oklahoma Geological Survey,
100 E. Boyd, Room N-131, Norman, OK
73019 (phone: 405/325-3031).

ANNOUNCEMENT AND CALL FOR PAPERS
Source Rocks, Generation, and Migration
of Hydrocarbons and Other Fluids in the
Southern Midcontinent



OKLAHOMA
GEOLOGICAL SURVEY

A Symposium/Workshop
February 6-7, 1990
Norman, Oklahoma

The Oklahoma Geological Survey
announces sponsorship of its third
symposium/workshop in as many years.
The theme for this symposium is "Source
Rocks, Generation, and Migration of
Hydrocarbons and Other Fluids in the
Southern Midcontinent." Topics to be
covered include: characterization,
depositional environments, and diagenesis
of known or potential source rocks;
thermal and pressure influences on
source rocks; generation, migration, and
correlation of hydrocarbons; and
characteristics and flow dynamics of
water and other fluids (such as
paleohydrology). These topics need to be
applied to some part of the Southern
Midcontinent, which includes all of
Oklahoma, north Texas, Texas Panhandle,
northeast New Mexico, southeast
Colorado, southern Kansas, southwest
Missouri, and western Arkansas. If you
have been doing exploration in the
Southern Midcontinent, or studies on any



Early Permian fusulinids from the Owens
Valley Group, East-Central California,
SPE 217, by Robert T. Magginnetti, Calvin
H. Stevens, and Paul Stone, 1988, The
Geological Society of America, P.O. Box
9140, Boulder, CO 80301. Paperback, 65
p., 8-1/2"x11" format, profusely
illustrated. ISBN 0-8137-2217-9. Price
\$11.25, postpaid.

Geological Society of America Special
Paper 217 is a paperback report whose
65 pages include location maps, measured
sections, stratigraphic and range charts
as well as 14 plates devoted to fusulinid
Foraminifera. Two welcome appendices
provide tabulated data concerning
collecting localities and repositories of
types and figured specimens,
respectively. This is a visually
attractive volume, including cover photo
in color, with well-designed format and
carefully crafted figures which are both
informative and uncluttered.
Reproduction of the plates,
unfortunately, does not match the quality
of the other illustrations.

In terms of content, the paper is
comprised of two major parts -- the first
and shorter of which concerns the
geologic and paleogeographic aspects of
the study whereas the second is devoted
to systematics. As indicated by its title,
the paper deals primarily with the
taxonomy and biostratigraphy of
fusulinids from the Lower Permian

portion of the Owens Valley Group from the Darwin Canyon and Conglomerate Mesa areas in east-central California. Most of the fossils are from gravity-flow deposits containing mixtures of faunal elements from presumed coeval environments. However, the authors feel there was little stratigraphic reworking of older faunas, thus allowing the recognition of more or less standard subdivisions of the Lower Permian. Aside from their biostratigraphic value, the fusulinids provide an added parameter of paleogeographic significance. The Owens Valley Group contains fusulinid elements of the *Pseudochwagerina* association of the Texas-Cordilleran region plus some forms from the *Chalaroschwagerina* association of the eastern Klamath Mountains, as well as some species endemic to the area. Thus the temporal relationships of these provincial faunas

are very significant from the standpoint of regional correlation, assuming, as the authors believe, that there is no stratigraphic dislocation involved.

More than half the paper is devoted to systematics, which is not surprising in view of the size of the Owens Valley fauna. The authors describe 60 species of fusulinids, 17 of them new, as well as a new genus, *Reticulosepta* and its species *R. pholeophobia*, *R. elongata*, and *R. ? sp. A*.

The systematic descriptions are well written and free of the "telegraphese" demanded by some editors as a space-saving measure. A welcome addition is the statement of the number of specimens studied, but, curiously, no etymologies are given. Tables of measurements are not included in the paper, although some biometric data are mentioned in the descriptions. The extent to which measurements are included in current publications is a philosophical question relating to the importance attributed to quantitative morphologic data, and there certainly are two schools of thought on the subject. Traditionalists will find the measurements in this paper adequate, while those concerned with population variability may wish for more comprehensive biometric data.

My only reservation is the paucity of sagittal data presented in this work. Of the 60 taxa described, only three contain septal counts in their characterizations, and only two sagittal sections are figured in the 14 plates of fusulinids. No sagittal data are provided in the diagnosis of the new genus *Reticulosepta*. While it is true that visual identifications are made, for all practical purposes, from the axial view, the fact remains that significant parameters relating to septation and initiation of the growth curve are obtainable only from the sagittal section. A complete characterization of a new taxon should include both axial and sagittal data, in my opinion. Perhaps this omission was circumstantial. In view of the thoroughness exhibited by the authors in preparation of this paper, it seems most likely that the scarcity of sagittal data is more a function of availability of material than of intent.

The above criticism notwithstanding, this is an important document of biostratigraphic and paleogeographic significance which should be in the library of every student of the Late Paleozoic.

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Tide-Influenced Sedimentary Environments and Facies, P.L. de Boer, A. van Gelder, and S. D. Nio (Editors), 1987. D. Reidel Publishing Company, P.O. Box 17, 3300 AA Dordrecht, Holland (Sold and distributed: In the U.S.A. and Canada by Kluwer Academic Publishers, 101 Philip Drive, Norwell, MA 02061, U.S.A.; In all other countries by Kluwer Academic Publishers, P.O. Box 322, 3300 AH Dordrecht, Holland), i-x + 530 pages, illustrated, ISBN 9027726221, hardbound, Price Dfl. 190.00, US\$ 89.00, UK 58.75.

