

Thomas D. Demchuk
Amoco Production Co
Houston, TX

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Martin J. Head, Editor

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NEW AASP NEWSLETTER EDITOR

Martin J. Head
Department of Geology
University of Toronto
22 Russell Street
Toronto
Canada M5S 3B1

Phone (416) 978-5080
Fax (416) 978-3938
Email: head@mica.geology.utoronto.ca

The AASP NEWSLETTER is published four times annually. Members are ENCOURAGED to submit articles, "letters to the Editor," technical notes, meeting reports, information about "members in the news," and information about job openings in the industry. Every effort will be made to publish all information received from our membership.

Deadline for the next NEWSLETTER, the first of 1995, is **January 1**. All information should be sent on computer disk (MS Word for the Mac is best, but anything will do) or by e-mail, if possible, or if not—send hard copy. Always include a

duplicate typescript of all electronic copy sent so I can check diacriticals. If possible, please illustrate your contribution with art, line drawings, eye-catching logos, etc. We look forward to contributions from our membership.



Lucy Edwards hands over the reins to new President, Reed Wicander, at the November AASP Annual Meeting in College Station. (Photo: Sue Jarzen).

PRESIDENT'S ADDRESS

"The Times They Are A' Changing"

Today I'd like to share with you my thoughts on the current and future state of AASP. It is always easy to look back and recognize critical junctures that determine the course of history. It is not as easy, however, to recognize those junctures when one is actually experiencing them. I feel that we are at such a juncture in the history of our organization and we must recognize this and take action to ensure that we remain a strong and viable organization into the next century. We must also remember that all

organisms evolve. They adapt to changing conditions or become extinct. AASP, like all organizations, is also an organism of sorts, and it too must adapt to change or it will become extinct.

AASP is no longer the organization it was when it was founded in 1967. Throughout its history, the emphasis of our organization has been in the field of stratigraphic palynology, because this aspect of the science was what most of our members practiced. Many, if not most, were employed by oil companies that were interested in palynology as a tool for age-dating and correlation. Furthermore, most of our members were from the United States.

Stratigraphic palynology has served us well, and will continue to do so in the future, but it no longer plays the prominent role it once did in palynology. Times change. If you look at the composition of the talks at the annual meetings during the past several years, there has been a trend away from purely stratigraphic papers and towards other aspects of palynology, such as palynofacies, paleoclimatology, forensic palynology, analysis of honey, and the use of palynology in the recognition of prehistoric earthquakes, to name just a few of the topics recently presented. Stratigraphic palynology is still important and a valuable tool in sequence stratigraphy and high-resolution biostratigraphic studies. However, the fact remains that what resources are available, are being spent on the nonstratigraphic aspects of palynology. It also seems that even major parts of the geologic column are receiving less attention. For example, at the last annual meeting in Baton Rouge, only one paper dealt directly with the Paleozoic!

The composition of our membership is also changing and reflects the global changes taking place in business, and society in general. Our membership has changed during the past several years so that we are now truly a global organization. Our membership, as reported by David Pocknall in the August, 1994 issue of the AASP Newsletter, shows that U.S. members constitute only 40% of the total membership as of July 1, 1994. Even if one includes Canada, Mexico, and South America (taking in all the regions under the name **American** Association of Stratigraphic Palynologists) the American region is still not a majority, but a large minority (49%). In short we truly are an International organization. Should this be reflected in a name change? I don't know. The American Association of Petroleum Geologists is now known as the American Association of Petroleum Geologists—An International Geological Organization. S.E.P.M. now stands for Society for Sedimentary Geology, recognizing the changing employment patterns and research interests of the members of their society. We should think about these changes in our society and how the composition of our membership might be incorporated into our name to reflect the globalization of our organization.

While our membership is becoming more diverse and far-flung, and the areas of research in palynology encompass a wider variety of topics, we have had one of the lowest turnouts for an annual meeting in our history. In part this might be explained by the restructuring and layoffs occurring in the oil industry. I also wonder if it's not part of a larger trend, in which our members are attending meetings with more geological and biological variety, such as the G.S.A., A.A.P.G., or S.E.P.M. Have we become too inbred, talking only to ourselves, and not expanding our hori-

zons? Attending such meetings as G.S.A. allows one to hear what the new ideas are in geology, and how we might apply them to palynology. Giving palynological talks at such meetings also has the added benefit of reaching a wider scientific audience. All of this has been said before, yet it seems that we only play lip service to it and continue down the same road we've traveled in the past. But is it the road that will lead us to a brighter future, or towards extinction?

As you may or may not know, our bylaws require that "an annual meeting of the members shall be held each year for the purpose of holding scientific sessions, for the transaction of other business as may come before the meeting, and for installing the new Board of Directors" (Article 3.01). We are scheduled to meet in Ottawa next year, in Houston in 1996 as part of IPC 9, but there have been no offers forthcoming to host the 1997 annual meeting. We need to have someone agree to organize that meeting.

The lack of interest in having someone offer to host the 1997 meeting, along with the topics I've just discussed, started me thinking about whether we need to meet every year. According to the bylaws, we do. However, perhaps we could meet in conjunction with another organization every other year. The benefits of this would be the exposure of palynology to a broader audience along with the benefit of hearing a wider variety of talks then is given at our meeting. Many of us remember the problems we had when we tried to do this at the San Diego Meeting in conjunction with G.S.A., and we want to avoid those problems in the future.

In order to explore the possibility of affiliating with another organization, I am forming an ad hoc committee to look into the pros and cons of affiliation with another geological society, and in particular to explore the possibility of holding joint meetings with them every other year. I will chair the committee and Harry Leffingwell has also agreed to serve on this committee. I am asking for additional volunteers to serve with us. Our goal is to have a report ready and to hold a forum at the annual meeting next year to discuss this issue, and come to some consensus regarding our future.

Am I pessimistic about the future of our organization and palynology in general? Not at all. I do, however, think we are at a critical juncture in our history, and by recognizing this, we can take the appropriate action to ensure our survival and become an even stronger and more dynamic organization and science in the future.

Reed Wicander, President, AASP Inc.

VOLUNTEERS NEEDED TO HOST THE 1997 AASP ANNUAL MEETING

As of this time, we still do not have a site for the 1997 Annual Meeting. We need someone to host this meeting. If you are interested in submitting a proposal please contact me as soon as possible. You can write, call (517-774-3179), fax (517-774-2142), or email me (3yjjwexp@cmumv.csv.cmich.edu). I need

to hear from you right away as time is getting short. We meet next year in Ottawa, in 1996 in Houston as part of IPC 9, but do not have a meeting site for 1997. We need to start planning now for 1997. Hope to hear from you soon.

Reed Wicander, President, AASP Inc.

EMAIL AND AASP MEMBERSHIP

As some of our members already know, there is a growing number of palynologists who now have email addresses and can be reached on the "information highway".

Because email is such a rapid way of communicating, I would like to suggest that all AASP members who have an email address please send that information to the AASP Secretary **David Pocknall** (dtpocknall@amoco.com), or to **Robert T. Clarke** (rtclarke@dal.mobil.com) at the AASP Foundation. This will ensure that your email address will be added to you mail address when the next AASP Directory is printed.

Vaughn M. Bryant, Jr. (vbryant@tamu.edu)

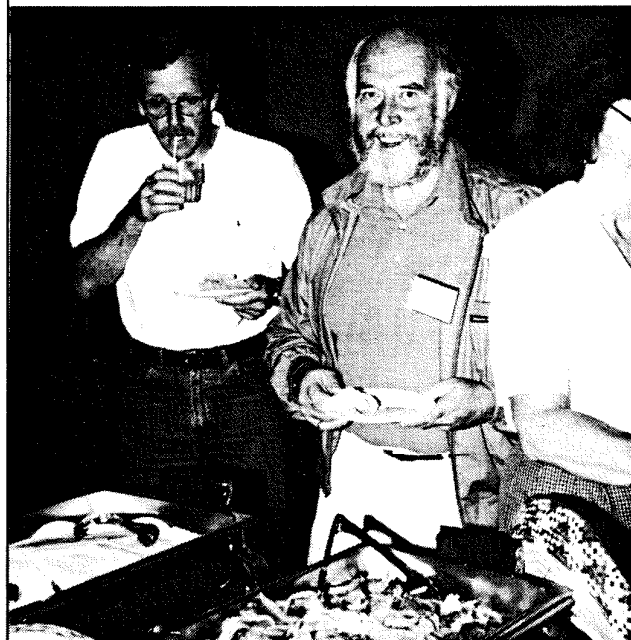
AASP MEETING REPORT

The 27th AASP Annual Meeting at College Station, Texas, November 1994
by Susan A. Jarzen

The 27th Annual Meeting was attended by 69 registrants (small by comparison to previous meetings) and provided 46 talks and 9 poster presentations on topics covering all aspects of palynology and spanning the geologic column from Ordovician to Recent. The icebreaker and luncheon food were traditional Mexican, a southwestern favorite, which most everyone seemed to happily partake. College Station is, of course, the home of Texas A&M University and signs announcing "Aggieland" were everywhere. A Texas A&M Bonfire Celebration was held on Thursday evening, which is usually in late November, but as Vaughn stated, "was held during the AASP meeting just for us!" The meetings were hosted by Dr. Vaughn Bryant, Jr., Professor and Department Head, Department of Anthropology, Texas A&M University. His organizational skills and enthusiasm made the time spent in College Station enjoyable and informative.

The symposium, "Tips & Traps of Palynomorph Sampling, Processing, and Analysis," consisted of several original and unique applications, demonstrating the variety of uses of palynology other than in stratigraphic sequencing. Dr. D.C. Mildenhall, Institute of Geological and Nuclear Sciences, Lower Hutt, New Zealand, was the invited guest speaker, whose informative topic "Forensic Palynology: some case studies from criminal and civil trials in New Zealand," held everyone's

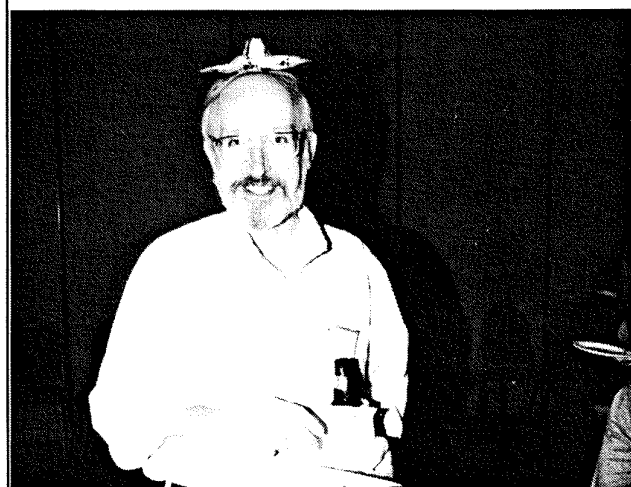
ANNUAL MEETING ICEBREAKER



David Pocknall (left) and Geoff Norris. (Photo: Vaughn Bryant.)



Bob Ravn (left) and Bert Van Helden. (Photo: Vaughn Bryant.)



John Wrenn keeping a steady head. (Photo: Vaughn Bryant.)

attention. The majority of the talks were in Tertiary and Mesozoic palynology; representation in the Paleozoic and Quaternary sessions was low.

At the luncheon, President Lucy Edwards requested a few moments of silence in respect for the loss of several prominent palynologists this past year: Gerhard Kremp, Norman Hughes, Don Cameron, Al Loeblich, and Pieter van Gijzel. A short slide presentation was given by David and Susan Jarzen with an invitation to Ottawa in 1995 for AASP 28. Among the luncheon awards, Peter Kershaw, Monash University, Clayton, Victoria, Australia, was recognized as having travelled the greatest distance to this meeting!

A Saturday morning (November 5) workshop, presented by Dr. D.C. Mildenhall, was attended by 24 registrants. Part of the workshop was devoted to a discussion of how/why/when palynologists may be called to court to testify/present evidence in a forensic case. Such practice is now common in parts of the USA, England, Australia, and New Zealand where police departments regularly contract palynologists to assist in criminal investigations. In addition, a brief review of Melissopalynology and Entomopalynology by Gretchen D. Jones, U.S. Department of Agriculture, described several areas where palynology is being applied to complement other forms of scientific investigation.

The meetings were run very smoothly and every minute was put to good use, keeping all participants hopping, renewing old acquaintances, making new contacts, discussing new projects and sharing ideas, especially with their bagels and coffee, or during other meals at "T. Bones" next door to the Hilton for the ubiquitous huge Texas steak!

There were, of course, noticeable changes; after 27 years of consecutive meetings, one would expect it. But the discipline of palynology is still alive and doing well in its own right and in conjunction with other areas of science as a prominent component.

Susan A. Jarzen
Canadian Museum of Nature

...AND ANOTHER PERSPECTIVE by Vaughn M. Bryant, Jr.

