

APRIL, 1988
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AASP NEWSLETTER
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AASP NEWSLETTER

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J. H. WRENN, EDITOR

PRESIDENT'S MESSAGE

NSF GRANT AWARDS

As reported in a previous issue of the Newsletter, AASP was awarded \$25,000 by the National Science Foundation (NSF) to support travel of AASP members to the 7th International Palynological Congress in Brisbane this summer. By the deadline of February 1, 1988, 26 applications had been received by the AASP Peer Review Committee, which consisted of Don Benson (chairman), John Clendening, William Cornell, Loretta Satchell, Bert van Helden, and Roger Witmer, none of whom applied for funding under this grant.

The Committee scored each application according to criteria that were specified in the NSF grant proposal. The scores from each Committee member were used to rank each applicant. The rankings of each Committee member were then plotted to form scatter diagrams, and the Committee divided the applicants into three groups, (1) those to receive full funding of their airfare (to a maximum of \$1500), (b) those to receive partial funding, and (a) those not recommended for any funding. Most applicants did receive at least partial funding of their airfare. Thus, we believe that the NSF grant was successful in helping a reasonable maximum number of applicants to attend the Congress.

AASP members who will be receiving travel funds include:

Grace S. Brush	Louis J. Maher, Jr.
Carol A. Chmura	Merrell A. Miller
Joyce L. Clark	Karl R. Newman
Lucy E. Edwards	Douglas J. Nichols
Michael J. Farabee	Fredrick J. Rich
Martin B. Farley	Eleanora J. Robbins
R. Farley Fleming	Alfred Traverse
Norman O. Frederiksen	Robert S. Van Pelt
Javier Helenes-Escamilla	Jerome V. Ward
Carol Hotton	E. Reed Wicander
Terry J. Hutter	Gordon D. Wood
Harold V. Kaska	

The AASP extends its sincere thanks to the National Science Foundation for helping these palynologists travel to the 7th International Palynological Congress. The Board of Directors is grateful to the Peer Review

Committee for their diligence in reading the applications, scoring them, and dividing the applications into groups, all of which had to be done within a limited time.

I also thank Pat Gensel and Bill Cornell for helping me write the NSF grant proposal, and especially Pat for being Principal Investigator, which means she has a lot to do in order to make the grant work.

QUATERNARY PLANNING SESSION

At this year's midyear Board of Directors meeting, the Board voted to encourage AASP's participation in the U.S. Committee for the International Union for Quaternary Research (INQUA). The main purpose of INQUA is to plan the INQUA meeting that takes place every four years (the next one is in China in 1991). The main purpose of the U.S. Committee is to provide for input by U.S. Quaternary scientists into INQUA planning. New elections to the U.S. Committee will not take place for several years; therefore, AASP will not have the opportunity to place a representative on the Committee until then. However, the Committee encourages input by interested societies. The next meeting of the U.S. Committee will be at the GSA meeting in Denver in October/November 1988. If any of our Quaternary-minded members are planning to be at the GSA meeting and would like to sit in on the meeting of the U.S. Committee, please let me know and I will send you what material I have about the Committee.

Norman Frederiksen
President, AASP

BOARD OF DIRECTORS MIDYEAR MEETING

MARCH 5, 1988

COMFORT INN, DENVER, COLORADO

Board Members present:

Norman O. Frederiksen	President
Harry A. Leffingwell	President-Elect
Gordon D. Wood	Secretary-Treasurer
David K. Goodman	Managing Editor
Harold V. Kaska	Director-at-Large
Robert L. Ravn	Director-at-Large
Loretta S. Satchell	Director-at-Large

Other AASP, Inc., members in attendance:

Robert T. Clarke
Douglas J. Nichols
Virgil D. Wiggins

SECRETARY-TREASURER'S REPORT

Secretary-Treasurer Gordon Wood distributed the Treasurer's Report and reported that the expenses for the year totaled \$18,904.93. This year's balance, as of March 1, 1988, is \$45,992.10, slightly greater than last year's balance of \$43,229.95. However, some of this represents future income because a number of members have paid their dues in advance. In addition, there is a lower cash flow from foreign dues because of the lower dollar exchange rate.

Gordon also reported that he will close the non-interest bearing checking account upon his return to Houston and incorporate the money into the AASP, Inc. - Money Market Checking Account. There is a CD in the L. R. Wilson account, earning an interest of 6.8% for six months.

Gordon reported that Palynology, Volume 11 has been fully paid for and amounted to \$14,804.25. Norm Fredriksen asked about the payment procedures for Palynology. Bob Clarke responded that the AASP Foundation initially pays for all publications. When the volumes are distributed to the membership, AASP, Inc., purchases them from the Foundation. The number purchased is based on current membership, plus an additional 25 copies for late-paying members.

Total membership was 945, as of March 1, 1988. This included 816 individual and 129 institutional members. Since October 2, 1987, AASP has welcomed 28 new members and has accepted 9 resignations. Almost 300 members have yet to pay their 1988 dues and, of these, 74 are also in arrears for their 1987 dues! These members will be dropped from the membership at the Annual Meeting in Houston if they are still in arrears.

MANAGING EDITOR'S REPORT

Dave Goodman distributed the Managing Editor's Report and reviewed the highlights of the Newsletter and of Volume 11 of Palynology. Dave thanked Rip Ford for his outstanding work as Assistant Editor. Dave also reviewed the progress of Palynology, Volume 12, noting that in addition to the papers ready for publication, two manuscripts are in the mail, three new manuscripts have been received, and two manuscripts have been promised. There appears, therefore, to be a surplus of papers for Volume 12. Dave will try to distribute Volume 12 before the Annual Meeting by moving up the production schedule to mid-Fall. Bob Clarke noted that Palynology has only been issued once before the Annual Meeting, and twice it has been distributed during an annual meeting.

Dave reported that Book Review Editor Reed Wicander has generated a total of 28 reviews to date. There were 6 in the last Newsletter, and 7 have been submitted for the April Newsletter. Software reviews will be added to materials reviewed in the near future.

AASP FOUNDATION REPORT

Bob Clarke reported that AASP began 1987 with \$20,600 and ended the year with \$18,300. Foundation expenses for the year were \$30,300, the bulk of which was for publishing costs (\$24,500) and postage (\$3,100). The cost of specific publications were:

Palynology Volume II - \$18,750

Contributions Series #18 - \$9,950

Contributions Series #19 - \$5,758

The cost of Contribution #19 was partially defrayed by corporate contributions.