This hardbound volume is a collection of papers mostly presented during the 1985

Symposium on Clastic Tidal Deposits held in Utrecht. Unlike many other symposium volumes, this is a representative and comprehensive collection containing the extended version of symposium papers, reports on studied excursion items, and several solicited postmeeting contributions.

The vast subject of intertidal sedimentation with its varied facies and environments is well represented in these proceedings by a wide range of topics and views. The 31 papers of the volume deal with the following geographical areas: 4 discuss general principles involved in tidal sedimentation, 21 deal with localities in Europe, the North Sea, and Canada; 3 in onshore and offshore Africa; 2 in China; and one in Australia. The papers are grouped within three sections: offshore tidal deposits (14 papers); near- and onshore tidal deposits (14 papers); and biological aspects of tidal deposits (3 papers). The papers express such varied observations, results, and views that it was appropriate to review them in the sequence in which they appear in the volume.

Dott's opening article is a synopsis of the tenuous nature of the preservation potential of periodic or nonperiodic episodic events in shallow marine deposits. He defines these various types of events and distinguishes truly deterministic periodic phenomena from stochastic ones. However, he cautions that some stochastic phenomena may be found to have deterministic causes such as apparently random biotic extinction patterns in the fossil record that seem to indicate a cyclicity of astronomic encounters with the earth. The mode of sand preservation in various environments is analysed in the next nine papers of the first section "Offshore Tidal Deposits". Stride discusses conditions for preservation of modern marine sand wave structures and recognizes similar preservational modes for some Cretaceous and Tertiary cross-bedded marine sands probably representing ancient sand waves. Yang Chang-shu and Sun Jia-song explore the characteristics of tidal sand ridges on the East China Sea shelf which developed during post-glacial transgression under shallower water depths and stronger tidal currents than those of the present day.

Smith's three articles provide morphological evidence for sand bypassing over sand waves and through the sand wave field, interpret the morphological development of a gap, and analyse the stability of an offset kink in the southern North Sea. Based on television, photographic, and side-scan sonar data, Belderson, Wilson, and Holme observe longitudinal furrows in gravel and their transition with sand ribbons on the sea floor of the English Channel. De Maeyer and Wartel explore the relation between superficial sediment grain size and morphological features of the coastal ridges off the Belgian coast. Their finding that the average grain size values coincide with the seaward flank, not with the ridge crest, support a landward accretion of the coastal ridges. Wiersma and van Alphen's initial results of morphological mapping of the Dutch shoreface and adjacent shelf area, combined with lithological, hydrodynamical, and geological data of the area, led to the hypothesis of shorefront development in relation to sand transport and the relation between shore-face connected ridges and recent coastline behavior. Kohnsiek reports on the mechanism of the reworking of former ebb-tidal deltas into large longshore bars after the artificial closure of tidal inlets in southwest Netherlands.

Santisteban and Taberner describe the geometry, structure, and geodynamics of an Eocene sand wave complex in the Catalan Basin (Spain) and discuss its sedimentation mechanisms. Houthuys and Gullentops describe Eocene Vlierzele Sands in Belgium and suggest that these sands represent a longitudinal tidal sand ridge deposit. The next paper, by the same authors suggests that the middle Eocene sedimentary structure of a medium to coarse sand facies exposed in the sand pit at Kraaiberg, Belgium, represents a short period depositional build-up by a series of large transverse bars.

In the final article of the section, Flemming explores pseudotidal sedimentation in a non-tidal shelf environment in the southeast African continental margin. The interaction between the Agulhas Current and the local

shelf morphology with wind and swell driven counter currents has produced depositional features associated with tide-dominated environments.

In the second section "Near-and Inshore Tidal Deposits", the first eight papers discuss Recent and sub-Recent depositional processes. Villas and others describe the sedimentary processes and facies of the Corrubedo tidal inlet that is a part of a beach barrier complex along a mesotidal coast in Galicia, Spain. Kohsiek and others report on the sedimentary processes on a sandy shoal in a mesotidal Oosterschelde estuary in the Netherlands. Roep and van Regteren Altena recognize fossil high-and low-tide levels in tidal sediments of 3800-3635 BP at Bovenkarspel, the Netherlands. On the basis of the compaction rate and the sea level rise, they calculate the mean sea level rise during the period between when the people colonized (3275 BP) and deserted (2620 BP) the area. Terwindt reviews diagnostic criteria for identifying tidal deposits and subenvironments of siliciclastic inshore tidal deposits. Wand Bao-can and Eisma's study of the Wenzhou Bay mudflat in southern Zhejiang (China) shows that the mud deposition is related to the current velocity and submergence depth whereas its erosion takes place during storms, particularly typhoons, with the net result of the mudflats growing about 10 m per year seawards. Flemming reports on the processes and pattern of sediment mixing in a microtidal coastal lagoon along the west coast of South Africa. Pejrup suggests a new triangular diagram for interpretation and classification of recent estuarine sediments. Dionne examines the characteristics of modern high latitude tidal flats in cold regions.