David and Susan Jarzen gave a very nice 15 min presentation, with slides, about their plans to hold the meeting in Ottawa next year. It was a very good idea and may encourage others to do the same at future meetings. This allows the participants to get an idea of what Ottawa looked like, what the facilities were like, and what to expect next year at the meeting.

John Firth of the Ocean Drilling Program (Texas A&M) conducted a Saturday afternoon field trip that was not a scheduled event at the time we planned the meeting, but which was included as part of the meeting for those who wanted to go and were attending. It was free.

The best student paper was given by Dr. Gretchen Jones, who graduated in 1993 with her Ph.D. in botany from Texas A&M University. Her paper was a joint paper with Vaughn Bryant on *Techniques in Melissopalynology*.

As a special event for the meeting, we got Texas A&M

University to hold their annual "bonfire" event on Nov 3. There were 50,000 who attended the bonfire event...including a fair number of our folks as well.

Vaughn M. Bryant, Jr. (vbryant@tamu.edu)
Department of Anthropology
Texas A&M University
College Station, Texas 77843-3452

PALYNOLOGICAL GOLFING

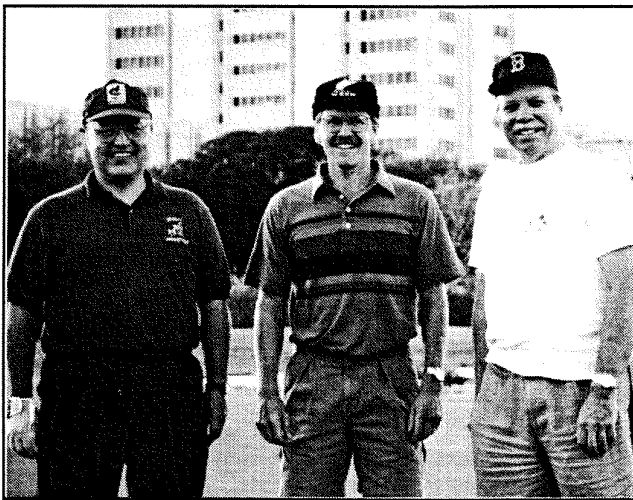
by Vaughn M. Bryant, Jr.

Six AASP Members entered into stiff competition at the Seventh Annual AASP Championship Invitational Golf Tournament, held during the 27th Annual AASP Meeting in College Station, Texas. The two championship teams consisted of Judi Lentin, John Bennett, and Vaughn Bryant on the First Team, and David Pocknall, Ken Piel, and Rick Aurisano on the Second Team.

The tournament was a hard fought battle, and close game, with the lead changing many times. However, a few stray shots on the 17th hole by members of the First Team finally gave the Second Team the edge, and the victory.

At the 19th hole, both teams agreed to meet again on the Plains of Ottawa to renew the competition at the 28th Annual AASP Meeting. Also, all participants agreed that it was perfectly normal for palynologists to play golf; after all, golfing and pollen studies have much in common.

The members pointed out many of the similarities between golfing and palynology. These include: 1) both disciplines deal with round spheres that occur in different colors and can be found in different stages of preservation; 2) in both disciplines the participants end up searching for specimens in all sorts of sediments, lake deposits, and even wooded locales; 3) in both disciplines natural events such as wind speed, rain conditions, the sinking speed of spheres, and accuracy of dispersion become critical elements in determining where the spheres will land; and



The winning team: left to right, Rick Aurisano, David Pocknall, and Ken Piel. (Photo: Vaughn Bryant.)

4) both disciplines can be time-consuming and may leave the participants frustrated and tired, or elated.

For all of the above reasons, the participants could not understand why more palynologists do not continue their research efforts on the golf course.

AASP ELECTION RESULTS

The AASP Ballot Committee (Martin Farley, Chairman; Yow-Yuh Chen; Tom Davies) announces that the following have been elected as AASP officers:

President-Elect: Jan Jansonius
Managing Editor: David Goodman
Secretary-Treasurer: David Pocknall
Directors-at-Large: Rosemary Askin, Thomas Demchuk

The winners will take office at the Annual Meeting in College Station this October.

A total of 177 ballots were received. The committee thanks all those members who took the trouble to vote and returned their ballots in a timely way.

1995 AASP MEETING—OTTAWA, ONTARIO, CANADA

As organizers for the AASP 28th Annual Meeting, we invite you to Ottawa for the 1995 meeting. The venue selected is the historic and beautiful Chateau Laurier, a Canadian Pacific Hotel. We have been offered room rates of CAN\$125 single/double occupancy per night. Please note that with the current rate of exchange on the Canadian dollar, this room rate, as well as other expenses, will most certainly be a saving for many of the AASP registrants.

The Chateau Laurier is situated along the Rideau Canal locks to the Ottawa River, and is "next door" to the Parliament Buildings, the Bytown Historic Museum, the new Contemporary Museum of Photography, the Byward Market, the Rideau Centre Shopping Complex, and much more to gain the interest of the adventurer. Everything is located within a convenient 10- to 15-minute walk of the hotel, including the exciting Canadian Museum of Nature and the Museum of Civilization.

The 1995 meeting is scheduled for October 10–14. The technical sessions and symposium will begin on Wednesday and continue through Friday. The usual two-day technical sessions will be held, with a special Quaternary Session being organized by Dr. Pierre Richard and committee. A field trip on Saturday, October 14th, is being organized by Dr. Richard Harington of the

Canadian Museum of Nature, who will lead the group to Eardley, Québec (nodule site) and surroundings to do a little digging in some Quaternary deposits.

The Ice Breaker is planned on the first full session day, Wednesday evening, in the Salon of the Canadian Museum of Nature. Two of its galleries, specifically the Botany Hall, with the Pollen Exhibit, and the new Viola MacMillan Mineral Gallery, will be available for viewing.

We have not decided on any evening entertainment as yet, mainly because of the variety of social events, museums, and restaurants available in the city from which to choose. October is a beautiful time of year in Ottawa; the Fall colors, especially in the nearby Gatineau Provincial Park, Québec, will be at their peak and certainly worth viewing.

Ottawa is now easily reached by the addition of new direct flights of USAir from Pittsburgh, New York City or Syracuse. We are pleased to announce that we have contacted USAir to be designated as the official carrier for the attendees of the 95 Annual Meeting. USAir agrees to offer a 5% discount off First Class and any published USAir promotional round trip fare. A 10% discount off unrestricted coach fares will apply with 7-day advance reservations and ticketing required. These convention discounts are valid between October 7–17, 1995, to allow visitors more time, if needed, before and after the meeting. To obtain your discount, telephone 1-800-334-8644, refer to Gold File No. 11270009.

Also contacted for discounted airfares was Air Canada, which is affiliated with Continental Airlines. Discounts can be obtained by calling 1-800-361-7585 or your travel agent, requesting Event Number CV950224 to be entered in the Tour Code box of your ticket. Discounts of 15% off regular roundtrip Executive and Hospitality Class within Canada; 15% off Business Class between Canada and USA, and other discounts depending on the class.

The participants must note that the two airline discounts cannot be used together; it is an either/or situation. We felt that the Canadian travellers would not otherwise be able to take advantage of the discount if only USAir was used. This, however, gives the U.S. and overseas participants the opportunity to use either Air Canada, Continental, or USAir in choosing their routing to Ottawa. The Ottawa International Airport is a short 20-minute drive to the Chateau Laurier, which can be reached by shuttle bus every half hour for CAN\$9 one way, rental car, or taxi (approximately CAN\$25).

Watch for the May issue of the AASP Newsletter for registration and accommodation details.

On behalf of the **Canadian Association of Palynologists**, we invite you all to attend the 28th Annual Meeting in Ottawa, Canada. It will truly be a CAPital Experience!

David and Susan Jarzen
Organizers for the 1995 Annual AASP Meeting



LETTERS TO THE EDITOR

Regarding the article concerning palynology and the shroud of Turin in the April 1994 edition of the Newsletter.

I think your readers should be made aware that Max Frei's work has largely been discredited. Frei apparently claimed to identify 57 pollen types at the species level from a sample size of only about 100 grains, a doubtful undertaking at best. Radiocarbon dating of the shroud fabric indicates that it dates from the Middle Ages, and thus could not have been the death shroud of Jesus. For a recent summary, with references, see J. Nickell (1994; "Pollens on the 'Shroud': A study in deception". *Skeptical Inquirer*, 18: 379-385).

This is perhaps not the best example of "palynology in the news."

Dr. G. Kent Colbath
Dept. of Earth Sciences
Cerritos Community College
Norwalk CA 90650



WHY AASP SHOULD JOIN GSA OR AAPG

Geoff Norris' suggestions in his thoughtful letter to the Editor in the December 1993 AASP Newsletter merits consideration by the Board of Directors and the AASP Membership, especially that section which raises the most critical question before us as a society and a discipline: "How can we gain further exposure?" Geoff's first recommendation, in my view, has the greatest potential impact, i.e., holding our meetings as an integrated part of a more broadly based society, such as the AAPG or GSA. I would add a more specific recommendation: That AASP immediately investigate the pros and cons of joining GSA or AAPG, submit the results of the inquiry to the membership via the Newsletter, and subsequently put the issue to a vote of the membership.

Affiliation would:

- Expose our research and application studies to a much broader geological community.
- Expose our membership to the newest findings in geology, geochemistry and geophysics.
- Engage a broad cross section of researchers in mutually beneficial, interdisciplinary discussions.
- Access a much greater diversity of pre- and post-meeting seminars, workshops and field trips (to which we also could contribute to showcase palynology's capabilities).
- Reduce the organizational chores of our annual meeting committees.
- Justify, more convincingly, attendance at palynological meetings.

Affiliation would still give us the opportunity to hold our own social events (ice-breaker, luncheon, business meetings, etc.) and would also enable us to invite key scientists outside our discipline to attend selected events at a minimal cost to the AASP.

Most of us are familiar with the reorganization within the U. S. petroleum industry, where administrative units, such as mi-

cropaleontology, have been reconstituted into functional, multidisciplinary groups to increase teamwork. The change was sometimes uncomfortable, but in general, micropaleontology stands to gain from this restructuring because it is included in more broad-based studies and its value exposed to a broader cross-section of earth scientists. It is time for us as a society to avail ourselves of a similar advantage by joining GSA or AAPG. Continuing to "go it alone" risks isolation from the earth scientists whose support we need. I believe the results of "going it alone" are already displayed in the lack of awareness for palynology by many geologists, geophysicists and paleontologists.

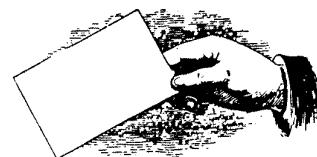
Grant Willson, former head of polymer science at IBM's Almaden Research Center commented about needed changes in IBM's research philosophy. "There was a group of people who felt they were special people who should do research in any area they chose. They weren't doing world class stuff. They would do something, and they would go to a society meeting where the size of the meeting was 150 people, and they would give each other prizes and praise each other and then go back and do it some more" (Scientific American, Dec. 1993, p 45).

I believe there are some parallels between IBM and AASP, although I believe Willson's comments are too harsh for an organization (IBM) which produced two Nobel Prize laureates. And I also believe there has been some world-class science in our organization: the dinoflagellate research at Exxon; the integrated research studies of Paleozoic microfossils by Amoco; and the kerogen research by Unocal, to name a few. But Willson's perception of the ineffectiveness of exposing one's science to a small and select scientific community is one we need reflect about, especially in times when economic conditions demand that each geologic discipline justifies its value by solving complex geologic problems.

Palynology's value in geoscience studies has never been greater. By providing time and paleoecologic control in fine-grained sediments, palynology is an essential element in the application of sequence stratigraphy. It is the only paleontological discipline which can correlate marine and non-marine sections, and provide high resolution time stratigraphic and paleoecologic zonations throughout the Phanerozoic record. Kerogen analysis provides useful measures of a section's prospectivity for oil and gas.

Palynology has many capabilities, but we need to do a better job in demonstrating those capabilities to potential clients and communicating how we can assist in solving geologic problems. We can do that best by holding our meetings in affiliation with a larger geological society, which would provide a more effective forum for communicating our capabilities. We also need to devise innovative strategies to demonstrate more effectively the value of paleontology in a restructured petroleum industry (see article by this writer in *American Paleontologist*, Vol. 2, No. 1, Feb. 1994). The most effective first step for palynology, however, is affiliation. We can ill afford to delay consideration of this critical issue.