Income during 1987 totaled \$28,000, including proceeds from publication sales (\$14,900), author page charges and reprints (\$10,900), donations (\$1,250) and account interest (\$950). The bottom line is that the Foundation ended the year with \$2,300 less than it began.

This was due primarily to the end-of-the-year publication mailing and invoicing. Some of the proceeds from that end-of-the-year mailing were received early in 1988. Foundation income between January 1 and April 1, 1988, was \$21,950, publication sales accounted for \$20,000 of the total. Expenses thus far in 1988 total \$13,400 (\$9,800 in publication costs and \$2,500 in postage). The Foundation balance as of April 1, 1988, is a healthy \$26,900.

ANNUAL MEETING REPORTS

1987 Halifax Meeting: Final Report

Doug Nichols delivered the report for Rob Fensome. There were 123 registrants; 63 attended the dinoflagellate workshop convened by Greg Gaines; 56 people attended the spore/pollen workshop convened by Dave Batten; 133 people attended the historic feast; and 140 attended the Annual Luncheon. The most important lesson learned was in realizing the importance of recording every detail in writing, especially all sources of expenses (i.e., taxes, etc.). The income for the meeting was \$17,844.67; expenses totaled \$17,430.15, resulting in a profit of slightly over \$400.

1988 Houston Meeting

Bob Clarke presented the Houston Committee Report. He noted the addition to the committee of Don Engelhardt as Program Chairman. Bob reviewed the

responsibilities of each committee member, and stated that the financial estimates are based on 150 attendees. He believed that attendance would be helped by the TSOP Meeting, which will be held just prior to ours, and by the joint AASP-TSOP symposium to be held on Wednesday, November 9, 1988. The symposium is entitled "The Relationships of Temperature, Mineralogical Alterations and Related Phenomena in the Processes of Organic Maturation, Hydrocarbon Phases and Reservoir Creation and Destruction". AASP and TSOP will share the profits of the symposium based on membership participation from each society.

A golf tournament will be held prior to the AASP Annual Meeting, in lieu of a field trip. A half-day Paleozoic Symposium will be held on Thursday afternoon, and there will be 2 1/2 days of technical sessions. The Pleistocene Symposium is progressing. A special evening event is being planned.

The GSA and Geotimes have been given announcements of the meeting. Bob hopes to have a list of papers in the July Newsletter, and other meeting reminders.

1989 Tulsa Meeting

Norm Frederiksen presented the report for Jeff Stein. Hotel rates at the Sheraton-Kensington will be low; currently they are \$45 per night. Meeting dates are October 18 - October 20, 1989. A Paleozoic field trip will be organized by Merrell Miller and Len Eames. Norm assumed it would be on a Saturday, so that low rate airfares could be utilized, but stated he would confirm that with the Committee. Other chairman assignments were reviewed. The committee is exploring the possibility of a public session on a popular topic such as dinosaurs, and the relationship of palynology to dinosaurs. The Board considered this an excellent idea.

AWARDS COMMITTEE REPORT

Virgil Wiggins reviewed the Awards Committee Report. An issue was raised in a letter from Art Sweet to allow a supervising professor's name to be added to the L. R. Wilson Best Student Paper presentation. The Awards Committee was divided in their opinion on the issue, and Lucy Edwards reviewed in writing, the history of the issue within AASP. Lucy cited one instance at the Washington meeting where a student could not obtain travel funds from his professor's grant because the professor's name was not on the contribution. Doug Nichols cited one past abuse when a professor gave a paper for the student and won the award. Harry Leffingwell also stated that Dr. Wilson's preference, when he was asked several years ago, was that it be a contribution only of the student, but that Dr. Wilson was not adamant about this point. The Board of Directors decided that the supervising professor could be

co-author, but that the student must be the senior author and must present the paper.

NOMINATING COMMITTEE REPORT

Norm Frederiksen noted that Bob Ravn will soon be retiring from the Board of Directors because he will be transferring to England. Consequently, there will be three Directorships vacant in the next election rather than the usual two; two for two-year terms, and one for a one-year term. It was the consensus of the Board that the two-year terms would go to those candidates with the two highest vote counts, and the one-year term to the candidate with the third highest number of votes. Norm distributed the report submitted by the Chair of the Nominating Committee, Fred Rich. (See report and biographies of the Board of Director nominees elsewhere in this Newsletter.)

IFPS REPORT

Doug Nichols presented the IFPS Report that he prepared jointly with Harold Kaska. Four cities have made bids to host the 8th International Palynological Congress, including:

Aix-en-Provence, France
Cracow, Poland
Nagasaki, Japan
Oslo, Norway

He distributed brochures for the Board of Directors to examine. Doug mentioned that there was a feeling within IFPS that it is time for the International Meeting to return to Europe. Leffingwell asked about the official language of the French proposal. Bob Clarke replied that it was English and French. The Board of Directors voted to support the proposal for Aix-en-Provence, France.

NEW BUSINESS

Ballot Committee

Norm Frederiksen reported that Harold Kaska has been appointed Chair of the Ballot Committee to replace Bob Ravn who is being transferred to England. Harold has named Tom Edison and Bill Evitt to be members of the Committee.

Request That AASP Join INQUA

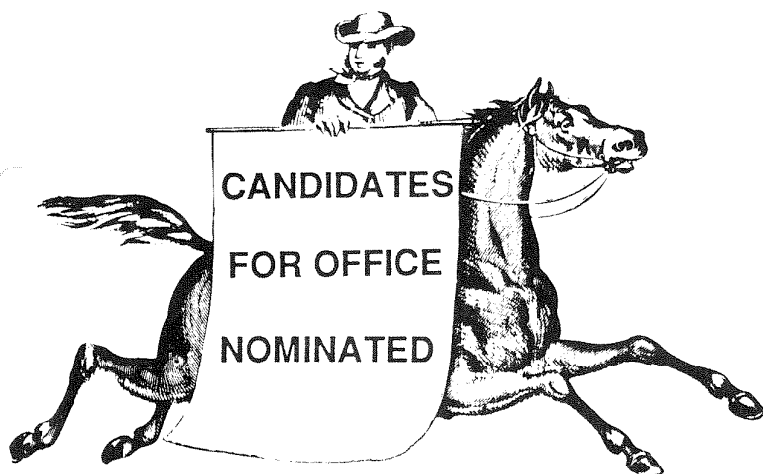
Norm stated that Vaughn Bryant requested that AASP become a member of the U.S. Committee of INQUA. Norm made inquiries and learned that INQUA is an umbrella organization and that only countries are eligible for membership. The purpose of the U.S. Committee is to take part in the planning of INQUA meetings and issue a newsletter on this and related matters. No dues are involved in membership in the U. S. National Committee. Some of the societies that are members of the

U.S. Committee include: AAAS, AGI, American Institute of Biological Sciences; BSA; Ecological Society of America; GSA; Vertebrate Society; Paleontological Society; etc.