Among the subsequent six papers discussing ancient deposits, Ladipo interprets the different levels of periodicity in the Upper Cretaceous Ajali Sandstone of the Anambra Basin in Nigeria. He explores the various sedimentary structures within the succession that show bedform modifications in response to changing hydrographic conditions. Kessler and Gollop describe in detail a 14 m thick inner shelf/shoreface intertidal

transition zone within the Upper Precambrian Port Askaig Tillite of western Scotland. Diemer and Bridge's article illustrates intrabasinal and extrabasinal controlling factors in the deposition of the fluvial to marine sediments associated with the Tournaisian marine transgression in southwest Ireland. Thorez, Goemaere, and Dreesen interpret tide-and wave-influenced depositional environments based on the stratigraphy and lithology of the Psammites du Condroz (Upper Devonian) of Belgium. Smith considers several examples of modern and Quaternary point bar deposits analogous to the Athabasca Oil Sand deposits of the Lower Cretaceous McMurray Formation in northeast Alberta, Canada. Rahmani describes in detail the estuarine tidal channel and nearshore deposits of the transition between the Late Cretaceous Bearpaw and the Horseshoe Canyon Formations of southcentral Alberta, Canada. He compares the depositional environment with modern estuaries of the mesotidal Atlantic Coastline of Georgia (USA), the Rhine delta estuaries (the Netherlands), and the macrotidal coastline of SW France. Rahmani uses fossils and microflora (p.452) for paleoecological interpretations, but does not consider the earlier detailed paleoecological studies based on palynology of the Horseshoe Canyon and the Bearpaw Formations of the same area (Srivastava 1970, Harland 1973).

Among the three papers of the final section, "Biological Aspects of Tidal Deposits", Belperio and others describe in detail the Holocene tidal sequences in southern Australia demonstrating the relationship between sediment-organism zonation and the evolution of sequences. Grant discusses the role of benthic microalgae to stabilize intertidal sand sediments. In the final article, Vos, de Boer, and Misdorp provide qualitative and quantitative observations on sediment stabilization by benthic diatoms in intertidal sandy shoals. Terms such as "mucus" for diatom exudates (slimy fluid) and "skin" for the diatom cell-wall (p. 499) are used in the final two articles. In general, these terms have a

zoological connotation and may confuse readers.

The volume covers varied intertidal sedimentary environments and facies of different parts of the world ranging from the Precambrian to the Recent but largely remains limited to siliciclastic sediments. In the preface, the editors regret the absence of carbonate and mixed carbonate/siliciclastic sediments in the volume. However, they do not address the absence of organic sediments that are so important in interpreting environments of the intertidal facies.

Intertidal sequences have several depositional environments that are important petroleum resources. Siliciclastic sediments form excellent petroleum reservoirs. Thus this volume should be of interest to sedimentologists, petroleum geologists, organic sedimentologists (palynofacies workers), as well as palynologists. This excellent reference volume is well written, edited, printed, and illustrated. All libraries and institutions should possess it. However, the steep price may preclude many from buying a personal copy of this volume.

Harland, R. 1973. Dinoflagellate cysts and acritarchs from the Bearpaw Formation (upper Campanian) of southern Alberta, Canada. *Paleontology*, 16(4):665-706.

Srivastava, S.K. 1970. Pollen biostratigraphy and paleoecology of the Edmonton Formation (Maestrichtian), Alberta, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 7:221-276

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Chondrichthyes II: Mesozoic and Cenozoic Elasmobranchii by H. Cappetta, 1987. *Handbook of Paleoichthyology*, Volume 3B. Gustav Fischer Verlag, Stuttgart-New York; 193 pages; ISBN 0-89574-231-4. \$150.00

Paleoichthyology, the study of fossil

fishes, is quite faraway from palynology, but nevertheless I offer this book review on the off-chance that fellow fossil fish fans may be in the audience. This is the long-awaited companion volume on fossil sharks and rays, covering Mesozoic and Cenozoic forms. Six years after the publication of part 3A (Zangerl, 1981) in this series of paleoichthyological handbooks, Henry Cappetta has made quite an effort to compile data on the teeth of all Mesozoic and Cenozoic elasmobranchs. The descriptions and especially the carefully prepared figures are one of the strengths of this book as they permit good and secure identification of the fossils. This is of great importance for stratigraphic work, because the fossil record of this group, consisting mainly of isolated teeth, is one of the richest and perhaps the stratigraphically most complete of all vertebrates (Maisey, 1984a).

The strong focus on tooth description in this volume has resulted in the drawback of having only a very short and almost superficial introductory treatment of the general morphology of these organisms. Other than the large amount of data on teeth, scales and fin spines, there is little information provided on other preserved parts of the body, especially on the cranial morphology of previously described Mesozoic forms. This discrepancy is evident, for example, in Figure 82, where the entire specimen of *Scapanorhynchus lewisii* is sketched as a simple outline drawing, whereas the teeth of a related form, *S. texanus*, are figured in magnificent detail.

The classification used in this book is based mainly on work on recent forms by Compagno (1973, 1977) and hardly includes critical remarks by paleoichthyologists such as Schaeffer (1981) and Maisey (1984b).

I would have found it quite useful if the author had added an identification key, at least for the teeth, and, furthermore, it would have been useful had the author provided a table on the stratigraphic ranges of the individual taxa. It would have made editorial separation of the Paleozoic (Zangerl, 1981) from the Mesozoic and Cenozoic elasmobranchs somewhat less abrupt and artificial.

Nevertheless, Henry Cappetta has worked out a fine source book on Mesozoic and Cenozoic shark and ray remains (and it must have been an imposing amount of compilation) and it will be, without doubt, a primary reference source, for students of paleoichthyology and biostratigraphy, despite its \$150 tag.

Toni Burgin
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Switzerland

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Dinosaurs of the West by Ron Stewart.
1988. Mountain Press Publishing
Company, P.O. Box 2399, Missoula,
Montana 59806. \$14.95 paperback. 144
pages.