Harry A. Leffingwell
3180 Bonn Drive
Laguna Beach, CA 92651
August 9, 1994



TRANSFER OF STOVER TYPE SPECIMENS

The type and figured specimens of taxa erected by Lew Stover in:

Stover, L.E., 1977, Oligocene and Early Miocene dinoflagellates from Atlantic Corehole 5/5B, Blake Plateau. In: Elisk, W.C. (ed.), Contributions of stratigraphic palynology, vol. 1, Cenozoic palynology: *American Association of Stratigraphic Palynologists, Contributions Series*, No. 5A, p. 66-89.

have been permanently transferred from Exxon Production Research Company to the Department of Paleobiology, Smithsonian Institution, Washington, D.C. 20560. I relocated the specimens in Houston before transfer and checked Stover's Zeiss Photomicroscope III coordinates and established England Finder locations for the specimens. This information was included with the specimens when deposited at the Smithsonian. Two specimens could not be relocated: the slide coordinates for the paratype of *Homotryblum vallum* are on the slide label, and the coordinates for the holotype of *Distatodinium virgatum* are in a section of the slide where the glycerin jelly has dried up. The specimens were assigned USNM numbers 458609-458632. Further information on examining this material can be obtained from James Ferrigno, Paleobotany Collections Manager in the Department of Paleobiology at the address above or by phone at (202) 357-2539.

Martin B. Farley
Exxon Production Research Co.
P.O. Box 2189, Houston, Texas 77252

IPC FIELD TRIPS

As Field Trip Coordinator for the 8th International Palynological Conference in Houston in June 1996, I invite the membership of AASP to consider organizing field trips for the meeting. I have approached some people who I think would be interested in leading a field trip for the meeting; however, I do not wish to limit the possibilities to those of direct knowledge to me. Therefore, I **wholeheartedly encourage** anyone with an interest in leading or taking part in an IPC field trip to get in touch with me.

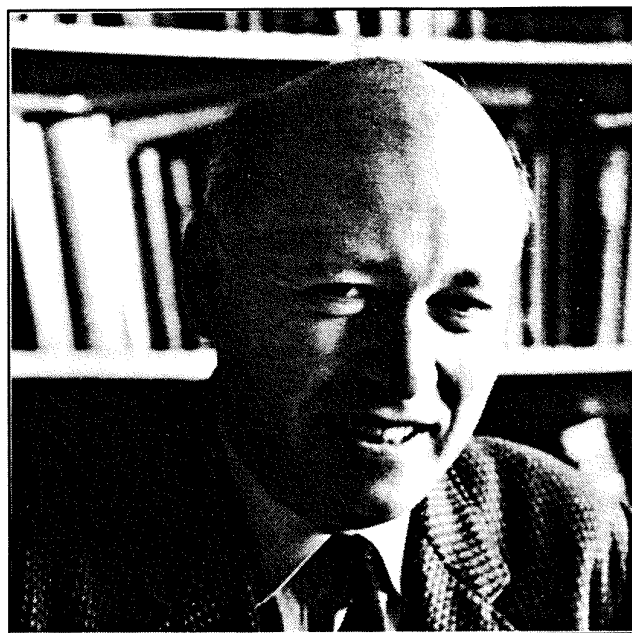
The possibility of holding short courses in conjunction with the IPC has also been raised. This is an opportunity to present your ideas before an international audience. This may also permit international palynologists to present a short course in North America who might not otherwise have the opportunity. Again, I **encourage** anyone wishing to organize a short course or suggest other people who could lead one to get in touch with me.

Martin B. Farley
Exxon Production Research Co.
Phone: (713) 965-4033; Fax: (713) 965-7279

IN MEMORIAM

NORMAN HUGHES

1918-1994



A personal tribute by David J. Batten

Norman Hughes' recent death took many of his friends and colleagues by surprise. Despite having had some health problems within the last few years, he appeared, until very recently, to be as active as ever. Indeed, in all the years I knew him (from early 1966) he seemed hardly to change physically at all. Since he retired in 1985 he extended his list of publications by two books and around half a dozen papers, and he continued to hold several offices at Queen's College in Cambridge where he was a Fellow. Many of the participants of the 5th International Palynological Conference in 1980 will have pleasant memories of being accommodated in this college for the duration of the meeting, the undoubted success of which was attributable in no small measure to his organizing ability.

An obituary by one of his colleagues, Brian Harland, which was published on October 7 in the British "quality" daily newspaper, *The Independent*, follows this personal tribute. Some additional facts and observations pertaining to Norman's career may be found in the introduction to *Special Papers in Palaeontology*, 35 (1986) which I organized with the help of Derek Briggs (Bristol University) to mark his retirement. All of the articles in this volume were written by former students and others who had spent some time in Cambridge under his guidance. Those who were unable to contribute did not hesitate to wish the project well, a response that showed the respect in which Norman was held by those who had come to know him in his capacity as a Ph.D. supervisor or general mentor, despite any differences of opinion in matters academic. I am sure that for the majority of his students, what began as a pupil-teacher relation-

ship sooner or later developed into a long-term friendship.

As Brian notes, Norman could appear authoritarian to some people. He could also be stubbornly argumentative, particularly in connection with one of his favorite topics; the failure, as he saw it, of the majority of paleontologists (not only palynologists) to handle their taxonomic data satisfactorily. There was, however, a more relaxed and gentler side to his nature. Unlike some academics, he was noted, in particular, for being prepared to listen to, sympathize with, and help students and others with both academic and personal problems.

I found him to be a good supervisor. I appreciated being left to my own devices for much of the time! Such an approach doesn't suit everyone of course, but in general I think he assumed that his students would be sufficiently motivated, self-confident and competent to develop their own research programmes without undue interference on his part, once the topic and general approach to it had been agreed. On the other hand, he would chivy and cajole when necessary. Although for several months during my first year he was away in Thailand in his capacity as a geologist with the Territorial Army (TA), he was otherwise usually around when I needed to talk to him. Most discussions, in fact, took place over morning coffee and 'chocolate digestive' biscuits, and would commonly range on to non-palynological topics. I found him particularly helpful when writing up the results of my research.

Norman's work in Thailand and elsewhere with the TA was one manifestation of his wider concern for the world beyond the confines of academe. Politically he was an 'internationalist', being especially concerned about improving the welfare of poor people in the developing world and in countries in the grip of oppressive dictatorships. More recently he was equally concerned about the rising tide of nationalism that has been sweeping through many countries. Socially he enjoyed good wine and conversation. He is survived by his wife Pam, a talented artist and companion of 50 years. He will be missed not only by those close to him but also by his many college and palynological colleagues and friends.

David J. Batten
Institute of Earth Studies
University of Wales
Aberystwyth SY23 3DB, U.K.

NORMAN HUGHES by W.B. Harland
from *The Independent*, October 7, 1994

Norman Hughes was known internationally for his contribution in the field of palynology, the study of plant microfossils—mainly pollen and spores.

Hughes took the rare opportunity afforded by the Natural Sciences Tripos in Cambridge to become a geologist with a thorough biological training and wide interests in the life sciences. In his chosen field his rigorous work led to original methods and insights. Focusing on Mesozoic stratigraphy and the origins of flowering plants or angiosperms he developed methods for recording data and was early in employing the electron microscope, which yielded a new wealth of information beyond what could previously be seen.

The electron microscope's much greater magnification allowed a higher level of discrimination between different kinds of fossils, revealing small evolutionary changes which had previously been undetectable. Hughes argues the advantages of microfossils, which are sampled in their thousands, as compared with megafossils from which species are erected often from few or even only one specimen.

His "biorecords" related individual characters to their stratigraphic context showing how much critical information is lost when only species descriptions are employed for purposes of comparison. Many traditional paleontologists mistakenly perceived this as a threat to the time-hallowed Linnaean system of nomenclature in which so much had been invested. Hughes advocated his biorecords as a supplement rather than a replacement to this system, whose bands of classification are far less detailed. Regrettably his rigorous reasoning was too often ridiculed rather than countered. Hence he suffered, not by his own choosing, as an anti-establishment figure.

He argued against the common neontologists' practice of deducing evolutionary lineages from living material, on the basis that only the fossil record can provide reliable evidence. After authoring (and editing) more than 70 scientific papers and books, his last work, *The Enigma of Angiosperm Origins* (1994) throws down a methodological challenge to the biological community, with the possibility of no explanation in a single lineage. It remains to be seen how far this challenge will be met.

Hughes was born in 1918 and educated at King's College School, Wimbledon and Queens' College, Cambridge, where he won the Wiltshire Prize on Part I of the Natural Sciences Tripos before serving in Field and Survey Regiments of the Royal Artillery in North Africa and Italy. He completed his Part II in 1947 with First Class Honours and won the Harkness Scholarship. His military service continued, however, till 1970 in the Royal Engineers Specialist Pool of Geologists of the Territorial Army, rising to the rank of Colonel and advising on terrains in many parts of the world.

On graduating he became lecturer in Geology at Bedford College, London, and in 1952 he moved to a University Lectureship in Cambridge, where he remained until his retirement in 1985. During this period, entirely on his own initiative and working with a succession of some 25 research students, he developed an internationally recognized school in palynology. He served as President of the International Commission for Palynology in the early Seventies and on many other international organizations, including two subcommissions of the Commission of Stratigraphy of the International Union of Geological Sciences, and he led projects in the International Geological Correlation Programme.

Hughes was one of the founding members of the Palaeontological Association and served it for many years in various capacities. He was active in other bodies, notably the Geological Society of London, especially chairing the Stratigraphy Committee. He was awarded [by Cambridge] an Sc.D. degree on his research in 1977.

Hughes was elected to a Fellowship at Queens', Cambridge in 1963, and continued till his death, serving in several college offices, not least as an expert on wine. As Steward he figured in the BBC television series on the college in 1984.

Not long before his death he and his wife Pamela, who survives him, celebrated their golden wedding. They had no children. Together they enjoyed the countryside, especially bird-watching, and he actively supported her career as an artist.

As a person Norman Hughes was heavyweight, not easily ignored. Perhaps in the eyes of some he could appear outrageously authoritarian. But in personal contacts he was exceptionally unselfish and generous with his time, especially to students. He belonged to a diminishing university tradition where teaching is primary, requiring hours of meticulous preparation of materials.

Conscientious in all he undertook and expressing himself with economy and precision, he was one of the rocks on which the excellence of a university system is built.

Biographical Summary. Norman Francis Hughes, geologist: born 4 August 1918; Lecturer in Geology, Bedford College London 1947–52; Lecturer in Earth Sciences, Cambridge University 1952–85; Fellow, Queens' College, Cambridge 1963–94; married 1944 Pamela Le Boutillier; died Cambridge 18 September 1994.

W.B. Harland
University of Cambridge, U.K.

GERHARD OTTO WILHELM KREMP 1913–1994



Gerhard Kremp was born November 14, 1913, in Berlin, Germany. He earned a Diploma in 1937 at Teachers College in Cottbus, and pursued graduate study at the University of Berlin until January, 1940, when he was drafted into the German military where he served until the end of the war. However, he was granted leave of absence during this time to finish his studies. In February, 1940, Gerhard Kremp was married to Eva Magdalene Agahd. In 1945 he earned his Doctorum Rerum naturalis from the University of Posen where his dissertation, entitled *Die Flora des Braunkohlenlagers von Konin an der Warthe auf Grund der Pollenführung*, was supervised by Profes-

sor Paul W. Thomson. He served as an Assistant Professor at the Geological Institute of the University of Göttingen from 1945 to 1947.

In 1947 Kremp began work as a Research Assistant at the recently founded "Amt für Bodenforschung von Nordrhein-Westfalen" (later changed to "Geologisches Landesamt", or State Geological Survey) at Liblar, subsequently being transferred to Herne in 1948, and to Krefeld in 1950. He joined the group working on Carboniferous stratigraphy, concentrating on the coal-bearing deposits of the Ruhr region and neighboring basins, and undertook the task of establishing a stratigraphic subdivision within the Carboniferous based on the distribution of megaspores, microspores, ostracodes, foraminifers, etc.). With the help of one full-time technician, and some help from a secretary and a second technician shared with the coal petrographers, he produced a number of publications. The publication he co-authored with Robert Potonie in 1955–1956, *Die Spores Dispersae des Ruhrkarbons I–III*, is still regarded as the standard for palynostratigraphy of the Ruhr Carboniferous.

In 1955 Kremp emigrated with his family to the United States to work at Pennsylvania State University in the coal petrography laboratory of William Spackman, who was organizing a program to study the uraniferous lignites of South Dakota with support from an Atomic Energy Commission grant. At Penn State Kremp supervised graduate assistants, and with Spackman established in 1956 the *Catalog of Fossil Spores and Pollen* which they initially co-edited with H. Tate Ames and Hilde Grebe.

In 1959–1960 Kremp was employed as a palynologist at the U.S. Geological Survey in Denver, Colorado. Effective October 1, 1960, he accepted the position of Associate Professor in Geochronology and Geology at the University of Arizona in Tucson, specializing in stratigraphic palynology. In 1962 Kremp, along with Professor Terah Smiley, co-hosted the First International Pollen Congress in Tucson, the first of the international conferences later organized and now regularly held under the auspices of the International Federation of Palynological Societies (IFPS).