The Board voted in favor of having AASP join the U.S. Committee of INQUA and appointed Vaughn Bryant to be its representative.

International Geological Congress

Jan Jansonius has written the President to suggest that we attempt to raise AASP's profile by being a sponsor of the International Geological Congress (IGC). Norm inquired as to the requirements to be a host society. This is an honorary function, and no money is involved. The main responsibility is to encourage members to be involved in the International Geological Congress. To be a host society, AASP will need to submit a request to the Secretary-General of IGC. The Board agreed that the President should write a letter to the Secretary-General of the IGC requesting that AASP be made a host society for the Washington meeting of the IGC.



AASP Nominating Committee Chairman Frederick J. Rich presented the 1988 slate of candidates to the AASP Board of Directors at their Midyear Meeting in Denver. Fred and Committee members Dick Baker, Jocelyne Legault, Bud Simpson and Bert Van Helden selected the following nominees:

President-Elect:

Judith K. Lentin
Virgil D. Wiggins

Secretary-Treasurer:

Gordon D. Wood (unopposed)

Managing Editor:

David K. Goodman (unopposed)

There are six candidates for the office of Director-at-Large because Robert L. Ravn will be resigning from

office this November, after the Board of Directors meeting at the AASP Annual meeting in Houston, Texas. Bob is being transferred to England for two years and will not be able to complete his second year in office. (On the move again, eh Bob?! Bon Voyage!) One of the Director-at-Large candidates elected this year will serve out the last year of Bob's term in office. The other two candidates elected will each serve a full two-year term.

The biographies of all candidates for office are presented below, in alphabetical order.

Lynn A. Brant (Director at-Large)

Lynn has been a member of the Department of Earth Sciences of the University of Northern Iowa and a member of AASP since 1982. He considers himself primarily an educator: including the geologic and environmental education of nonscience majors. Before entering the teaching profession, Lynn held several positions with the State of Montana in environmental agencies.



His research has been in the area of Quaternary palynology and, most recently, chrysophycean cysts. His present work is an attempt to determine the degree to which the cysts can be used as paleoecological indicators based on palynological interpretations of past environments.

Lynn is a member of the Geological Society of America, Botanical Society of America, American Association for the Advancement of Science, Sigma Xi, National Association of Geology Teachers, and several state and local organizations.

Owen K. Davis (Director-at-Large)

Owen Kent Davis was born March 13, 1949, in Nampa, Idaho, received his M.S. in Botany in 1974, and his Ph.D. in Ecology in 1981. He is married and has two children.

Owen is an Assistant Professor in the Department of Geosciences at the University of Arizona, a member



of the Numerical Methods and North American Working groups of the INQUA Subcommittee of the Holocene, and the North American coordinator for IGCP 252, "Past and Future Evolution of Deserts." He has published over 40 papers on the analysis of pollen and plant macrofossils from sites in California, Idaho, Utah, and Arizona. His current research interests include the regionalization of climatic change in arid North America, the effects of climatic change on the extinction of the Pleistocene megafauna, and the pollen analysis of trade rat (*Neotoma*) middens.

David K. Goodman (Managing Editor)

Dave became a member of AASP in 1975 and is the incumbent Managing Editor. He has served as Assistant Journal Editor (1985-86), Journal Editor (1986-88), and Director-at-Large (1986-87). He was a member of the L. R. Wilson Outstanding Student Paper Award Committee in 1981 and 1987.



Dave is a member of Sigma Xi, the Paleontological Society, Society of Economic Paleontologists and Mineralogists, Society of Systematic Zoology, British Micropaleontological Society, the International Society for Evolutionary Protistology, and the Palaeontological Association. He is chairman for the upcoming Fourth International Conference on Modern and Fossil Dinoflagellates at Woods Hole. Dave currently acts like a geochemist in the Source, Migration and Petroleum Evaluation Section at the ARCO Research Center in Plano, Texas.

Stephen A. Hall (Director-at-Large)



Steve is an Associate Professor of Geography and the Director of the Palynology Laboratory of the University of Texas at Austin. He earned a B.S. at Oklahoma (1967), an M.S. at Iowa (1971) and a Ph.D. at Michigan State University (1975).

Steve was a Research

Associate at Northern Illinois University (1975) and an Assistant Professor at North Texas State University (1977-1985) before moving to U.T. at Austin in 1985. Steve teaches Quaternary palynology and biogeography. His current research on the late Quaternary palynology and paleoecology of alluvial deposits around Zuni, New Mexico is supported by a National Geograph-

ic Society grant. His very active research efforts in Quaternary palynology have resulted in over 30 publications.

Steve was a judge on the 1979 L. R. Wilson Outstanding Student Paper Award Committee, served on the 1980-81 Nominating Committee and is the co-chairman of the Quaternary Palynology Session to be held at the 1988 AASP meeting. He has held numerous offices in the International Association of Aerobiology, including that of the Secretary-General (1982-86) and is currently the Vice-President (1986-90).

Steve is also a member of the American Association for the Advancement of Science, the Geological Society of America, AMQUA, INQUA, Sigma Xi, Society of American Archaeologists, the Plains Anthropological Society, and the American Malacological Union.

Steve likes tennis, hiking and camping with his wife and two sons. They all enjoy looking for fossils in the Cretaceous limestones of Texas.

George F. Hart (Director-at-Large)

George Hart is a Professor of Geology at Louisiana State University, Baton Rouge, Louisiana. He was a founding member of AASP, organized the first Annual Meeting and, with Bob Perkins, organized the original journal of AASP, "Geoscience and Man."