Dinosaurs of the West, published by
Mountain Press Publishing Company, is
another in their fine line of geology books
that are scientifically accurate, yet
written in non-technical language for the
general public. Considering the current
interest in dinosaurs, this paperback book
is an excellent introduction to dinosaurs,
as well as covering such cognate topics

as geologic time, how rock units are
dated, what a fossil is, and how dinosaur
bones are collected.

The book is organized into three major
parts. Part I: The Lost World introduces
the reader to the paleogeography of
western North America and then answers
the question of what were the dinosaurs?
This is followed by a discussion of the
various types of fossilization and the
concept of geological time. In the last
section, the major biologic events are
summarized for each period of the
Paleozoic Era.

Part II: The Bestiary begins with an
introduction to the dinosaurs and how
they are classified. This is followed by
an alphabetical listing and description of
the 26 most common dinosaurs. Included
for each dinosaur is the order it belongs
to, its geologic age, where it has been
found in North America, and what its
generic name means. This is followed by
a brief synopsis of the dinosaur including
a black and white drawing of its skeleton
and either a photograph of its bones or a
color drawing of what it may have looked
like in life. Following the dinosaur "field
guide" is a brief summary of
Archaeopteryx, pterosaurs, and marine
reptiles, with color photographs or color
reconstructions of each group.

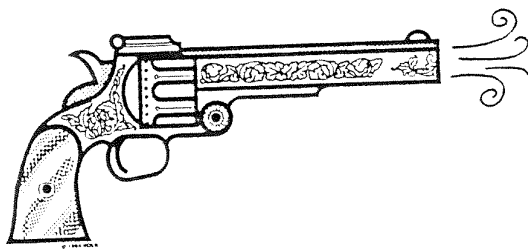
Part III: The Mystery Continues covers
such diverse but interesting topics as
dinosaur eggs and young, warm-blooded
or cold-blooded?, various theories for
the dinosaur extinctions, plants of the
Cretaceous, dating techniques, Dinosaur
Provincial Park, pioneer dinosaur hunters
in Canada, field collecting, recent
dinosaur finds, and the role of the
dedicated amateur.

The end of the book contains a
pronunciation guide of dinosaur names, a
glossary, and a listing of the major
museums that display dinosaurs.

I enjoyed *Dinosaurs of the West*,
particularly the last section on Dinosaur
Provincial Park and the pioneer dinosaur
hunters in Canada. My only complaint
about the book is that I thought the
photographs (both the color and black and
white) did not print very well and came

out too faded and fuzzy. This is in contrast to the excellent color drawings depicting the dinosaurs as they may have looked 225 million to 65 million years ago.

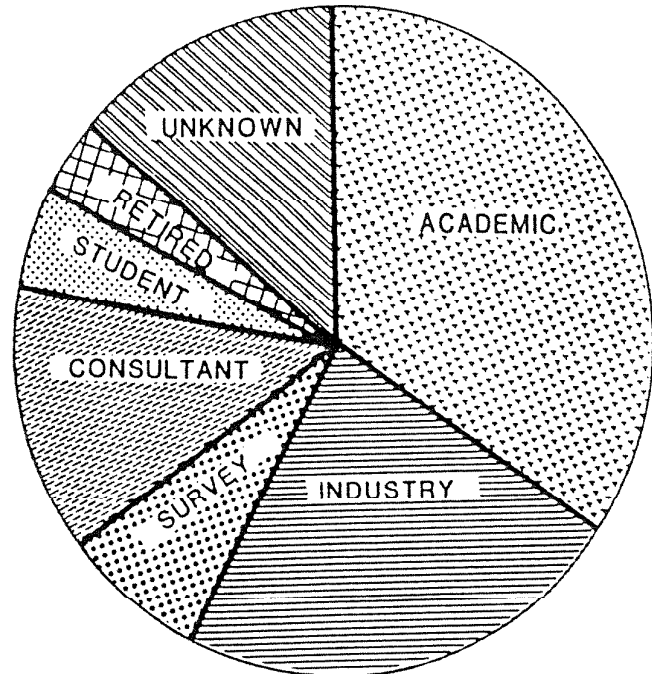
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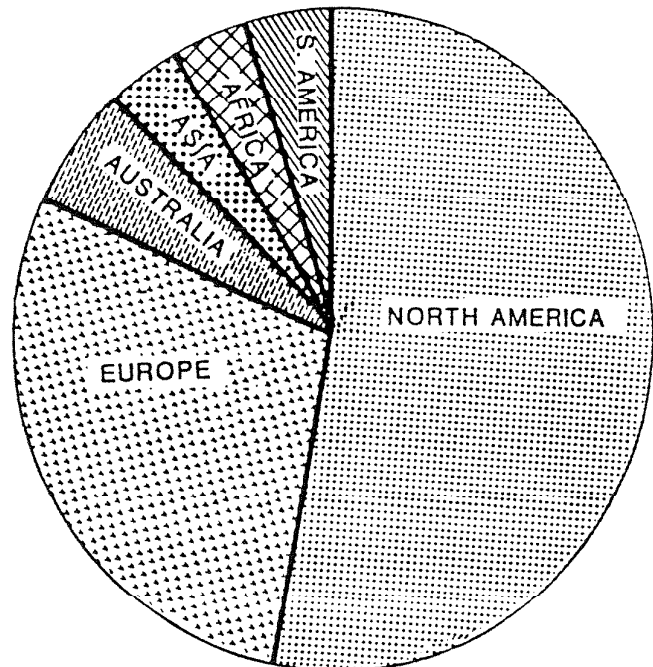
Parting Shots

When I first tried for a Parting Shot in this issue, I drew a blank. Then I remembered getting the following bit from Gordon Wood earlier this year: Over 350 in arrears letters were mailed April 2. This is over 1/3 of the total AASP Inc. membership! I was among those delinquent individuals and, while I may be able to say AASP gets its dues out of my hide, not many of the rest of you can. In any case, my check went in the mail recently and I hope the rest of you who are in arrears will follow my lead. An army may march on its stomach, but an organization such as ours marches on its bank balance, not its accounts receivable. Look for the year code on your mailing label. If it reads 89 or less, you're in arrears!