Among Kremp's 148 publications are numbered two books: his *Morphological Encyclopedia of Palynology: An International Collection of Definitions and Illustrations of Spores and Pollen* published in 1965, and *The Spores of the Pteridophytes: Illustrations of the Spores of the Ferns and Fern Allies*, published in 1972 in collaboration with T. Kawasaki. The encyclopedia was translated into several languages, and has been reprinted several times.

In 1965 Kremp began seeking oil industry support on behalf of a project to place the world's palynological literature in a computer datafile, which he hoped would ultimately be available to the entire palynological community. He hoped that the nomenclatural information to be contained therein would help palynology avoid the taxonomic chaos which he feared could result from the erection of duplicate names by palynologists working with inadequate reference libraries, and which had afflicted some other microfossil disciplines. His tireless efforts were rewarded when the support materialized and the Kremp Palynological Computer Research Project (now Palynodata, Inc.) became a reality in 1968. The datafile now contains all of

the information on the nomenclature, stratigraphic occurrence, and geographic location of each microfossil reported in nearly 18,000 pre-Pleistocene palynological publications. Kremp retired from the University of Arizona as Professor Emeritus on December 31, 1978, to devote full time to his work on Palynodata and the *Paleo Data Banks* series which he produced.

Among his many honors are included his receipt of the Gunnar Erdtman International Medal of Palynology awarded by the Palynological Society of India in 1970, and his listings in *Leaders in American Science*, *Dictionary of International Biography*, and *Personalities of the West and Midwest*.

Gerhard and Eva Kremp are the parents of three children: Eva (Kremp) Smith; Peter Kremp, DDS; and Sabine (Kremp) Weil. Their shared talent and love for music was evident in their enthusiastic participation in their church's choir and musical programs. To all who knew him Gerhard was a loving and devoted family man; and his kindness, grace, enthusiasm, energy, and deep involvement in palynology were obvious to all those around him. He was an inspiration to his many professional colleagues and graduate students.

Gerhard Kremp passed away on Thursday, August 18, 1994 at 80 years of age.

Prepared by Ken Piel with assistance from Eva Kremp, Owen Davis, Hilde Grebe, Jake Gerhard, and Norm Frederiksen.

ALFRED RICHARD LOEBLICH, JR.

1914–1994

It is with great regret that I report the death, on September 9, 1994, of Al Loeblich, Jr., a pioneer in micropaleontology and palynology. Al was born in Birmingham, Alabama on August 15, 1914 but soon moved to Kansas City, Missouri. He received the B.S. and M.S. degrees from the University of Oklahoma and a Ph.D. from the University of Chicago in 1941. He taught at Tulane University for two years before reporting for military duty in 1942 where he served as a captain in the U.S. Army Field Artillery in the Pacific theater. Upon returning to the U.S. following the end of World War II in 1946, Al accepted a position as Curator of Invertebrate Paleontology and Paleobotany at the United States National Museum in Washington, D. C.

After spending several summers collecting Bryozoa in North America and never getting to work on them, Al returned to studying foraminifera. Following the death of Joseph Cushman, Al moved the Cushman Collection to Washington, D.C., and spent more than a year curating it. Al was also instrumental in organizing the Cushman Foundation for Foraminifera Research and started the Contributions of the Cushman Foundation, serving as editor for two years. During 1953–1954 Al was sent by the Smithsonian Institution to Europe to collect samples and study the foraminiferal collections in many Europe's museums. This was to serve as the background for Al and Helen's work on the Treatise on Invertebrate Paleontology. In addition to this work, Al also collaborated with various micropaleontologists on a planktonic foraminifera project which led to the publication of the now classic USNM Bulletin 275.

In 1957 Al joined Chevron Oil Field Research Company, heading their micropaleontological program. During his tenure at Chevron, Al organized short courses on a wide variety of microfossil groups, prepared numerous research reports and indices on various microfossil groups, and published numerous papers. Upon his retirement from Chevron he served as an adjunct professor at UCLA for about 10 years where he continued publishing, teaching graduate courses, directing theses on acritarchs and dinoflagellates, as well as collaborating with and sponsoring post-doctoral students. After retiring from UCLA, Al still remained active in micropaleontology.

Al was a Fellow of the Geological Society of America, a recipient of the Cushman Foundation for Foraminiferal Research, the Paleontological Society Medal, and the Raymond C. Moore Medal of the Society of Sedimentary Geology.

During his long and illustrious career, Al published numerous articles covering foraminifers, thecamoebians, acritarchs, prasinophytes, silicoflagellates, ebridians, tintinnids, and calcareous nannoplankton. Approximately 75% of his publications were jointly authored with his wife of more than 55 years, Helen Tappan Loeblich. Together, they achieved a level of scientific achievement that is unlikely to ever be matched.

Al will be remembered, not only for his contributions to the field of micropaleontology, but as a unique individual who was never afraid to speak his mind. He was generous with his time and resources, but did not suffer fools gladly. He could be sharp and withering in his criticism when needed, but also very helpful and encouraging. He was especially helpful to students and more than willing to help them succeed. Those who had the opportunity to get to know Al came to appreciate his honesty, humor, hard work, and extreme dedication to the field of paleontology and education.

A festschrift to Al and Helen is in the final stages of preparation. While he did not live to see the final result, he was aware of it. It is hoped that it will be published next year and serve as a tribute to one of the true giants in micropaleontology.

Reed Wicander
Dept. of Geology
Central Michigan University
Mt. Pleasant, MI 48859

FROM AROUND THE WORLD

THE UNITED KINGDOM SCENE

by our U.K. Correspondent, Jim Riding

It is with great sadness that I report the death of Dr. Norman F. Hughes to fellow AASP members. Norman died, following a short illness, during September. He retired from his position on the staff of the Department of Earth Sciences at Cambridge University in 1985. Norman Hughes was one of the most influential palynologists of his generation and is best known for his work on Cretaceous miospores, the origin of angiosperms

and the handling of paleontological data. He was a strong advocate of the scanning electron microscope (SEM) and Norman's ideas on alternative taxonomic methods were the center of much debate. Many geological societies have benefited from Norman's considerable editorial, organizational, and committee skills. One of the highlights of his career must have been the organization of the highly successful 5th International Palynological Conference at Cambridge in 1980. The Palaeontological Association published one of their *Special Papers*, "Studies in Palaeobotany and Palynology" in 1986 in honor of Norman. One of the editors, David Batten, gave a comprehensive biography and bibliography (pp. 1–5), to which readers are referred. The latter bibliography lists 70 articles and books published from 1955 to 1985 by Norman. In retirement, Norman remained typically active and published many more contributions. On behalf of AASP and the entire palynological community—including Norman's many former research students—we pass our sincere condolences to the Hughes family.

On to less somber matters and, between the 6th and 10th of September 1994, a CIMP symposium entitled "Palynology, Paleoenvironments and Stratigraphy" was held at the University of Sheffield. [See below for report by Reed Wicander.] This conference continued the successful series of biannual CIMP meetings. Sixty-six palynologists attended the meeting. Countries represented included Algeria, Australia, Canada, Estonia, India, Poland, Romania, South Africa, and the U.S.A. The first event was a workshop meeting of the CIMP Acritarch Subcommittee held on Tuesday 6th September and continued two days later. Six presentations were given on acritarch taxonomy and much discussion took place on this subject. Because of a lack of consensus, it was decided to investigate working groups on acritarch morphography and suprageneric classification. Thomas Servais (Liège) and Alain Le Merisse (Brest) are coordinating these groups. Lectures were presented during five technical sessions and delegates could peruse a wide variety of posters. Talks on Paleozoic topics dominated, with only five (out of thirty-two) presentations on Mesozoic to Quaternary palynology! Highlights (for me) of the oral presentations included Jacques Verniers' (and six co-authors) talk on a global

Silurian chitinozoan zonation, Sue de Villier's superbly illustrated account of Tertiary miospores from Namaqualand, South Africa, Teresa Winchester-Seeto's lecture on Devonian Chitinozoa from Australia, and the two presentations given by Florentin Parrs and Geert Van Grootel on computer data capture/imaging of the Chitinozoa. A break from the technical sessions was provided on Thursday afternoon (8th October), when a field trip to the nearby Carboniferous stratotypes at Stairfoot Quarry and Langsett and a Chitinozoan Submission workshop were organized. Congratulations to David Jolley and his team of organizers for an enjoyable symposium.

A number of AASP members took advantage of the British Micropalaeontological Society's cut-price offer on their journals (Volumes 1 to 12). If anyone else is interested, we only have a limited number of full sets available. The postage charge for a full set to the USA is £49 (=US \$76). This means that a full set delivered to your door is a bargain US \$108—hurry! Any visiting AASP members are very welcome to attend the B.M.S. Annual General Meeting at University College London on November 16, 1994.

This column is an ideal way to disseminate any address/or staffing changes of interest to AASP members; I will try to collate these for this feature.

Recent changes at the British Geological Survey include Rex Harland's early retirement last March. Rex, who is well known to many AASP members, will concentrate on his teaching and research interests. We also lost Aileen McNestry last month: Aileen, whose speciality was Upper Paleozoic miospores, is taking up a career in teaching.

**CIMP SYMPOSIUM ON PALYNOLOGY,
PALEOENVIRONMENTS, AND STRATIGRAPHY
SEPTEMBER 6–10, 1994
UNIVERSITY OF SHEFFIELD, ENGLAND**
Report by Reed Wicander

A CIMP sponsored symposium on palynology, paleoenvironments, and stratigraphy was held at the University



Registrants of the CIMP Symposium on *Palynology, Paleoenvironments, and Stratigraphy* held in September at the University of Sheffield, U.K.
Photo: Jim Riding.

of Sheffield, from September 6 to 10, 1994. Approximately 60 people from all over the world attended the meeting to listen and participate in five technical sessions, two workshops, and a field trip.

An acritarch subcommission workshop was the first event of the conference. Several papers on various aspects of acritarch morphology and classification were presented including "Biometrics of the *Dicrodiacrodium ancoriforme-normale* group" by Thomas Servais, Rainer Brocke, and Olda Fatka, "The Lower Palaeozoic 'galeate' acritarch plexus: a discussion" by Thomas Servais, Klaus-Hermann Eiserhardt, Olda Fatka, and Ivo Paalits, and "Remarks on *Peteinosphaeridium* and related genera" by Marco Tongiorgi, as well as other speakers. The workshop format worked well as it allowed for discussion among specialists that probably would not be of particular interest to a general audience.

The first technical session began Wednesday morning and was led off by a talk by Ken Higgs on "Palynological correlation of the Devonian–Carboniferous boundary in the auxiliary global stratotype in Hasselbachtal in Germany with other sections in Belgium, southern Ireland and southwest England." In this talk, Ken reviewed the miospore zonation for the Late Devonian–Early Carboniferous boundary and discussed the importance of initially incorporating palynological data into the definition of where boundaries for the various stratotypes will be drawn, rather than after the boundary has been decided and trying to fit palynological data into established zonations. He pointed out what all of us in the palynological community have known for a long time and that is we have some of the best data available for stratigraphic correlation.

Ken's talk was followed by another excellent presentation along the same lines by Maurice Streel and his coauthors Stanislas Loboziak and Philippe Steemans titled "Devonian miospore stratigraphy and correlation with the recently defined Stage Stratotypes." Six additional papers on various aspects of Paleozoic palynology were also presented that day including an interesting "Proposal for a revised chitinozoan classification" by Florentin Paris, Yngve Grahn, Viuu Nestor, and Iskra Lakova.

Six more papers were presented on Thursday ranging from ways to set up an "Image-incorporated electronic database for chitinozoan identification" by Florentin Paris and Daniele Bernard to "Further application of Microwave Technology in palynological preparation" by Rae Anthony Jones to "Event stratigraphy" by Yngve Grahn.

Friday's technical sessions included several talks on acritarchs and chitinozoans, as well as a talk by Jim Smith on "A quantitative palynofacies analysis of a Namurian A delta complex, NW Ireland" as well as several non-Paleozoic presentations, among them "Palynology of Tertiary sediments from a palaeochannel in Namaqualand, South Africa" by Sue E. de Villiers. The technical sessions ended with a talk by Jacques Verniers et al. on "A global chitinozoan biozonation for the Silurian."

In addition to the talks, there was a poster session that ran the length of the conference in which 18 posters were presented.

Overall, the quality of presentations and discussions was very high, and it was nice to attend a conference in which there was the opportunity for extended discussion following a presentation. The organizing committee of Geoff Clayton, Ken J.

Dorning, David W. Jolley, Bernard Owens, and Edwin Spinner are to be thanked for their efforts in ensuring a smooth running and enjoyable conference. My only complaint, and there wasn't anything that could be done about it, was that the field trip and chitinozoan workshop were both held at the same time of Thursday afternoon, which meant that I was unable to attend the workshop. The field trip organizers Nick Turner and Bernard Owens are to be congratulated for running a fine field trip (even though we did have to walk almost 8 m to the first outcrop) and keeping the rain away until we finished our collecting.