George's paper "A Bibliographic File for Computer Analysis of Permian Palynological Data (1933-1969)," initiated the AASP Contributions Series. George served on the AASP Industry Liaison Committee. He was a student of L. R. Moore at Sheffield University and of the late S. N. Naumova in the U.S.S.R. George has been involved with teaching and research since 1957. He is currently conducting palynofacies analyses and investigating biostatistical methods.

Martin J. Head (Director-at-Large)



Martin joined the AASP in 1981 and has worked with Geoff Norris at the University of Toronto, as a Research Associate since 1985. Martin was Assistant Treasurer for the 5th IPC (Cambridge, 1980), co-organizer (with Peta Mudi and Anne de Vernal) of

the First Neogene Dinocyst Workshop at AASP 1986 (New York), organizer of the AASP 1987 Computer "Show and Tell" (Halifax), and is on his second term as Secretary/Treasurer of the Canadian Association of Palynologists. He is also co-convenor (with John H. Wrenn) of the Second Neogene Symposium on Dinoflagellates, to be held at the Fourth International Conference on Dinoflagellates at Woods Hole, Massachusetts in 1989 (see this Newsletter for further details!).

Martin was ship-board palynologist on the JOIDES Resolution for ODP Leg 105 and his research interests include late Cretaceous and Cenozoic palynology, particularly of high latitudes. Martin is a keen promoter of increased palynological involvement in the Ocean Drilling Program. He considers ODP research to be a vital means of improving the precision and reliability of our stratigraphic and paleoecological interpretations (not just dinoflagellates, but spores and pollen too), much in the way that other microfossil groups have long benefited from DSDP and ODP involvement.

Martin is also an avid SCUBA diver and spends much of his spare time exploring the shipwrecks of nineteenth and turn-of-the-century wooden schooners and paddle steamers in lakes Ontario and Huron.

Richard G. Holloway (Director-at-Large)

Rick received his Ph.D. in botany from Texas A&M University in 1981. His dissertation research focused on experimental studies of pollen degradation, and he is primarily a Quaternary palynologist. During the past several years, Rick was employed by both the biology and anthropology departments at Texas A&M University where he continued his research on Quaternary environments. In September of 1987, Rick moved to Eastern New Mexico University where he is the Director of the Palynology and Paleoethnobotany Laboratories. This year has been spent setting up the pollen laboratory and teaching part-time in geology, biology, and anthropology. Rick currently has several students pursuing independent research projects on the Quaternary and Tertiary palynology of New Mexico.



Judith K. Lentin (President-Elect)



Judith joined the AASP in 1972. She was Director-at-Large from 1984-1986. She has worked as a reviewer for PALYNOLOGY and developed the software for the creation of an index of that journal. In 1987 she recompiled the AASP membership directory and placed it in a user-friendly PC database for ease of annual publication.

Judith is a member of the Canadian Association of Palynologists (CAP) and is currently editor of the "CAP Newsletter." She is editor of the "Round Brown Newsletter" for dinoflagellate specialists and the current chairman of the Canadian Society of Petroleum Geologists, Paleontology Division. She was Program Chairman for the 6th International Palynological Conference held in Calgary in 1984. Her research interests include the study of fossil dinoflagellates which has included research and teaching in the USSR and China. Judith founded Lentin International Biostratigraphic (LIB) Consultants in 1979 after 10 years in the oil industry.

Virgil D. Wiggins (President-Elect)

Virgil joined AASP in 1969 and has served the organization in a variety of functions since that time. He has been a reviewer for Geoscience and Man, Palynology and the AASP Contributions Series. He was elected to the Board-of-Directors (1983-85), served on the Public Relations Committee (1985-86) and is Chairman of the Awards Committee (1986-88). At the 1983 AASP Annual meeting in San Francisco, Virgil was the Technical Program Chairman. He has been an AASP Century Club contributor.



Virgil has been employed by Chevron U.S.A., Inc., Western Region as an Exploration Palynologist and Palynostratigrapher since 1959.

Gordon D. Wood (Secretary-Treasurer)



Gordon joined AASP in 1969 and is the incumbent Secretary-Treasurer. He was Chairman of the 1985 AASP Nominating Committee and has been the Chairman of the Ballot Committee. Gordon is the Chairman of the Paleozoic Symposium to be held at the 1988 AASP

Annual Meeting. Gordon is a member of the Society for Organic Petrology, Paleontological Society, Society of Economic Paleontologists and Mineralogists and of the American Association of Petroleum Geologists. He has been the recipient of a Sigma Xi Research Award and Delta Theta Mu and Phi Kappa Phi Scholastic honors. Gordon is a Project Paleontologist with Amoco Production Company in Houston, Texas.

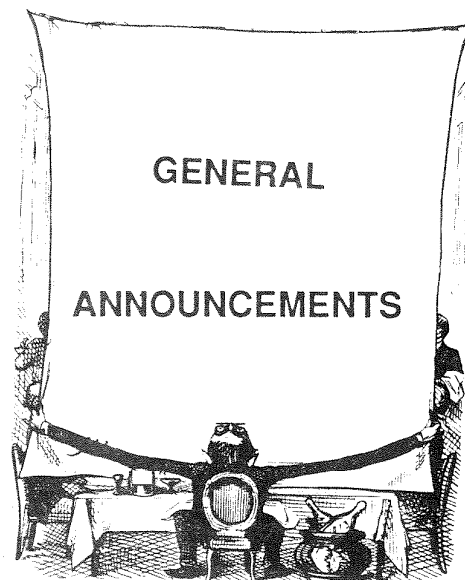
Palynologist Seeks Position

A palynologist with a BS, MS, and 32 years experience seeks employment. He has worked with palynomorphs, nannofossils, foraminifera, kerogen, and has experience as a geologist and seismic interpreter. This palynologist/geologist has worked in the Chad (Mesozoic), Egypt (Cambrian-Tertiary), Alaska (Tertiary), Utah-Colorado-Nebraska (Penn.-Tertiary), South China Sea (Tertiary), Yellow Sea (Tertiary), Sumatra (Tertiary), Taiwan (Tertiary), and Trinidad (Tertiary). Available immediately for domestic or foreign assignment. Will provide a complete resume upon request through the Newsletter Editor.