WHERE THE AASP MEMBERSHIP WORKS



WHERE THE AASP MEMBERSHIP LIVES



The Fourth International Conference on Modern and Fossil Dinoflagellates

Submitted by

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The Fourth International Conference on Modern and Fossil Dinoflagellates was hosted by the Marine Biological Laboratory at Woods Hole, MA between April 16-22, 1989. A more congenial and appropriate setting than this scenic sea side village would be difficult to imagine for such a meeting. Few places in Woods Hole are more than a block or two from the sea, and from millions of living dinoflagellates--those bizarre creatures of the deep to whom this meeting was dedicated.

The organizing committee, chaired by **David k. Goodman**, consisted of **Donald M. Anderson, Leonard N. Ford, Jr., Martin J. Head, Sarah Pierce Damassa and John H. Wrenn**. Approximately one hundred and twenty neontologist and palynologist, from 20 countries, gathered to review dinoflagellate research as Spring returned to Cape Cod, the prow of New England.

Fifty-six oral presentations and 40 poster exhibits were given during the meeting. Their titles and authors are listed at the end of this review. Copies of the Program and Abstracts volumn are available; contact **Dave Goodman**, ARCO Oil and Gas Company, Research Center, 2300 West Plano Parkway, Plano, TX 75075 USA , for further information.

The Second Symposium on Neogene Dinoflagellates was held on Wednesday, April 19, under the auspices of **Dino IV**. See the separate report on this event elsewhere in this Newsletter.

Before discussing **Dino IV**, its not too early to think about **Dino V** in 1993. Well, may be it *is* a little early, but it never hurts to plan ahead. And that is just what Henk Brinkhuis, the Chairman of the Organizing Committee is doing right now. The Fifth International Conference on Modern and Fossil Dinoflagellates will be held at the Laboratory of Palaeobotany, State University of Utrecht. Thoughts and ideas for the technical program should be sent there to Henk. See you there!!!

Now, on to **Dino IV**. The papers and poster displays dealt with a broad range of modern and fossil dinoflagellate research. Modern dinoflagellate papers covered the spectrum of neontological studies, including morphology, life cycles, molecular phylogeny, red tides, cyst sedimentation fluxes, ecology, and evolution. Fossil dinocyst reports dealt with morphology, taxonomy, sequence stratigraphy, and

paleoceanography. Because of space limitations, comments are given below on selected papers.

Ruth E. Schmitter (Albion College, Albion, Michigan) discussed the structure and function of globular bodies (PAS-bodies) in vegetative cells of photosynthetic dinoflagellates, such as Gonyaulax polyedra and freshwater species of Peridinium. The function of the PAS-bodies may be to recycle nutrients within the dinoflagellates on a daily basis. These apparently are the same as some "accumulation bodies" observed in fossil dinocysts. (Ruth's paper suggested to me that PAS-bodies may provide a means of determining which fossil dinocyst species were produced by photosynthetic dinoflagellates. Undamaged and/or unexcysted cysts that contained accumulation bodies were probably produced by photoautotrophs, those lacking accumulation bodies may have been primarily heterotrophs. Have you seen accumulation bodies in any species of known heterotrophs, such as Proto-peridinium spp.?)

Don M. Anderson, Bruce A. Keafer and Ken O. Buesseler showed that different dinocyst depositional and preservational pathways exist in nearshore coastal waters vs. estuarine waters. The winnowing and concentration of dinocysts with silts and clay size sediments in coastal waters is not seen in Perch Pond, a restricted, sheltered estuary. Dinocyst distribution in the estuarine sediments reflect bloom distribution (often of one species) rather than resuspension and redeposition. (This was interesting in that the estuarine assemblages may be a modern analog of some of the nearly monospecific assemblages occasionally seen in the fossil record.)

Peter J. S. Franks discussed the effects of topographic, tidal, wind and thermohaline forcing on the distribution of dinoflagellates in the water column. The scale and dynamics of the particular forcing mechanism can produce a distinctive distribution pattern of dinoflagellate populations.

A clear modern example of oceanographic forcing on the distribution of dinocysts was provided by **Isabel M. Van Waveren**. She documented the predominance of Proto-peridinioid dinocysts in upwelling areas in the Banda Sea off Indonesia. Areas remote from upwelling contained few such taxa. (In a like manner, the distribution of fossil dinocysts on an isochronous plane in the rock record should provide evidence of paleoforcing mechanisms prevailing at the time of deposition.)

Bill Sarjeant provided an entertaining and enlightening after dinner historical synopsis of dinocyst studies on Monday evening (April 17). Bill began with Ehrenberg and walked us through the nineteenth and twentieth centuries (thus far at least), pointing out the luminaries whose contributions still light our research paths. (This was particularly interesting as he discussed the giants of the past thirty years, because some of them, like **Bill Evitt**, were in the audience. Their presence emphasized the continuum that exists between dinoflagellates researchers of the past, the present and the future.)