Reed Wicander
Department of Geology
Central Michigan University
Mt. Pleasant, Michigan 48859

REPORT FROM THE NORDIC COUNTRIES

by our Correspondent, Niels Poulsen

A DOCTOR OF SCIENCE IN PALYNOLOGY

In the previous issue of the AASP Newsletter, Pre-Quaternary palynology at the Geological Survey of Denmark (DGU), Stratigraphic division, was presented. Quaternary and Holocene palynology is also carried out at the Geobotany Division which was started in the late thirties under Johannes Iversen. At that time the division was called the "Bog-lab". Jørgen Troels-Smith joined the "Bog-lab" in 1939. The division was enlarged in 1947 when Alfred Andersen and Peter Ingwersen joined, and again in 1951 with the recruitment of Inger Brandt and Harald Krogh. Svend Th. Andersen joined in 1954, and became chief for the division after the death of Iversen in 1971. The staff expanded to include senior paleoecologist Bent V. Odgaard. The division has, in recent years, concentrated its research within the field of environmental history, covering settlement ecology, development of forests and lakes, and biological variability of natural forests.

Bent Odgaard was awarded the Doctor of Science degree on the 23rd September from the University of Copenhagen for his work on the Holocene vegetation history of West Jylland, Denmark.

Bent completed his M.S. on postglacial vegetation history of



The medieval seal of Copenhagen University.

Skovbjerg Bakkeø, western Jylland in 1980 and joined the Geobotany Division at DGU the same year, working with regional inventories of semi-natural woodland stands, paleoecology of fossil mosses and moss floras in virgin woodland stands, and stands used for forestry. He has also worked on the deposition of industrially derived soot particles in lake sediments, on recent paleolimnology of shallow lakes, using plant macrofossils, on long-term landscape-scale diversity dynamics, on recent lake eutrophication, and primarily on the Postglacial vegetation history of western Jylland.

THESIS ABSTRACT

Bent's thesis describes the history of heaths in West Jylland (Jutland), western Denmark, based on pollen analysis of lake sediments from the Holocene.

The sediments of three closed Danish lake basins (Solsø, Skaansø, Kragssø) were used for the investigation into post-glacial vegetational dynamics in former heathland areas in northern West Jylland. The sites were selected to represent the major geomorphological units. The Holocene history of each lake basin was investigated by mapping of sediment distribution, analysis of loss-on-ignition, coarse inorganic matter, humus content, mineral magnetics, $\delta^{13}\text{C}$, pollen and selected other microfossils. These techniques were supplemented by plant macrofossil analysis at one site. Holocene terrestrial vegetational development was investigated at each site from analyses of pollen and microscopic charred particles. Chronologies were provided by numerous ^{14}C dates. Stratigraphies of wet ground and terrestrial pollen and spore types were zoned by stratigraphically constrained cluster analysis. Based on the resultant site pollen assemblage zones (site PAZ), regional PAZ were proposed. Using modern analogues, Holocene floristic richness was estimated from pollen richness in the microfossil assemblages. The results support the hypothesis that disturbance is one of the most important mechanisms behind the maintenance of floristic richness. In particular, the response of estimated floristic richness to the intensity of vegetational fires followed the predictions of the Intermediate Disturbance Hypothesis. A period of elevated palynological richness and inferred vegetational disturbance was identified at all sites between 6000 and 5500 BC (calendar years). Using correspondence analysis (CA), the major gradient in the terrestrial pollen sequences was identified as a light-shade gradient, and CA first axis sample scores were used as a supplement to standard AP/NAP pollen ratios as an indicator of the shade-tolerance/light-demand of Holocene terrestrial plant communities. In spite of different vegetational developments since 4000 BC, the timing of major changes towards more light-demanding vegetation types were broadly synchronous at the three sites. Using chord distance as a dissimilarity index, rates of palynological change suggest that the interval between 8000 and 7500 BC (calendar years) was the period of most rapid vegetational change during the Holocene, both in terrestrial as well as lacustrine ecosystems. While climatic forcing of the rapid events around 8000 BC is hypothesized, the synchronous timing of relatively rapid inferred change in lake and terrestrial vegetation around AD 600 may reflect changes in climate as well as in land-use. Redundancy analysis was used to develop a

model between fire intensity (inferred from microscopic charred particles) and vegetational response, as reflected by pollen assemblages. Formulated at one site and tested at the two other sites, the model explains regional *Calluna*-heathland expansions as a result of vegetation burning. Similarly, declines in heathland cover are explained by lack of maintenance by fire.

Regional vegetational development in northern West Jylland is reconstructed and special consideration is given to heathland history. The Holocene heathland development is interpreted as resulting from its importance for grazing. The hypothesis is put forward that on poor soils, *Calluna*-dominated heathland was a better grazing resource than grass-dominated pasture, due to the winter-grazing offered by *Calluna* and the low palatability of dominant grasses on poor soils. This hypothesis is relevant for the explanation of the variation in timing of heathland expansions on the different soil types represented by the study sites.

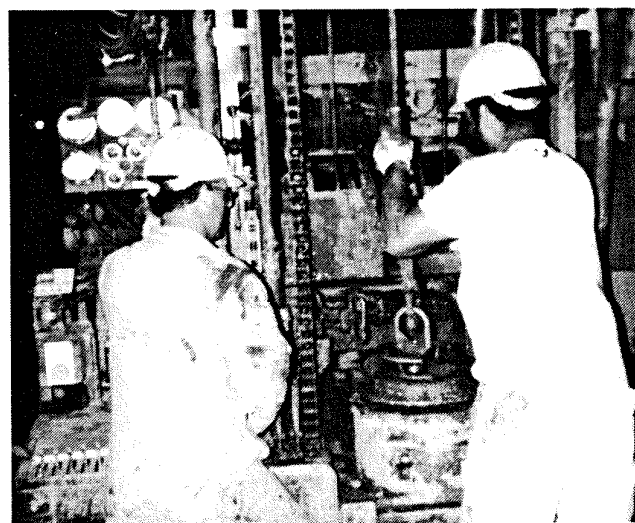
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Submitted by Niels Poulsen
Geological Survey of Denmark
Email: st005@mmdgu.dgu.min.dk

U.S. GEOLOGICAL SURVEY GLOBAL CHANGE DRILLING PROJECT AT FORT YUKON, ALASKA

During the summer of 1994, the U.S. Geological Survey carried out a drilling operation at Fort Yukon, Alaska (66°34'N, 145°16'W) as part of an interdisciplinary research project on



Drilling for global change, Fort Yukon, Alaska. Photo: Tom Ager.

climate and ecosystem history. The drilling project represents the final phase of a Global Change Research project that began in 1990 in cooperation with the Geological Survey of Canada. The objectives of the overall project are to (1) develop a detailed history of climate and ecosystem changes in northern North America during the late Cenozoic; (2) improve the geochronological framework for late Cenozoic deposits and their associated fossil assemblages from Alaska and northern Canada; and (3) to improve the regional biostratigraphy for terrestrial fossil groups (especially pollen and spores and plant macrofossils for the late Cenozoic. Funding for the U.S. Geological Survey participants in the project was provided by the USGS Global Change and Climate History Program.

The first four years of the project focused upon gathering samples and information from dateable natural exposures of fossil-bearing deposits of Miocene, Pliocene, and Pleistocene age in Alaska and northern Canada. Some of the results of the 1990 and 1991 field investigations were recently reported in a special issue of *Quaternary International* (vols. 22/23), "Tertiary/Quaternary Boundaries."

The objective of the 1994 field season at Fort Yukon was to obtain a long sediment core from Yukon Flats basin, a tectonic basin with an area of about 34,000 square kilometers, and which may contain 3 to 5 km of Cenozoic sediments. The drilling depth target for this project was 400 meters, using a U.S. Geological Survey drill rig and drill crews. An old well log from a water well borehole drilled in 1954 at Fort Yukon provided a guide to what might be encountered in the upper ca. 150 meters: eolian silt and sand near the surface, up to 30 meters of fluvial gravel, then a thick sequence of lacustrine clay.

The drilling effort in 1994 faltered initially when attempting to penetrate the Pleistocene fluvial gravel unit near the surface, but the gravel was finally penetrated and cased off. Coring began at the top of the lacustrine clay unit at a depth of 30 m. The drilling operation penetrated to a maximum depth of 388 meters, and about 90% of the sediments penetrated were recovered as 7.5 cm-diameter cores. Most of the sediments penetrated are lacustrine clay, silt, and muddy sand. Coal layers up to 7 meters thick were recovered from the lowermost 15 meters of the core.

The core contains 32 volcanic ash layers with thicknesses of 1 to 19 cm, and many thinner ash layers were also observed. Some of the numerous volcanic ashes from the core may be dateable by fission-track or $^{40}\text{Ar}/^{39}\text{Ar}$ dating methods. Additional age control will be provided by magnetostratigraphy for the core.

Preliminary examination of pollen samples from the top and bottom of the Fort Yukon core suggests that (1) sediments of late Pleistocene and Holocene age are absent from the core, as a result of the drainage of the lake during the early? Pleistocene; and (2) the age of the coal-bearing sediments at the base of the core appears to be early middle Miocene, approximately 15 Ma. The pollen from the coal includes many temperate broad-leaf, mostly deciduous taxa that have been documented from other fossil assemblages of early middle Miocene age in Alaska (e.g., *Liquidambar*, *Fagus*, *Nyssa*, *Quercus*, *Castanea/Castanopsis*).

The Fort Yukon core appears to contain one of the longest and most continuous records of late Cenozoic onshore environmental changes from anywhere in North America. We invite

interested university-based researchers to consider collaborating with us on the detailed analysis of portions of this core (e.g., pollen and spores, diatoms). For further information contact Dr. Thomas Ager, U.S. Geological Survey, Mail Stop 919, Box 25046 Federal Center, Denver, CO 80225 (phone 303-236-5728), e-mail: tager@greenwood.cr.usgs.gov

Thomas Ager
U.S. Geological Survey

THE OCEAN DRILLING PROGRAM



News Update

by John V. Firth

ODP Leg 156 (May 31–July 26, 1994) drilled the north Barbados Ridge accretionary prism, to study the relationship of fluid flow and structural deformation in a fine-grained siliciclastic regime.

ODP Leg 157 (July 31–September 25, 1994) drilled the Madeira Abyssal Plain (MAP) and the Canary Island volcanoclastic apron (VICAP). A mid-Miocene to Recent history of turbidite deposition across the MAP region was documented, with individual turbidites being correlatable across the entire basin. Four sites drilled around the island of Gran Canaria recovered sequences that reflect the entire volcanic history of the island from the submarine shield stage through early explosive volcanism, to more recent basaltic volcanism.

ODP Leg 158 (September 30–November 23, 1994) drilled TAG, a geothermal "black smoker" site, to study the geochemistry, mineralogy, and fluid flow regime of the deposits.

The 1995 drilling schedule

Drydock (Nov. 24, 1994–Jan. 3, 1995) is scheduled to perform maintenance, cleaning and overhaul of the ship. Drydock will be at Falmouth, England.

Leg 159 (Jan. 5–March 2, 1995) will drill the Eastern Equatorial Atlantic Transform Margin in the Gulf of Guinea, to study the structural development of a transform margin from its inception in Early Cretaceous time to the present, and to study the equatorial Atlantic gateway opening from the mid to Late Cretaceous. Sediments from the Lower Cretaceous to Quaternary are anticipated.

Leg 160 (March 12–May 3, 1995) will drill the eastern Mediterranean collisional margin to the west, south, and east of Crete, and to study sapropel development in this region. Staffing

is now underway for this leg. Staffing is almost complete for this leg.

Leg 161 (May 8–July 4, 1995) will drill the Alboran Basin to study the structural development of an extensional basin within collisional margin area, and to study sapropel history in the western Mediterranean. Staffing is almost complete for this leg.

Leg 162 (July 9–Sept. 3, 1995) will be the second leg of the North Atlantic–Arctic Gateways program (the first being Leg 151), and will study the gateway development between the Arctic, Norwegian–Greenland Sea, and Atlantic oceans from Paleogene to Quaternary, as well as paleoceanographic and paleoclimatic history of this region. Staffing is almost complete for this leg.

Leg 163 (Sept. 8–Nov. 3, 1995) will drill the Blake Ridge and Carolina Rise to study gas hydrate formation. Staffing is now underway for this leg.

The drilling schedule for 1996 will be decided at the December meeting of the JOIDES Planning Committee.

For more information on Ocean Drilling and other JOIDES activities, write to Joint Oceanographic Institutions, Inc., 1755 Massachusetts Ave., NW, Suite 800, Washington, D.C., 20036-2102, U.S.A.; Phone: 202-232-3900; Internet: joi@iris.edu; to request copies of the JOIDES Journal.