Anyone wishing to contact this palynologist may do so by sending your letter of interest to:

John H. Wrenn, Editor
AASP Newsletter - "Position"
Amoco Production Co.
P. O. Box 3385
Tulsa, OK 74102
U.S.A

All inquires so addressed will be forwarded, unopened if addressed as above, to the AASP member seeking employment.



AASP GOLF TOURNAMENT

Arrangements have been made to hold the 1988 AASP Golf Tournament on the Bear Creek Masters Course on the far west side of Houston. All AASP members and their spouses or traveling companions are invited to participate in the tournament which will be held on Tuesday afternoon, November 8, 1988. Plan to come to Houston early, play some golf, and then attend the TSOP-AASP Symposium on the following day. The Masters Course was the site for the 1981 56th U.S.G.A. Amateur Public Links Championship, the 1982 Big "I" Insurance Youth Classic, the 1984 87th N.C.A.A. Division I Golf Championship, and since 1980 the annual All America Intercollegiate. The course is rated in the top 50 public golf courses in America with the 18th hole ranked as one of the top 6 public finishing holes in America. Come see what you can do with it. We will prepare some "cheat sheet" notes to help you along. Handicaps will be determined by the scores made on 9 of the 18 holes. The 9 holes used for determining the handicap shall be drawn by lot after the end of the tournament. We feel this will be a fair method for accurate scoring and determining the winners.

The entry fee will be \$50.00 (U.S.) per person. This will cover transportation from the hotel to the golf course and return, (Lunch?), green fees, cart rental, refreshments, prizes, etc. We plan to award plaques to all participants. You will need to provide your own clubs and balls (I believe clubs can be rented at Bear Creek -- If you have a need for this, please advise).

Any profits from the tournament will be returned to AASP along with any other profits from the Annual Meeting.

Detailed information for this event will be sent to all members who indicate an interest. Please do so at your earliest convenience. Pre-registration for the tournament will be required prior to October 1, 1988. Late registration will be accepted only if spaces are still available on the date of the tournament.

Please indicate your interest by responding to:

John A. Clendening
P.O. Box 3092
Houston, Texas 77253
U.S.A.

INFORMAL FIELD TRIP OFFERED

No official field trip has been scheduled for the 1988 AASP annual meetings in Houston. However, a number of people have expressed an interest in an informal tour of geological features in the Huntsville - College Station area. If there is enough interest, we will schedule a tour for either Tuesday, November 8 or Sunday, November 13. Such a trip would probably last most of the day.

Possible touring locales include the Blue Lagoon quarry near Huntsville (to see Oligocene plant fossils in the Catahoula), the TMPA lignite mine near Carlos (to examine the Upper Eocene Manning Formation), the Stone City and Lower Crockett Middle Eocene Formations near Bryan, Texas, and the Upper Eocene plant fossil and lignite beds at Lake Somerville. Other sites are also being considered. This tour would pass through both the East Texas Piney Woods and the Post Oak Savannah of Central Texas.

If you would be interested in attending this informal guided tour, or have any suggestions, please contact:

Judy Gennett
Department of Geology
(tel. 409-845-3071), or

John G. Jones in the
Anthropology Department
(tel. 409-845-9334)

Both of these AASP members are at Texas A&M University, College Station, Texas 77843.

MYUNG S. YI WINS AASP STUDENT SCHOLARSHIP AWARD

Virgil D. Wiggins, Chairman of the Awards Committee, reports that an AASP Student Scholarship has been awarded to Myung S. Yi, Ph.D. candidate at the Department of Geology at Michigan State University. The details of Myung's research proposal and additional information will be published in the next issue of the Newsletter.

L. R. WILSON AWARD FOR THE OUTSTANDING STUDENT PAPER

Students are encouraged to compete for the L. R. Wilson Award for the Outstanding Student Paper at the AASP Annual Meeting in Houston, TX. This award consists of:

1. A commemorative plaque.
2. A monetary prize of \$300.
3. A two-year fully paid membership in AASP.
4. Announcement of the recipient of the award in the Association's journal.

Participants for this year's award should indicate to the Program Chair that they wish to be considered for the award. The Program Chair will send each participant a copy of the judging form for his/her guidance, and can schedule the paper at the appropriate time. The Program Chair is:

Dr. Donald W. Engelhardt
Amoco Production Co.
P. O. Box 3092
Houston, TX 77253

To be eligible for consideration for the L. R. Wilson Outstanding Student Paper Award, a speaker must fulfill the following requirements:

1. The speaker should be registered in a graduate or undergraduate degree program, or if the speaker has formally completed his/her graduate degree requirements, he/she cannot have been employed more than 6 months at the time the paper is given.
2. The paper must represent research carried out during his/her academic career.
3. Such papers may be co-authored by the student's professor if the student is the first author and if the student actually presents the paper.

These requirements are intended to minimize any advantage that might be gained through resources available at post-graduate, non-academic institutions. In addition, the oral presentation of research results is an important part of the AASP Annual Meeting, and we are attempting to encourage such presentations with this award. Thus, posters are not eligible for the award. The Committee also recommended that in the instructions to judges it be made clear that illustrations are to be judged solely for their clarity and effectiveness, and that judges take into consideration the limited facilities available at many academic institutions.

ANAPS ACCEPTS IN PRINCIPLE CHICAGO AS NEXT NAPC SITE IN 1993

The Association of North American Paleontological Societies (ANAPS) held its Annual Meeting on October 26, 1987 at the Geological Society of America Annual Meeting in Phoenix, Arizona. Eight of 11 societies invited to send representatives to the Phoenix Meeting did so. AASP was represented by Harry Leffingwell, and CAP by Wayne Brideaux. Only the North American Micropaleontological Society of the SEPM, the Paleobotanical Society of the BSA, and the Paleontological Division of the Canadian Society of Petroleum Geologists did not attend. The following items of potential interest to AASP members were abstracted from the minutes of the ANAPS Meeting.

At the San Antonio (1986) Annual Meeting of ANAPS, it was decided that ANAPS would be the proper vehicle to provide guidance to any future North American Paleontological Convention (NAPC). Since then, ANAPS has received a letter from Chicago area paleontologists with a proposal to hold NAPC V in Chicago in 1993, when both the University of Chicago and the Field Museum will celebrate their centennials. Society representatives to ANAPS accepted the proposal in principle. Gary Lane of the Paleontological Society will interact with the Chicago organizers to obtain additional information.