Dave Goodman and Rip Ford presented what can only be called a short course on sequence stratigraphy and ecostratigraphic analysis. The sheer volume of information was more than most listeners could absorb in one sitting. Hopefully, the authors will contribute a detailed paper to the DINO IV volume, in which we can read

and digest these important topics more slowly, more completely. (The future of industrial palynology may well depend on how quickly it can provide the needed ground truth for seismic sequence analysis. Already one hears from some quarters that paleontology is superfluous in light of the advent of seismic stratigraphy.)

Angelika Koethe discussed the biostratigraphy and an intriguing paleoecological model for the distribution of Paleogene dinocyst in northwest Germany. The model was used to identify water depth, paleotemperature, salinity and proximity to shore line. Embayment, nearshore and offshore paleoenvironments were recognized and related to transgressive-regressive cycles.

Probably the most incredible technical paper presented was that of **Bill Evitt, Sarah Damassa** and **Nairn Albert**. Their paper, entitled "The Exophragm of Fossil Palaeoperidinium", dealt with some very unusual dinocysts that are formed on the *outside* of the theca. In addition, they documented a technique for taking *microcasts* of ornamentation on the *inside surface* of the dinocysts. Their light and scanning electron micrographic and microcasting study revealed that a variety of subspecies of P. pyrophorum existed in populations derived from rocks of different ages and localities.

Raimond Below contributions were each a technical *tour de force* of scanning electron photomicrography. The stunning SEM photomicrographs that distinguished **Raimond's** Palaeontographia papers of the past few years were used to good effect in his talk and both of his poster presentations.

Greg Gaines and **Max Taylor** created a great deal of discussion with their paper on the "Implications of the Morphology of Cyst Formation For the Systematics and Paleoecology of Fossil Forms". The long reported claim that Gonyaulax spinifera gave rise to a variety of cyst types was the crux of their paper. Their culture of that species produced a variety of cysts, including some attributable to Spiniferites, and "...forms superficially resembling Impagidinium, Nematosphaeropsis, Planinosphaeridium and Tectatodinium". The resemblance to these genera was indeed superficial in some cases. But there was no question that there was a wide variety of cyst morphologies produced from the culture of G. spinifera. The history of the culture was queried, as was the assertion that the only species in the culture was G. spinifera. The cysts themselves were not subsequently incubated because time was not available to do so. This matter is so important to fossil cyst studies that one can only hope that someone will follow up on this interesting and provocative research.

Rob Fensome, Max Taylor, Bill Sarjeant, Dave Wharton, Gram Williams and **Geoff Norris** presented a new suprageneric classification of all living and fossil dinoflagellates. The authors view their contribution as a hypothesis to be tested by future observations and they emphasize that it is not an immutable key to taxonomy. Their approach to constructing their classification included cladistic analysis.

ORAL PRESENTATIONS

- ANDERSON, D., M., B. A. KEAFER AND K. O. BUESSELER: Deposition and burial of living dinoflagellate cysts in estuarine and nearshore coastal sediments.
- BEAM, C. A. AND M. HIMES: Toward a timeline for Crypthecodinium diversification: collecting in the Caspian?
- BELOW, R. Classification of the dinoflagellate family Pareodiniaceae.
- BRINKHAUS, H., A. J. POWELL, T. C. PRINS, D. ZEVENBOOM AND W. J. ZACHARIASSE: High resolution dinoflagellate cyst stratigraphy and correlation to the Oligocene/Miocene transition in northwest and central Italy.
- CARTY, S.: Peridiniopsis polonicum, P. gymnodinium, or none of the above.
- CEMBELLA, A. AND B. A. HAYHOME: Application of molecular methods to problems of dinoflagellate biogeography, speciation, and systematics.
- COLBATH, G. K. AND H. R. GRENFELL: Biological affinities of Paleozoic "acritarchs".
- DALE, B.: Dinoflagellate cysts as paleoclimatic indicators in marine Quaternary sediments of northwestern Europe.
- DALE, B. AND A. L. KAROWE: Recent deep sea dinoflagellate cysts from the Nordic seas.
- DODGE, J. D.: An examination of the ventral epithecal plates of modern species of Gonyaulax and related genera.
- EDWARDS, L. E.: A new plate labeling system for dinoflagellates.
- EVITT, W. R., S. P. DAMASSA AND N. R. ALBERT: The exophragm of fossil Palaeoperidinium.
- FEIST-BURKHARDT, S.: Dinoflagellate assemblages from Aalenian to Lower Bajocian strata of southwest Germany.
- FENSOME, R. A., F. J. R. TAYLOR, W.A.S. SARJEANT, D. I. WHARTON, G. L. WILLIAMS AND G. NORRIS: A classification of fossil and living dinoflagellates.
- FORD, JR., L. N.: Integration of depositional sequence architecture and ecostratigraphic analysis. II. Application.
- FRANKS, P. J. S. Dinoflagellate blooms: patterns, scales and forcing mechanisms.
- FRITZ, L., D. M. ANDERSON AND R. E. TRIEMER: The sexual cycle in Gonyaulax tamarensis : A light and electron microscopic study.
- GAINES, G. AND F. J. R. TAYLOR: Implications of the morphology of cyst formation for the systematics and paleoecology of fossil forms.