Shipboard participation

To apply for participation as a shipboard scientist on an ODP cruise, send a letter of request and a resume to the Manager of Science Operations, Ocean Drilling Program, Texas A&M University Research Park, College Station, TX, 77845. You will receive an application form to fill out and return to ODP.

Sample requests

To request samples from ODP/DSDP cores, send a letter of request to Chris Mato, Assistant Curator, Ocean Drilling Program, Texas A&M University Research Park, College Station, TX, 77845. You will receive an application form to fill out and return to ODP.

John V. Firth, Ocean Drilling Program
Texas A&M University
Email: john_firth@odp.tamu.edu

THESIS ABSTRACTS

MODERN POLLEN RAIN IN COSTA RICA*

M.Sc. thesis by John C. Rodgers III

The modern pollen rain of 29 sites in Costa Rica was characterized by analyzing pollen spectra in surface lake and pond sediments and soils. The sites were located within nine principal vegetation types: mangrove, tropical dry forest, degraded savanna, tropical moist forest, tropical wet forest, premontane rain forest, montane rain forest, montane bog, and paramo. Pollen data were analyzed using cluster analysis and

detrended correspondence analysis (DCA). Sites with similar vegetation showed similar pollen percentages and were clustered together in the cluster analysis and DCA. Results demonstrate that different vegetation types in Costa Rica can be distinguished by their modern pollen rain.

*Thesis for M.Sc. degree in botany, The University of Tennessee, Knoxville. Major Professors: Sally P. Horn and Ed. E.C. Clebsch. (May 1994.)

PRECOLUMBIAN AGRICULTURE, FIRES, AND VEGETATION DYNAMICS IN A LOWLAND RAINFOREST: PALEOECOLOGICAL EVIDENCE FROM LAGUNA BONILLA AND LAGUNA BONILLITA, COSTA RICA*

M.Sc. thesis by Lisa Anne Northrop

Issues of where, when, how, and to what extent pre-Columbian humans affected the natural landscapes of Central America have been debated for years. While many studies have been conducted in Guatemala and other areas of Olmec, Aztec, and Mayan influence, little attention has been paid to peripheral areas. It has been suggested that indigenous populations were small in countries such as Costa Rica, Nicaragua, and northern Panama (Origgi, 1981), but little is known about how these sparse populations affected their environment. As part of a broader study aimed at exploring prehistoric human-environment relationships throughout the Central Atlantic watershed of Costa Rica, several lake sediment and soil cores were obtained from two lowland tropical lakes—Laguna Bonilla and Laguna Bonillita. The lakes are located in a region of Costa Rica that has been used for millennia as a trade route by both northern and southern cultures. Many archaeological sites are located within the region and much work has been carried out to establish archaeological sequences for the area. While the archaeology of the area is fairly well established, very little is known about prehistoric vegetation patterns, disturbance factors, and human-induced environmental change.

This thesis provides some of the first direct evidence of pre-Columbian human impacts on vegetation in the tropical wet lowland rainforests of Costa Rica. Paleoecological profiles constructed from the analysis of pollen grains, charcoal fragments, and sediment characteristics provide a continuous record of human occupation in the two lake basins since pre-Columbian times. The paleoecological sequence of Laguna Bonillita firmly establishes human settlement within the lake basin before 2560 yr B.P. But problems with the presence of old carbon within the lake system at Laguna Bonilla has made the radiocarbon dating of these sediments difficult. Zea is the only food crop that was identified in the pollen assemblages in the lake sediments and the relatively high abundance (up to 5 percent of total pollen) of this heavy pollen type indicates that the crop was being grown on or near the lake margin. The lake sediment analyses document widespread forest disturbance in the basins during the past several thousand years. Macroscopic charcoal present in soil cores from

the Laguna Bonillita basin record fire as an important disturbance factor in the late Holocene.

*Thesis for M.Sc. degree in geography, The University of Tennessee, Knoxville. Major Professor: Sally P. Horn. (May 1994.)

STRATIGRAPHIC, PALYNOLOGICAL AND PALEO-
ECOLOGICAL STUDIES
IN THE EAST-CENTRAL SUDAN (KHARTOUM AND
KOSTI BASINS),
LATE JURASSIC TO MID-TERTIARY*
Dissertation by Mohamed Zayed Awad

Kimmeridgian/Tithonian to Oligocene–Miocene terrestrial sedimentary rocks of the east-central Sudanese rift basin (Khartoum and Kosti basins) are considered in this study. Pollen and spores are used to assess age determinations, zonation and paleoecologic and paleophytogeographic developments. Fossil angiosperm leaves from exposures are primarily used for paleoecologic interpretation.

Seven informal palynozones spanning the Kimmeridgian/Tithonian to Paleocene are defined. They permit a detailed correlation with other palynological suites from West and North Africa. Age assignment of the palynozones can be summarized as follows:

Assemblage Zone S-O: Kimmeridgian/Tithonian–early Neocomian based on the association of *Dictyophyllidites harrisii*, *Foraminisporis wonthaggiensis*, *Staplinisporites caminus*, *Concavissimisporites punctatus* and others.

Assemblage Zone S-I: Neocomian based on *Impardecispora apiverrucata*, *I. purverulenta*, *Pilosisporites verus*, *P. trichopapillosus*, *Concavissimisporites variverrucatus*, *Ischyosporites disjunctus*, *Deltoidospora mesozoica*, *Trilobosporites valanjinensis* and others.

Interval Zone S-II: Early Barremian based on the occurrence of *Dicheiropollis etruscus* and others.

Unfossiliferous interval: Barren interzone of post-early Barremian to pre-Campanian age (Al Democratia-1, El Salam-1).

Assemblage Zone S-IV: Late Albian to late Cenomanian based on *Afropollis jardinus*, *Cretacaeiporites polygonalis*, *C. scabratus*, *C. mulleri*, *Hexaporitricolpites emelianovii* and others.

Assemblage Zone S-V: ?Turonian/Coniacian to Santonian based, among others, on *Droseridites senonicus*.

Assemblage Zone S-VI: Santonian to Campanian based on the association of *Scabratiporites simpliformis*, *S. samoilovitchi*, *monocolpopollenites spheroidites*, *Zlivisporis blanensis*, *Tubistephanocolpites cylindricus*, and the absence of characteristic Maastrichtian pollen and spores that exist on top of this zone (see below).

Assemblage Zone S-VII: Maastrichtian on the basis of the occurrence of *Proteacidites sigalii*, *Periretisyncolpites phosphaticus*, *Azolla cretacea*, *Syncolporites marginatus*, *Syndemicolpites typicus* and others.

Assemblage Zone S-VIII: Paleocene to ?Eocene based on the association of *Longapertites vaneendenburgi*, *Proxapertites*

operculatus, *Retidiporites magdalenensis*, *Echitriporites trianguliformis*, *Cicatricosporites parallatus*, and *Striatopollis nigericus*.

The presence of *Classopollis* in the Late Jurassic to the Early Cretaceous matches the arid conditions that prevailed in North Africa by then; the associated pteridophyte spores and the bisaccate pollen indicate locally temperate-montane and slightly humid conditions. Onset of a moist-wet environment during late Albian and early Cenomanian is evident in the area. In the late Cenomanian an increase of seasonally dry conditions is apparent from the characters of angiosperm leaves and the rise of ephedroid pollen. Widespread wet habitats in the area during the Campanian–Maastrichtian are indicated by the frequent occurrence of the freshwater ferns *Azolla* and *Ariadnaesporites*. A warm tropical to subtropical climate in the Maastrichtian to Paleocene is indicated by several pollen assignable to the Palmae and Proteaceae. Later, during the Oligocene–Miocene, the conditions changed to a humid tropical to subtropical climate.

Throughout the Late Jurassic to the Oligo–Miocene the study area was part of the tropical Northern Gondwana Province. The boundaries of this province are presented on a series of paleocontinental maps spanning Late Jurassic to Paleocene. Those between the Northern and the Southern Gondwana Provinces remained unaltered from the Late Jurassic to the Early Cretaceous in spite of the emergence of new taxa. During the Albian–Cenomanian the southern boundary of the Northern Gondwana Province remained unchanged, but the northern boundary shifted slightly northward in the NW to include the southern parts of the present Mexico and Florida.

Reworked marine Paleozoic scolecodonts in the Late Jurassic and the Neocomian sediments of the Khartoum Basin indicate a source area with, at least partly, marine sediments of Paleozoic age.

*From Abstract and Summary of a dissertation submitted to the Technical University Berlin. Supervisors: Prof. Dr. E. Klitzsch, Dr. E. Schrank. The dissertation is published in: *Berliner Geowissenschaftliche Abh. (A)*, vol. 161, 1994, 163 pp., 25 figs., 6 tabs., 18 pls. Available from: Selbstverlag Fachbereich Geowissenschaften, FU Berlin, Podbielskialle 62, D-14195, Berlin, Germany. Price DM85 (about \$50.00).

Dr. Mohamed Z. Awad
University of Khartoum, Faculty of Science
Geology Department, Khartoum, Sudan

MIOCENE PALYNOSTRATIGRAPHY AND
PALEOENVIRONMENTS OF NORTHWEST-
ERN AMAZONIA: EVIDENCE OF MARINE
INCURSIONS AND THE INFLUENCE OF
ANDEAN TECTONICS*

Ph.D. thesis by Carina Hoorn

A reconstruction is presented of the Miocene depositional history of the intracratonic basins in northwestern Amazonia. This reconstruction is based on an integration of palynological,

sedimentological and paleontological data which were collected from outcrops and wells. These data provide detailed information about the age, sediment provenance, depositional environments and paleovegetation in NW Amazonia during the Miocene.

This study was initiated with the purpose of gaining an insight into the recent geological past of NW Amazonia and to determine how the sedimentary environments and the paleovegetation evolved in this area during the Tertiary. Implicitly an answer was expected to the question of how the paleovegetation of this area responded to environmental and/or climatic change in the past.

In the first chapter the subject is introduced. A general overview is presented of previous works and the purpose, outline and the general methods that were used during this work are explained.

The second chapter presents a palynostratigraphic zonation for the Miocene sediments in the Solimões Basin (Brazil) based on the analysis of well 1AS-4a-AM. Five pollen zones are distinguished namely *Verrutricolporites*, *Retitricolporites*, *Psiladiporites*–*Crototricolpites*, *Crassoretitritiletes* and *Grimsdalea* which relate to existing zonations in northern South America. The pollen assemblage is occasionally dominated by mangrove pollen (*Zonocostites*) which indicates that NW Amazonia was episodically influenced by marine incursions during the Miocene. These episodes relate to phases of high global sea level stand during the Burdigalian, Langhian and Serravallian. Between the Early and Middle Miocene a change in sediment composition occurred. The heavy mineral assemblage changed from a stable to an unstable suite indicating a change in provenance. Until Early Miocene times the Guyana Shield formed the main source of sediment input in NW Amazonia. However, due to a general phase of uplift in the Eastern Cordillera (Andes) during the Middle Miocene, the main source of sediment supply changed and was from then on situated in the Cordillera. A subsequent change in sedimentary environments and paleovegetation is reflected in the change from a NW directed fluvial system to an east directed fluvio-lacustrine system. Furthermore, a change in the pollen composition and an increase of the Gramineae was observed.

The third chapter describes the Early Miocene to early Middle Miocene sediments that outcrop along the Caquetá River (Colombia). These sediments belong to the *Retitricolporites* and *Psiladiporites*–*Crototricolpites* zones and correlate with the lower part of the Brazilian well (1AS-4a-AM). Outcrop data suggest that during this period sedimentation took place in a low sinuous to anastomosing, NW directed fluvial system with its origin in the Guyana Shield. The heavy mineral assemblage is characterized by stable components such as tourmaline, zircon and rutile. At the time the vegetation was dominated by *Mauritia* palm swamps and riparian taxa such as *Amanoa* and Bombacaceae. The pollen assemblages indicate that NW Amazonia was then forested by a very diverse, tropical lowland and riverine vegetation generally similar to the present vegetation in the area. Episodic marine incursions reached the area as evidenced by the presence of mangrove pollen (*Zonocostites*) and marine palynomorphs such as microforaminifera and dinoflagellate cysts. These marine incursions are related to the Late Burdigalian

sea level rise and reached the area from the Caribbean or maybe via a low in the Andes from the west. The best analogue for this Miocene environment is the present Caquetá River although it has an opposite transport direction and there is no marine influence.