It was the sense of the representatives present that integrated sessions at NAPC V should have input from member societies as well as organizers of NAPC V, along about a 60%/40% split, with societies organizing about 60% of such sessions.

It was also agreed that professional paleontologists need to reach out to amateurs. It was therefore decided that amateurs be included in NAPC V, that they be allowed to present exhibits, and that workshops by professional preparators of fossils should be held for amateurs.

The Chair of ANAPS is to propose guidelines for the 1993 and future NAPC's meetings, to serve as a basis for discussions at the ANAPS Meeting in Denver in 1988. Don Eicher replaced Tom Bolton as Chairman of ANAPS and Peter Hoover of PRI was elected Vice-Chairman.

I would appreciate any suggestions from the AASP membership for guideline proposals for the 1993 and future NAPC's, so that AASP members can be afforded maximum input to the discussion of guidelines to be held in Denver this Fall. Here is an opportunity to improve NAPC's meetings, which have been criticized by some of our members in the past. I also will ask the Board of Directors at its Annual Meeting in Houston (1988) to recommend guidelines it deems desirable and appropriate.

Harry A. Leffingwell
AASP Representative to ANAPS

BILL CHALONER, where are you?

All AASP mail sent to William G. Chaloner at Bedford College has been returned, marked "Undeliverable - Gone Away!" Anyone who knows Bill's whereabouts, please have him contact or send his address to Secretary-Treasurer Gordon Wood. Thank you.

MAIL PROBLEMS

AASP has experienced no little difficulty in sending international mail. A significant amount has required double and even triple mailing because it has been incorrectly returned from the receiving country. (This is true even when the addresses used are correct, as verified through telephone conversations or by mail we have received!) Mail to Canada, especially Calgary, has been a vexing problem.

If you have not received expected publications from AASP, Inc., or AASP Foundation, please contact Secretary-Treasurer Gordon D. Wood (for AASP, Inc., mail) or Robert T. Clarke (for AASP Foundation mail).

POSTAL INCREASES WILL AFFECT AASP MAILING COSTS

Bob Clarke advises that the April 3rd increases in postage rates will significantly increase postage costs for AASP, Inc., and especially the AASP Foundation. The cost of mailing books within the U.S. went up by almost 35%, whereas some international rates for mailing 4 lbs of books rose by as much as 68%!

Bob noted that, "These mail increase will have to be passed along to the membership. The only question is how soon?" These stiff increases may seem outrageous, but they are the first increases in these postal categories in at least six years. (Still, it seems as though the postal service is aspiring for a slot alongside "death and taxes" as one of the watch words of the Universe.)

REPRINTS SOUGHT

Jonathan Bujak, Edward Davies and Javier Helenes wish to acquire reprint collections on palynological studies from Cambrian to Triassic ages. The collections will be integrated into a comprehensive Phanerozoic palynological reference collection.

If you are interested, please contact them at #1,2835-19th Street N.E. Calgary, Alberta, Canada T2E 7A2 or (403) 250-1641.

DIRECTORY OF PALEONTOLOGISTS OF THE WORLD (5TH EDITION): 2ND ANNOUNCEMENT

As we informed you last year, the next Directory of Paleontologists of the World (5th edition) will be published prior to the International Geological Congress in Washington, DC (mid-1989). It is imperative that the questionnaire be returned by December 31, 1988 for inclusion in the Directory. Many paleontologists were omitted from the 4th edition, and we would like the next edition to be as comprehensive as possible. Please help us in this endeavor by completing the questionnaire attached to the back of this Newsletter (if you haven't already sent one in). Return all questionnaires to Rex A. Doescher at the address indicated on the questionnaire.

Rex A. Doescher

William A. Oliver, Jr.

LETTERS TO THE EDITOR

Letters to the editor are always welcome; unfortunately they have been rather rare. The following letters contain food for thought. Let's have some more, out there.

FORD AND GOODMAN PAPER LAUDED

Dear Editor,

I shall begin by confessing that I am a student of foraminifera, and not palynology; however, for two years I have shared workspace with a palynologist who, each quarter or so, forces me to examine the AASP newsletter in the hopes that I may yet see the light.

I am writing in response to an item in the last issue of the newsletter, in which you discussed events at the most recent SEPM Research Conference in Houston (December, 1987). In particular, you made brief reference to the presentation by Ford and Goodman. ("Ecostratigraphic Analysis of Dinoflagellate Data from the Nanjemoy Formation (Ypresian) of Maryland, U.S.A.," by L. R. Ford, Jr. and D. K. Goodman.) There were a number of excellent presentations at the conference, as well as a number we could all have lived without; however, with respect to our principal goal as biostratigraphers (the interpretation of paleontologic data in terms of geologically meaningful information), the results of their research warrant particular scrutiny. In fact, without some expansion on your passing remarks, I would expect that the significance of their presentation would completely bypass your readers.

Based only on having heard their talk, and having read the abstract, my interpretation of what the authors are really trying to do is this: empirically determine the - relationships between biofacies (their "ecostratigraphic

units") and sequence stratigraphy (in the sense of Exxon Production Research). I have recently begun to experiment with similar analyses myself (based upon foraminiferal data); however, this was the first time I have heard a talk where the investigators overtly sought to establish the relationships between biofacies and the pieces of the sequence stratigraphic puzzle.

As I was unable to meet with either author subsequent to their talk, I trust that they will forgive me if I should distort their intent in attempting to summarize their approach. For those readers unfamiliar with sequence stratigraphy, the application of seismic stratigraphic interpretation techniques has resulted in an awareness that sedimentary rocks can be organized into packages (systems tracts) within major unconformity-bounded units (depositional sequences). As these packages have predictable stratal patterns and lithofacies, their recognition is of considerable importance in petroleum exploration. Basically, what Ford and Goodman have done is to apply multivariate statistical methods to numerical abundance data to identify packages of rock which, they believe (as do I), represent specific depositional systems tracts. They view this part of the analysis as a "dissection" of the sequence. Having divided the sequence into its component parts, it remains to assign those components to individual systems tracts. For this, the authors turn to more-or-less traditional methods, such as species diversity analysis, to ascertain patterns of regression-transgression. At this point I must be somewhat critical of their method: since sediment supply (as well as sea level and subsidence) may be an important variable in the sequence equation, one must be careful about assuming a one-to-one correspondence between regression-transgression and sea-level cycles.