- GAO, X. AND J. D. DODGE: The life cycle of a marine dinoflagellate Scrippsiella sp.
- GOODMAN, D. K.: Integration of depositional sequence architecture and ecostatigraphic analysis. I. Sequence stratigraphy.
- HARDING, I. C.: A comparison of three Early Cretaceous sexiform gonyaulacoid dinocysts.
- HARLAND, R.: Problems of interpretation with Quaternary dinoflagellate cyst assemblages.
- HEILMANN-CLAUSEN, C.: Morphogenetic observations in dinoflagellate cysts from the Lower-Middle Eocene in NW Germany and Denmark.
- HELENES, J.: Dinoflagellates through time.
- HERZOG, M.: Molecular phylogeny of dinoflagellates.
- JAN DU CHENE, R. AND L. LONDEIX: Dinoflagellate cysts from the Miocene Burdigalian stratotype, France.
- KNOLL, A. H.: Late Proterozoic evolution and environmental change.
- KOETHE, A.: Paleoecology and biostratigraphy of Paleogene dinoflagellates from northwest Germany.
- LEWIS, J.: Cyst-theca relationships in Scrippsiella (Peridinales) and related orthoperidinioid genera.
- LUCAS-CLARK, J.: Dinoflagellate cyst facies from Paleocene and Eocene strata of the Savannah River Plant area, South Carolina, U.S.A.
- MASURE, E.: New interpretation of the morphology of the genus Atopodinium, comparison and discussion with its junior synonym Maghrebinia.
- MATSUOKA, K.: Dinoflagellate cyst distribution in modern sediments around Japan: fundamentals for the paleoecology of Neogene to Quaternary dinoflagellate cysts.
- MCMINN, A.: Recent distribution of dinoflagellate cysts along the east coast of Australia.
- MONTEIL, E.: The genus Palaeotetradinium Deflandre 1936 emend.: systematics, phylogeny, and morphostratigraphy from Late Jurassic to Early Tertiary.
- MORZADÉC-KERFOURN, M.-T. Autochthonous and allochthonous dinoflagellate cysts in Pleistocene marine sediments from the west African margin and their paleoenvironmental significance.

- MUDIE, P. J.: Circum-Arctic Quaternary and Neogene palynofloras: the view from the top.
- PARTENSKY, F. AND D. VAULOT: Unequal division responsible for cell size differentiation in Gymnodinium cf. G. nagasakiense.
- POLLINGHER, U., H. R. BURGI AND H. AMBUHI: Freshwater dinocysts in plankton and sediments.
- POWELL, A. J., J. D. DODGE AND J. LEWIS: Quaternary dinoflagellate cyst biofacies of the Peruvian continental margin upwelling, ODP Leg 112.
- RAWAT, R. S. AND N. C. MEHROTRA: Neogene dinocysts from the Bengal Basin, India.
- ROWAN, R. G.: The rapid analysis of dinoflagellate ribosomal RNA genes.
- SARJEANT, W. A. S.: Xanthidia, hystrichospheres or cysts? Sidelights on the vicissitudinous history of the study of certain microfossils.
- SCHMITTER, R. E.: Structure and function of globular bodies in dinoflagellate cells.
- SILVA, E. S.: Different interpretations of the small forms in the cell cycle of dinoflagellates.
- STEIN, J. A. AND S.L. DUFFIELD: Palynological indications of paleoceanographic processes in the Neogene record of the eastern Atlantic DSDP sites 362 and 369.
- STOVER, L. E. AND G. L. WILLIAMS: Morphology and stratigraphy of the Paleogene dinoflagellate genera Areosphaeridium Eaton 1971 and Eatonicysta Stover and Evitt 1978.
- TAYLOR, F. J. R.: Aspects of the evolution of marine planktonic protists.
- TOCHER, B. A., I. JARVIS, G. A. CARSON, M. K. E. COOPER, M. B. HART, P. N. LEARY, AND D. HORNE. Microfossil assemblages from the Cenomanian-Turonian (Late Cretaceous) oceanic anoxic event.
- TYLER, M. A. Remote sensing of dinoflagellate blooms in estuarine environments.
- VAN WAVERAN, I. M.: Protoperidinium cyst concentrations in Recent to Sub-Recent sediments of the Banda Sea (Indonesia) responding to upwelling.
- DE VERNAL, A. AND P. J. MUDIE: Plio-Pleistocene dinocyst stratigraphy in the Labrador Sea: paleoenvironmental implications.
- DE VERTEUIL, L. AND G. NORRIS: Preliminary results on the Miocene organic microplankton flora of the Salisbury Embayment, U.S. Atlantic Coastal basin.

VERSTEEGH, G. J. M., D. ZEVENBOOM AND L. GUDJONSSON: Pliocene biostratigraphy and paleoenvironment of a southern Italian section on the basis of dinoflagellate cyst occurrences and stable isotope distribution.

WHARTON, D. I.: Aspects of dinoflagellate cyst morphology and their taxonomic significance, with special reference to observations of some Jurassic species.

WRENN, J. H. AND L. S. SATCHELL: Cenozoic palynology of the Exxon CH32-45 Core and the advent of the Loop Current, West Florida carbonate ramp, Gulf of Mexico.

Poster Presentations

ALBERT, N. R.: Morphological variability in the *Chlamydophorella trabeculosa* and *Gonyaulacysta dualis/jurassica* complexes, and in an undescribed species of *Oligosphaeridium*.

ARAI, M. AND N. UESUGUI: Dinoflagellate biostratigraphy of the Macaé Formation (Albian-Cenomanian), Campos Basin, offshore southeastern Brazil.

BELOW, R.: SEM analysis of dinoflagellate morphology.

BELOW, R.: Tabulation and plate overlap of dinoflagellate theca and cyst.

BILLO, S. M.: Marine phytoplankton as the source of petroleum.

BUCK, K. R., P. A. BOLT AND D. L. GARRISON: Dinoflagellate cysts associated with Antarctic pack-ice communities.