The fourth chapter describes the Middle to Late Miocene sediments along the Amazon River (Colombia, Perú and Brazil). These sediments belong to the *Crassoretitritiletes* and *Grimsdalea* zones and correlate with the upper part of the Brazilian well (1AS-4a-AM). The depositional environment was characterized by a fluvio-lacustrine system with an eastward transport direction of Andean origin. The heavy mineral assemblage is characterized by unstable components such as epidote, chloritoid and garnet. During the Middle to Late Miocene the paleovegetation was dominated by *Mauritia* and *Grimsdalea* palms, riparian taxa, and a relative abundance of ferns, fern allies, floating meadows and aquatic taxa. These sediments represent the first deposits of the paleo-Amazon River system and their best analogue should therefore be the flood plains of the present Amazon River. Marine influences have been detected by the presence of marine palynomorphs, mangrove pollen (*Zonocostites*), brackish tolerant molluscs and ostracods, ichnofossils of the *Thalassinoides*–*Teichichnus* association and, shark teeth. The marine influence reached the area during the Langhian and Serravallian sea level rise probably via a connection with the Caribbean.

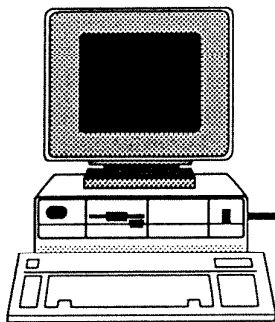
The fifth chapter describes the Middle to Late Miocene sediments along the lower Apaporis River (Colombia). Although biostratigraphic markers are rare, these sediments seem to belong to the *Grimsdalea* zone. The depositional environment was characterized by an low sinuous to anastomosing fluvial system which has its origin in the proximal Guyana Shield. This system was probably a tributary of the paleo-Amazon River. The abundance of pollen of mangrove (*Zonocostites*) and the palm *Mauritia* suggests the proximity of a mangrove forest with backswamps dominated by palms. The most suitable analogues are the present coastal plain of Surinam and Guyana and the tributaries of the Orinoco with their origin on the shield.

The sixth chapter gives a view on Miocene Amazonia in its regional perspective. A broad range of areas such as NW Amazonia, the Magdalena Valley, the Eastern Cordillera and the Mérida Andes all record the effects of paleogeographic changes as a result of regional tectonism induced by plate tectonic adjustments. This tectonism led to the genesis of major rivers such as the Amazon River and the Magdalena River and, a change in drainage pattern of the Orinoco River. Based on the aforementioned it can be concluded that the depositional history of NW Amazonia, like other areas in northern South America, was largely influenced by regional and global factors such as the Middle Miocene uplift of the Eastern Cordillera (Andes) and marine incursions, respectively. These large scale events influenced drainage patterns, depositional environments and the paleovegetation of NW Amazonia. Although global cooling of the climate started in the Middle Miocene there is no obvious link between the paleovegetation changes in Miocene Amazonia and this global climatic event.

*Ph.D. thesis of the Hugo de Vries-Laboratorium, University of

Amsterdam, The Netherlands (September 1994). Principal supervisor: Prof. Dr. Th. van der Hammen. The thesis includes 3 chapters based on articles in the journal *Palaeogeography*, *Palaeoclimatology*, *Palaeoecology*. The thesis consists of 156 pages including 13 plates with pollen photos and 16 palynological diagrams. In The Netherlands, we normally produce around 300 copies of our theses. Copies of my thesis are available from me upon request.

Carina Hoorn, Hugo de Vries-Laboratorium
University of Amsterdam
1098 SM Amsterdam, The Netherlands.
Phone: 31-20-5257672; Fax: 31-20-5257662
E-mail: A433CARI@SARA.NL



THE INFORMATION HIGHWAY

POLLEN ON THE INFORMATION HIGHWAY

by Vaughn M. Bryant, Jr.

For those AASP members who are on the INFORMATION HIGHWAY, via email, you may now join a growing list of palynologists who are part of the pollen-palynology bulletin board.

If you are not familiar with an email bulletin board, then read on. Essentially, what happens when you ask to be included on the "list" is that you will get email sent to the bulletin board by some members who might have a research question. That same letter is then sent to everyone on the list. If anybody who reads the message wants to respond with an answer, he/she may do so. If not, then one just ignores the message.

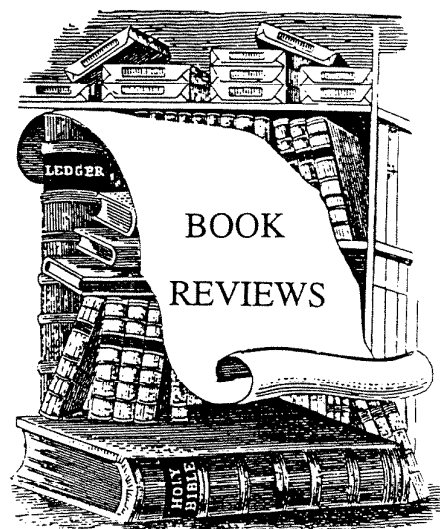
So, for those of you who love to receive email, want to read some stimulating messages, have a yearn to help someone out with a research problem in palynology, and just want to have some fun...then here is how you can join.

Send this message *only*: SUBSCRIBE POLPAL-L (in this space put your full name and that is all).

Send this one line message to this email address:
listserv@uoguelph.ca

Hope to see you soon on the INFORMATION HIGHWAY...

Vaughn M. Bryant, Jr.
Department of Anthropology
Texas A&M University
College Station, Texas 77843-4352



Spores et Pollen by Josette Renault-Miskovsky and Michel Petzold, 1992, Delachaux et Niestle, Lausanne, 360 pp. Hard cover, in French. Distributor: EDISUD, La Calade, RN7, 13090 Aix-en-Provence, France. Book \$ 96; optional set of 40 color slides \$ 58.

"Pollen, grain of life, witness of the past and present, constitutes the true natural plant archive of the future." The above quote from the Preface sets the lyrical tone and foreshadows the scope of this work, which attempts to span many diverse fields from the origin and evolution of spores and pollen in the fossil record to the economic importance of pollen for crop production and honey assays. The historical geology figure of an expanding spiral, charting 4600 million years of Earth's history, will be familiar to many. While not pretending to be exhaustive, the 360 page text does resemble a mini-encyclopedia of palynology and many subjects get attention—apitherapy, melissopalynology, allergy, agronomy, paleopalynology, plate tectonics, paleoecology, archaeology, ethnology, and criminology; the only omission noted here was Max Frei's pollen studies of the Shroud of Turin.

The stated purpose of this work is to offer the amateur naturalist an introduction to the broad field of palynology or a researcher interested in a specific sub-discipline additional insight. The book explores the wonderful world of pollen and spores familiar to specialists but unknown to laymen. Madame Renault-Miskovsky bridges this gap and brings these microscopic grains closer to everyone by zooming in on the sex life of plants just as Felix Dujardin did over a hundred and fifty years ago in his *Nouveau manuel complet de l'observation au microscope*. She also stresses the role of pollen and fertilization for the future of the green world, and for the production of both wild and domestic fruits and grains in particular. To connect the microscopic and macroscopic world, she uses a clever illustrative device: photomicrographs of pollen grains are shown next to their source plants of temperate origin, usually of the same genus, on a given plate. I can attest to the effectiveness of this heuristic device, which is one that students will appreciate.

Visually, the book is a delight, lavishly illustrated with over one hundred color plates, which underscores Renault-Miskovsky's carrot over stick approach, offering accurate information without tedium. The plates show pollen and spores in light and scanning electron microscopy, their source plants, close-ups of flowers, and landscapes, including views of the south of France. One section shows examples of flowers adapted for wind and animal (including bat) pollination, with rare cases of pollination by snails, and another case by a cocker spaniel (fig. 59). There are two hundred and seventy figures of excellent quality in all: they are well-composed, with good contrast and brightness throughout the work, and the color value is true and saturated. The forty optional color slides are recommended and make a helpful addition for teaching resources.

Renault-Miskovsky and Petzold are to be congratulated for producing a well-organized and beautiful volume, one that will remain a classic for introductory palynology for some time to come. The well-conceived figures make the work accessible to all those interested in pollen and spores, whether French-speaking or not.

Jerome V. Ward
P. O. Box 2592
Auburn, AL 36831-2592



SHORT REVIEWS OF GEOLOGICAL SOCIETY OF AMERICA SPECIAL PAPERS RECENTLY RECEIVED

by

Reed Wicander, AASP Book Review Editor

The Acadian Orogeny: Recent Studies in New England, Maritime Canada, and the Autochthonous Foreland by D. C. Roy & J. W. Skehan (Eds.), 1991. Geological Society of America Special Paper 275. Geological Society of America 3300 Penrose Place, P.O. box 9140, Boulder Colorado 80301. 171 pages. \$42.50.

It has been almost 100 years since H. S. Williams introduced the Acadian (Acadian revolution) into the geological literature (1895). Since that time, the Acadian event has undergone various interpretations. In the opening paper of this 10-paper volume, Rast and Skehan provide an overview of this important orogenic event in earth history by reviewing the current research on the Acadian orogeny. As noted by Rast and Skehan, the term *Caledonian orogeny* was coined by Suess (1908) for Late Silurian orogenic activity in Scandinavia and the British Isles and the formal relationship between these two events was accepted by Schuchert (1930) despite the differences in stratigraphic timing. Instead of trying to fit all the different orogenic episodes into various pulsating orogenic cycles, Rast and Skehan limit their discussion to the Mid-Paleozoic orogenesis in the North Atlantic based on the plate tectonics of the region during this interval of geologic time. In summary, their interpretation

one of successive terranes colliding with North America over a prolonged period of time, resulting in deformation, metamorphism, and plutonism of rocks along the boundaries of these

collisions.

In the only paleontologically oriented paper in the volume, Boucot provides his "Comments on Cambrian-to-Carboniferous biogeography and its implications for the Acadian orogeny." In this paper Boucot points out the causes of biogeographical distinctiveness and how historical biogeography can provide evidence useful in better understanding the timing of orogenic events, particularly the Acadian orogeny. With that background established, Boucot then provides an overview of our current understanding of Cambrian-to-Carboniferous biogeography in the Northern Appalachians. He concludes his paper by stating that fossil evidence indicates the Acadian orogeny began during the late Eifelian-Givetian time interval.

The rest of the volume contains papers dealing with the Acadian orogeny in specific regions in the Northern Appalachians in which detailed mapping, petrologic, geochemical, and paleomagnetic studies are applied in relation to the latest plate tectonic interpretations. The result is an excellent and up-to-date overview of this geologically complicated region. To quote the editors in their preface, "The Acadian orogeny... is considerably more intractable to model because there are no recognizable ophiolitic sutures to mark the presence of closed ocean basins, and the western foreland has been difficult to differentiate from that of the Taconian." After reading this volume, I would certainly agree with that statement.

Elk Lake, Minnesota: Evidence for Rapid Climate Change in the North-Central United States by J. P. Bradbury & W. E. Dean (Eds.), 1993. Geological Society of America Special Paper 276. Geological Society of America 3300 Penrose Place, P.O. box 9140, Boulder Colorado 80301. 336 pages. \$62.00.

Elk Lake, Minnesota is situated in north-central Minnesota between prairie and forest environments. Its sediments record a continuously varved Holocene record of climatic and environmental change, hence the reason an entire G.S.A. Special Paper is devoted to this particular lake.

The first paper "Elk Lake in perspective" by R. Y. Anderson, W. E. Dean, and J. P. Bradbury provide a background to the history of Elk Lake, as well as defining the three major objectives of this volume. The first is to "separate local and sequential changes in biota and geochemistry from changes that measure regional shifts and oscillations in climate." Secondly, to "connect the paleoclimatic data directly to airstream patterns," and lastly, "to determine how effectively the observations of several investigators from several disciplines can be brought to bear on the study of a single locality."

Following this introductory paper, the rest of the volume contains 18 papers detailing various aspects of the geologic and biologic history of Elk Lake. These include such papers as: Climatic and Limnologic Setting of Elk Lake, The Varve Chronometer in Elk Lake: Record of Climatic Variability and Evidence for Solar/Geomagnetic-¹⁴C-Climate Connection, Physical Properties, Mineralogy, and Geochemistry of Holocene Varved Sediments from Elk Lake, Minnesota, Geologic Implications of the Elk Lake Paleomagnetic Record, Holocene Diatom Paleolimnology of Elk Lake, Minnesota, Paleoclimatic Interpretation of the Elk Lake Pollen Record (P.J. Bartlein and C. Whitlock), and Fire, Climate Change, and Forest Processes

During the Past 2000 Years.

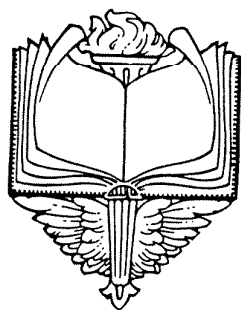
The final paper (20) by the same three authors as the first paper provides a synthesis of all that is known about Elk Lake. Titled "Holocene Climatic and Limnologic History of the North-Central United States as Recorded in the Varved Sediments of Elk Lake, Minnesota: A Synthesis," this paper integrates the results and interpretations of all of the various data concerning Elk Lake into a detailed chronology of limnological and climatic changes at Elk Lake during the past 10,000 years.