My reasons for bringing this subject to the attention of your readers is personal: I believe that sequence stratigraphy offers a relatively clear framework within which biostratigraphers can interpret paleontologic data - whether foraminifera or palynomorphs. To that end, we (the biostratigraphic community), must encourage more studies in this vein. I would also encourage the authors to publish the full text of their study (a few illustrations would be helpful!) so that we can all review the procedural details. Finally, I would like to urge all your biostratigraphically - inclined readers to examine the Proceedings volume from the SEPM conference, beginning with those by Baum and perhaps Armentrout.

I would prefer to offer this critique anonymously, as our management, though not totally Neanderthal in its philosophy, does not look favorably on our heaping praise upon the competition. I can hear it now, "If those guys are so smart, then how come we hired you and not them!" Nonetheless, I appreciate your providing me with a forum for sounding-off on this topic.

Respectfully submitted,

O.T.S.

CONCERNED PALYNOLOGIST SPEAKS OUT

The Editor
Geotimes
4220 King Street
Alexandria, VA

Dear Editor,

As a palynologist I am troubled by the discovery that the science of palynology has somehow escaped the notice of the Annual Review Issue of GEOTIMES. I looked very carefully, thinking that it may have accidentally been placed out of alphabetical order amid all of those other distinctly geological sciences. Although I found mention of palynology by name in one of the sections (Archeological Geology), there was little else to stir the hearts and pride of the working palynologist. This is a somewhat odd state of affairs considering you even have a section called "Evaporites" which has not, as far as I know, even reached "...ology" status.

Please allow me to elucidate the values of the science of palynology to the geological community. Virtually every subject covered in your February, 1988 issue uses the results of palynological analysis of geological samples. Because the size of most palynomorphs rarely exceeds 100 microns these fossils are particularly useful in the dating of oil well cuttings. A small fragment of rock can produce enough fossils for dating and environmental analysis of sediments from both marine and non-marine environments of deposition and for this reason many oil companies have palynologists on their exploration teams.

Palynomorphs are often the only fossils found in evaporite deposits thus giving the evaporite specialist a reliable method of dating evaporites. Equally, the vast lacustrine deposits of China are being dated by the study of their palynomorphs. This is an exciting new field of application because of the recent discovery of non-marine fossil dinoflagellates in these petroleum-rich sediments.

There are many features of clastic sedimentation in which palynology has an important application. In any integrated, multidisciplinary approach to sedimentary basin analysis palynology plays an extremely important role specifically because of the multi-facies occurrence of fossil palynomorphs. The understanding of Cretaceous cyclic stratigraphic sequences, which can be identified from seismic reflections, relies heavily on the study of palynomorphs, both marine and non-marine, for time calibration of events.

The science of palynology has played important roles in both the paleoecological and paleoenvironmental reconstructions so useful in archeology, geomorphology and Quaternary geology. There is a good deal of time and effort given to the study of the pollen from such unlike-

ly sources as rat droppings to delicate variations in the pollen record found in varved lake deposits.

Coal geology has long been blessed with the aid of palynologists. Indeed, the early days of palynology were given over almost exclusively to the study of coal deposits. The studies of the paleoenvironmental aspects of coals from the Carboniferous of Great Britain by A.H.V. Smith comprise some of the classic works in the palynological literature. Indeed, Prof. - Aural T. Cross (Michigan State University), this year's recipient of the Cady Award from the Coal Division of the GSA, is a palynologist.

Geological engineers and environmental geologists rely on palynology to help in hazardous-waste site characterizations and ground-water studies. Correlation of sediments from a variety of facies is extremely important to the understanding of the geology of a proposed site.

The science of palynology should not have been missed in the GEOTIMES Annual Review of Geological Sciences. With palynologists on the faculty of over 40 North American universities, the science will continue to grow. Next year when GEOTIMES Annual Review time comes around we want palynology to be recognized as the viable geological science in which we, the palynologists, participate.

Yours sincerely,

Dr. J. K. Lentin, President
Lentin Int'l. Biostratigraphic, Ltd.

AGE-CONTROL AND CIRCULAR REASONING IN EVENT STRATIGRAPHY

T. P. Poulton
Institute of Sedimentary and Petroleum Geology
Geological Survey of Canada
Calgary, Canada

I am not aware that the circular reasoning aspect of lithostratigraphic or event-stratigraphic correlations has been addressed as such, so here goes:

My long-standing concerns regarding the casual attitude by many so-called lithostratigraphers toward biostratigraphic controls on their units is heightened recently by commentary heard second- or third-hand after a talk at the 1984 International Geological Congress in Moscow, and with the enthusiasm with which one extreme aspect of the "new" (not new at all, certainly as old as stratigraphy), EVENT STRATIGRAPHY, is being greeted in some circles.

An extreme attitude can be paraphrased roughly: "We are at a stage of knowledge where the effects in the

stratigraphic record of eustatic sea level changes and other global or extra-global events can be correlated with some confidence. The resulting scale of events is chronostratigraphic and is sufficiently well understood to serve as a primary correlation tool." In my experience, this remarkable viewpoint, or something near it, is widespread in the stratigraphic community, and attempts to point out the major, condemning, fallacy within it are viewed as self-serving efforts by underappreciated or threatened paleontologists. A more extreme version: "New stratigraphic units parallel to the stages should be invented, or even the existing stages themselves should be redefined to coincide with the worldwide, event- or unconformity-bounded, units." (This last from a prominent member of the North American Stratigraphic Commission.)

The fallacy is one of circular reasoning, and the danger needs to be repeatedly brought forward, not least now, when the very profession of biostratigraphy is under the gun in some circles as being too "academic." Clearly, we cannot know whether events correlate from one locality to another, or worldwide, without having the events, or rather their geological results, accurately dated at each locality. There is no theoretical requirement that the dating necessarily be paleontological, but at present, the most precise and confident dating available for most of the geological column is in fact based on paleontology. In order to prove the contemporaneity (in geological terms) of each corresponding element in a series of transgressive and regressive cycles, the bio-, or chronostratigraphic control must be fine. Where the scale of correlative biostratigraphic units is not at least one half, preferably smaller, that of the physical stratigraphic unit, the contemporaneous (rather than say, the alternating, or random) character of the correlation simply cannot be demonstrated. The retort by the errant lithostratigrapher: "But, it seems only natural that the individual events in a sequence of alternating events should be contemporaneous given the theoretical and observed large-scale or global character of the causal events." Fine, justified, agreeable, but not proof, and dangerously close to wishful thinking.