DODGE, J. D.: The distribution of armoured planktonic dinoflagellates in the northeastern Atlantic Ocean.

DORNING, K. J. Quantitative palynology and organic palynofacies analysis: Acritarch microflora, dinoflagellate cysts and prasinophycean algae from the Cretaceous Woburn Sands, Bedfordshire, England.

DORNING, K. J., P. A. CORNICK, N. M. HOGG, S. W. SMITH, M. G. SNAPE, M. N. WHELAN AND S.E. WOOD: Quantitative palynology and organic palynofacies analysis: Acritarch and dinoflagellate cyst assemblages from the Middle Jurassic of Oxfordshire, England.

DUANE, A. M.: Dinoflagellate cyst associations in Cenomanian and Santonian sequences of south-east England.

DUANE, A. M. AND R. HARLAND.: A Late Quaternary dinoflagellate cyst stratigraphy for sediments of the Porcupine Basin, offshore western Ireland.

- ENGEL, E. Palynological investigations on Miocene sediments of the North Atlantic Ocean: First results of Site 408/Leg 49, Site 554/Leg 81, and Site 400A/Leg 48.
- FAUST, M. A.: Micromorphology of *Prorocentrum lima* and *Prorocentrum marinum* (Dinophyceae) from Twin Cays, Belize, Central America.
- FITZPATRICK, M. E. J.: Turonian dinoflagellate cyst assemblages from the Anglo-Paris Basin and their implications.
- FITZPATRICK, M. E. J.: Early Cretaceous dinoflagellate cysts from the Porcupine Basin, offshore western Ireland.
- FRANCA, S.: The association dinoflagellate-bacteria: ultrastructural observations on Gyrodinium instriatum with endocellular bacteria.
- FRITZ, L., D. MORSE AND J. W. HASTINGS: Here tonight, gone tomorrow: The bioluminescent organelles of Gonyaulax polyedra are formed and degraded on a daily basis.
- HEAD, M. J.: Dinoflagellate cysts from the Pliocene Coralline Crag deposits of Suffolk, eastern England: an SEM/LM study including new observations of wall ultrastructure of selected species.
- HEAD, M. J., G. NORRIS AND PETA J. MUDIE: New species of marine palynomorphs from Neogene sediments of Baffin Bay and the Labrador Sea.
- HEAD, M. J., J. H. Wrenn and L. E. Edwards.: A biostratigraphic synthesis of dinoflagellates and other marine palynomorphs for the Neogene.
- JETTÉ H.: Climatic implications of freshwater dinoflagellates in Allerød-Dryas time.
- HERZOG, M., G. LENAERS, Y. BHAUD, M. SALA-ROVIRA, D. SAINT-HILAIRE AND M.-O. S. GOBILLARD: A molecular phylogeny analysis of dinoflagellates inferred from ribosomal RNA sequence comparison.
- JIN, X. F.: Distribution of dinoflagellates in the eastern part of China in the Eocene.
- KIMOR, B. AND F. M. H. REID: Large dinoflagellates of the orders Gymnodiniales, Noctilucales and Pyrocystales from the west coast of North America.
- LAGE, O. M. AND R. SALEMA: Ultrastructural and physiological alterations in Prorocentrum micans Ehr. submitted to continuous darkness.
- LI, G.: On hydrofluoric acid treatment of spore-pollen samples and related problems.
- LI, G.: On the method of spore-pollen analysis of Cenozoic salt-bearing rocks.
- MATSUOKA, K. AND S. KOBAYASHI: A new calcareous cyst of Ensiculefera.

- MATTHIESSEN, J.: Recent dinoflagellate cysts from the Norwegian-Greenland Sea: preliminary results.
- NAKAMURA, H., Y. KISHI, O. SHIMOMURA, D. MORSE AND J. W. HASTINGS: The structure of dinoflagellate luciferin before and after light emission.
- NØHR-HANSEN, H. AND D. J. MCINTYRE: Stratigraphic correlation of mid-Cretaceous dinoflagellate cyst assemblages from East Greenland and Arctic Canada.
- O'MAHONY, J. H., P. CONNORS, J. DOYLE AND T. DUNNE: Short-term variations in the summer phytoplankton assemblages in Dunmanus Bay, SW Ireland, during 1982.
- SILVA, E. S.: Different interpretations of the small forms in the cell cycle of dinoflagellates.
- TAYLOR, F. J. R.: Extension of the Taylor Plate Homology System to peridinioids: the partiform gonyaulacoid-Glenodinium-Peridinium continuum.
- TOCHER, B. A., I. JARVIS, G. A. CARSON, M. K. E. COOPER, M. B. HART, P. N. LEARY AND D. HORNE: Microfossil assemblages and the Cenomanian-Turonian (Late Cretaceous) oceanic anoxic event.
- VAN DER ZWAN, K. J.: Palynostratigraphy and palynofacies reconstruction of the Upper Jurassic to lowermost Cretaceous of the Draugen Field, offshore mid Norway.
- WHITTEN, D. J. AND B. A. HAYHOME: Recombination and uniparental transmission of isozymes in Peridinium.
- VERSTEEGH, G. J. M.: Pliocene calcareous dinoflagellate cysts from southern Italy.
- WRENN, J. H. AND S. P. DAMASSA: Tuberculodinium vancampoeae: a curious reflection of its former self.
- ZONNEVELD, C. A. F. AND D. ZEVENBOOM: Miocene-Pliocene dinoflagellate cysts of the Beugen and Boxmeer wells (southeast Netherlands).