Southern Lesser Antilles Arc Platform: Pre-Late Miocene Stratigraphy, Structure, and Tectonic Evolution by R. C. Speed, P. L. Smith-Horowitz, K. v. S. Perch-Nielsen, J. B. Saunders, & A. B. Sanfilippo, 1993. Geological Society of America Special Paper 277. Geological Society of America 3300 Penrose Place, P.O. box 9140, Boulder Colorado 80301. 98 pages. \$35.00.

This relatively short Special Paper concerns a study conducted by the authors of pre-late Miocene rocks of the southern Lesser Antilles arc platform (SLAAP), exposed on Grenada and several of the Grenadine islands from Mustique Island south. By including studies in petrology, stratigraphy, structure, micropaleontology, and radiometric dating, the authors are able to synthesize their data and present a comprehensive geologic overview of the area that is counter to some of the commonly held assumptions about the tectonic histories and restorations of the Lesser Antilles arc.

The results of the author's research is presented in four parts. The first concerns the regional geology and crustal structure of SLAAP, the second is the geology of the islands, the third synthesizes the depositional, magmatic, bathymetric, and deformational history of the older rocks, and the fourth discusses the tectonic interpretations of SLAAP.

Within this volume is a wealth of information about SLAAP along with a very comprehensive Reference section.



NEW PUBLICATIONS

Guide to Genera File of Fossil Spores and Pollen of Jansonius & Hills (1976) by D. Burger, 1994. Australian Geological Survey Organisation Record 1994/46, 36 p., 3 tables.

From the moment of its appearance Dennis Burger has been browsing in the Guide to Genera File of Fossil Spores and Pollen (GFFSP) of Jansonius & Hills 1976. To find his way around in the File he has built up a "key" for spores and pollen grains, by

grouping genera into Turma, Subturma, Infraturma etc. categories. Within each category genera are listed alphabetically, with GFFSP number, age of genotype, and where relevant with symbols showing types of synonymy, changes in taxonomic rank, and type of fossil (megaspore/-pollen, tetrad).

Subscribers to the GFFSP may find the Guide a useful tool. It contains about 3900 entries (including Supplement 11 of 1992), it is spiral-bound and costs US\$ 25.00 (\$Aus 35.00, with air mail surcharge of \$5.00 Australia and \$15.00 overseas. Anybody who is interested may obtain further details from:

Reply Paid Service 536, AGSO Sales Centre, GPO Box 378, Canberra ACT 2601, Australia. Tel (06) 249 9519/9642, Fax (06) 2499982 International prefix (61-6).

Submitted by Dennis Burger
Australian Geological Survey Organisation
Marine, Petroleum and Sedimentary Resources Division
GPO Box 378
Canberra City, A.C.T. 2601, Australia

NEW PALEONTOLOGY MONOGRAPHS

Palynological reconnaissance of Early Cretaceous to Holocene sediments, Chatham Islands, New Zealand by D.C. Mildenhall, 1994. Institute of Geological and Nuclear Sciences Monograph 7: 204 p., 23 plates.

This monograph covers Early Cretaceous to Holocene biostratigraphy and palynology and is of interest to researchers in these fields as well as biogeography, paleogeography, geology, paleoclimatology and oil company investigations.

Monograph 7 addresses some 320 pollen samples from the Chatham Islands which range in age from the Cretaceous to Holocene and demonstrate marked vegetational changes. Swamp flora, angiosperms, dense podocarp and araucarian forest interspersed with fernlands, and recycled Permian to Jurassic pollen possibly from Marie Byrd Land, Antarctica are part of the early picture. Closed forest disappeared after the Eocene, and the present herbaceous and shrubby vegetational associations appeared in the Late Pliocene. Since the last glaciation, peats, which contain evidence of climatic fluctuations, have covered most of the island.

The Chatham Islands are the largest landmass between New Zealand and South America and have a surprisingly complete sedimentary sequence from the Early Cretaceous to the present. They are the remnants of a Late Cretaceous intraplate stratovolcano overlain by thin biogenic and authigenic sediments punctuated by local basalt volcanism.

Cretaceous-Cenozoic geology and biostratigraphy of the Chatham Islands, New Zealand by Hamish Campbell et al., 1993. Institute of Geological and Nuclear Sciences Monograph 2.

Researchers interested in the Chatham Islands should also be aware of the Institute's Monograph 2. This monograph includes discussion of economic and geological resources such as peat hydrocarbons and water, and geological hazards in the Chatham Islands. Some 33 tables of fossil lists and 85 photographs are incorporated along with maps, diagrams and paleogeographic

reconstructions. Its five appendices cover microfossils, macrofossils, palynomorphs, stratigraphic columns and radiometric dates.

To purchase copies, contact: The Publications Officer, Institute of Geological and Nuclear Sciences Ltd., State Insurance Building, Andrews Avenue, P.O. Box 30-368, Lower Hutt, New Zealand, Phone: +64-4-569 9059, Fax: +64-4-569 5016.

DINOSYS? DINOSYS!

WHY AND WHAT.—During the last decades, rapid developments in dinoflagellate palynology have led to a dramatic increase in taxonomic and stratigraphic data. Hundreds of genera and thousands of species have been described up to now. The number of taxa will continue to increase, including taxa from yet uncovered areas. In order to keep up with these developments, LPP, has, in 1990, started the development of an electronic data- and image-library on dinoflagellate cysts, a relational database for the IBM-compatible PC. This project is called the "DinoSys" database project. DinoSys is a relational database on fossil dinoflagellate cyst. It is not merely a software shell, but documents fossil dinocyst genera and (sub)species on the basis of published and specialist information: taxonomy, synonymy, stratigraphy, geography, images and literature. All text in English. In order to guarantee its continuity, and to be able to provide future updates, DinoSys is offered for sale to the palynological community: exploration companies, consultants, academic institutions and individuals.

Development. DinoSys software is developed by LPP. Data are compiled by LPP. Images are provided by LPP and palynologists worldwide. Major sponsorship from NORSE HYDRO, STATOIL, AMOCO, SIPM and LPP.

Palynologists involved so far. Jonathan P. Bujak, Sarah P. Damassa, Rob Fensome, Hans Gocht, Martin J. Head, Judith K. Lentin, Walter Riegel, Bruce Tocher, Laurent de Verteuil, Graham L. Williams, Graeme J. Wilson, and a bunch of people at LPP.

Hardware, software. IBM compatible from 486 DX(2) up. Windows accelerator (1 MB or up), colour VGA, 8 MB RAM or up. DinoSys now takes nearly 40 MB of your hard disk for program and data, and over 1.1 GB of images are presently available. Eventually these numbers may double. DinoSys runs under Windows 3.1, and can be used in a network. In the near future it is expected that images can be accessed directly from CD.

Only for dinos? A neat derivative of DinoSys, called PalSys, has been developed to accommodate other groups of palynomorphs and (micro-)fossils.

More information. Can be obtained at the address below. Please state the nature of your (company's) activities, e.g. exploration, consulting, or education. A new DinoSys demo is expected to be available this year. Further information on DinoSys, including some graphics, will appear in the next issue of the AASP newsletter.

Jan Willem Weegink
LPP Foundation
Laboratory of Palaeobotany and Palynology
University of Utrecht, Heidelberglaan 2
3584 CS Utrecht, The Netherlands
Phone: +31-(0)30-531909
Fax: +31-(0)30-535096
E-mail: janwillem@boev.biol.ruu.nl

EDITORIAL



Your Newsletter editor and Sarah—on their big day in November.

This newsletter sadly reports the loss of three giants in the field of palynology: Norman Hughes, Gerhard Kremp, and Al Loeblich. All began their careers in palynology well before its potential was fully recognized by others. Today, palynologists benefit from the infrastructure these pioneers laid, but must carry the torch in the face of dwindling resources and opportunities. The challenge continues.

This issue has been personalized by inclusion of a number of photos—I wish I could include more. I am particularly grateful to Sue Jarzen and Vaughn Bryant for their photo-coverage of the AASP Annual Meeting. Photos really enliven pages of text and I urge you to submit snaps of colleagues, field areas etc. along with your news. I also want to thank my new wife (see above) for putting up with a newsletter editor for a husband.

In order to reduce mailing charges of this Newsletter, some of the less time-sensitive items have been shunted to the next issue, which will appear on time in early February. Please note the strict **January 1st** deadline for copy.



November, 1994

REVIEWERS FOR PALYNOLOGY

Periodically, the editorial staff requests information from AASP members who are willing to provide technical reviews on manuscripts for Palynology. We must do this periodically to update our files because of changes in both research interest and address. Please return the form below if you are willing to act as a reviewer, even if you have completed a similar form in past years.

Name: _____

Address: _____

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Microfossil group(s): _____

Geologic age(s): _____

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Thank you very much. Please return the completed survey to:

Michael J. Farabee

Journal Editor

Estrella Mountain Community College Center

3000 N. Dysart

Litchfield Park, AZ 85340

If you have any questions please contact me at: (602)935-8455 or email:
farabee@emc.maricopa.edu

**SPECIAL OFFER TO AASP MEMBERS:
SALE OF BACKPARTS OF VOLUMES 1 TO 12 OF
THE JOURNAL OF MICROPALAEONTOLOGY**

The British Micropalaeontological Society (BMS) currently holds large stocks of backparts of Volumes 1 to 12 of *The Journal of Micropalaeontology*. BMS is therefore holding an unrepeatable sale of this stock. The Journal is one of the leading titles in this area and palynomorphs are well represented. AASP members, non-members and institutions may purchase backparts for US\$5 each (US\$100 the set) **inclusive** of surface mail postage. Payments of US orders (in US\$) should be routed to Prof. R. F. Lundin and order forms to J. B. Riding (see below). Non-US AASP members should order parts at £2.20 each (£44 the set) for UK members (£3.00 each, £60 the set, for the rest of the world) **including surface mail postage** from J. B. Riding at the address below.

Please indicate the parts you require in the left hand column below; a cross/tick will indicate one copy. Should you wish to order multiple copies, please clearly indicate the number you require. If a particular part becomes out of stock, and has been pre-paid, clients will be reimbursed. Pre-payment is welcome, but clients are advised to request an invoice in order to avoid over- or under-payments. The number of papers on palynology, the total number of papers and number of pages are indicated in the right-hand column below. Volume 3, Part 2 is a special issue to honour Professor Charles Downie. Volume 4, Part 1, on the Palynostratigraphy of northeastern Libya, unfortunately is out of print.

_____ Vol. 1	(July 1982)	6/17 palynology papers, 153pp.
_____ Vol. 2	(July 1983)	3/14 palynology papers, 117pp.
_____ Vol. 3, Pt. 1	(March 1984)	5/13 palynology papers, 82pp.
_____ Vol. 3, Pt. 2	(September 1984)	12/12 palynology papers, 128pp.
_____ Vol. 4, Pt. 2	(August 1985)	2/13 palynology papers, 187pp.
_____ Vol. 5, Part 1	(April 1986)	2/14 palynology papers, 114pp.
_____ Vol. 5, Pt. 2	(December 1986)	4/11 palynology papers, 106pp.
_____ Vol. 6, Pt. 1	(May 1987)	2/12 palynology papers, 116pp.
_____ Vol. 6, Pt. 2	(November 1987)	3/10 palynology papers, 121pp.
_____ Vol. 7, Pt. 1	(May 1988)	2/13 palynology papers, 109pp.
_____ Vol. 7, Pt. 2	(December 1988)	2/9 palynology papers, 138pp.
_____ Vol. 8, Pt. 1	(June 1989)	2/13 palynology papers, 130pp.
_____ Vol. 8, Pt. 2	(December 1989)	0/10 palynology papers, 117pp.
_____ Vol. 9, Pt. 1	(May 1990)	2/10 palynology papers, 114pp.
_____ Vol. 9, Pt. 2	(March 1991 for 1990)	1/17 palynology papers, 141pp.
_____ Vol. 10, Pt. 1	(August 1991)	3/15 palynology papers, 114pp.
_____ Vol. 10, Pt. 2	(December 1991)	3/12 palynology papers, 120pp.
_____ Vol. 11, Pt. 1	(June 1992)	2/11 palynology papers, 105pp.
_____ Vol. 11, Pt. 2	(December 1992)	1/15 palynology papers, 137pp.
_____ Vol. 12, Pt. 1	(August 1993)	2/13 palynology papers, 139pp.
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**I have sent remittance (in \$US) of \$US_____ to Prof. R. F. Lundin, P.O. Box 871404, Department of Geology, Arizona State University, Tempe, Arizona 85287-1404, USA. All cheques to be made payable to "British Micropalaeontological Society".

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Please return the completed form (xerox copies are acceptable) to: Dr. J. B. Riding, British Geological Survey, Keyworth, Nottingham NG12 5GG, UK. (Enquiries: tel. + 44 (0) 602 363447, fax: + 44 (0) 602 363200).