The result of erecting a scale of physically based events, the validity of which is not proven, necessarily leads to circular reasoning. Failure to continually confirm the results with paleontological technique not only perpetuates the assumed correlations, but at each stage broadens the credibility gap between the assumed correlations and those that can be confidently stated based on biostratigraphic evidence. In the extreme example paraphrased above, assumption of the sufficiency of a physically based stratigraphic scale leads not only to a wonderful new world of previously unrecognized relationships. It also leads to a bias against any techniques that cast doubt on the validity of the correlations and, therefore, of the newly recognized relationships, and leads to reinterpretation of fossil evidence that contradicts the physically based correlations. Regarding the

last result, reexamination of any contradictory evidence is a healthy and necessary stage of a scientific inquiry, but this is not necessarily what will happen, or is indeed happening right now. Based on personal observation of the attitude of many geologists toward paleontology during the "plate-tectonic revolution" or in discussions of the validity of eustatic sea level events, valid, but inconvenient paleontological results are ignored, cast aside or reinterpreted by lithostratigraphers at their will. The biostratigrapher loses credibility and thus becomes threatened for the sin of being honest and perhaps correct. Worse, very often no thought is given in the first place to whether biostratigraphy can contribute to the solution of a problem. With lithostratigraphic correlations, "biostratigraphic problems" arise that require calling in a biostratigrapher.

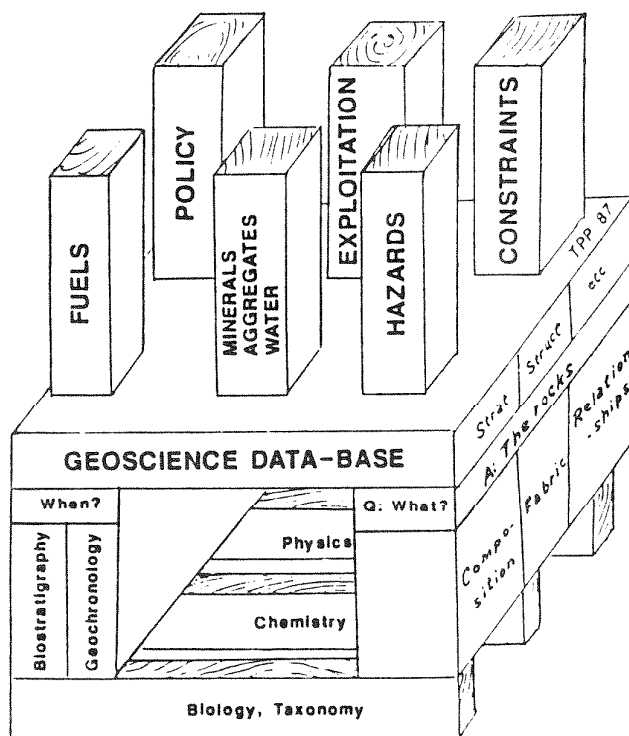
When physical units become the elements of a standard correlation scale, each component of the unit, including each paleontological component, must be squeezed into the chronostratigraphic element of the unit, in its middle, at its top, or at its base. The capability of recognizing new units between, or at the top or base of existing units, is removed. Each new bit of data, having been reconciled as part of one of the existing units of the time scale, becomes evidence for the validity of the scale itself. The possibility of revising or questioning the scale is removed, but equally important is also removed, of confirming the proposed time scale. The ultimate dream of the event-stratigrapher, and of any geologist, that events can be proven to be contemporaneous worldwide is, ironically, at risk. This proof can only be achieved where a biostratigraphic, or chronostratigraphic scale is held entirely separately from any scale based on lithological or other physical "events." Extinctions may be included in these physical, nonevolutionary events. Clearly, the basal boundary of any inter-regional chronostratigraphic unit, such as the stage or system, must be defined in a continuous sequence, otherwise its age is lost in a hiatus of unknown duration, and its correlatability becomes impossible.

To refer to another extreme example (borrowed from the transcendental Time in Stratigraphy by Alan B. Shaw, 1964, McGraw-Hill), cyclothems: the individual lithological units of each cyclothem are by their very nature, according to Walther's Law, diachronous. The sandstone, limestone, coal, or whatever at the top of each cycle is no exception. And how does the subsurface geologist working with logs correlate his "blips"? And how does the average field geologist correlate his units? And how are the blips and other funny markings on seismic cross sections handled? And what more does this say about "Seismic Stratigraphy"? Arguments that diachroneity is built into modern, fascinating versions of Sequence Stratigraphy or that diachronism is beyond the resolution of paleontological techniques do not obscure the tendency of the physical methods to replace biostratigraphic correlation methods. It is no exaggeration to say that much of our honorable

training about the diachroneity of units is forgotten as one gets farther and farther away from the "old prof." Of course, in the direction along stratigraphic strike, one can assume synchronicity, but in all other directions, NO!, and especially basinward, the favored directions for cross sections which are intended to show relationships. Again, applying Walter's Law; the one thing we do know is that the lithological correlations in the basinward direction are NOT time-correlatives.

This diatribe is intended not to be critical of Event Stratigraphy, but rather reflects strong support for the ultimate goals of such studies, i.e., Stratigraphy in the broad sense, provided the work is well done. Certainly, the tracing of volcanic or other events across facies boundaries is a fundamental conceptual and practical scientific advance, but sloppy acceptance of the concept and of individual cases does no service to science nor to Event Stratigraphy itself. These are all old complaints and perhaps I over-react, but I do hope to stimulate the paleontological community in their continuing drive to instill some modicum of intellectual rigor into their colleagues. And I do see the trend for sedimentologists and lithostratigraphers to replace biostratigraphers as the primary teachers of stratigraphic courses as an unhealthy means of perpetuating a bad situation. I found on my arrival as a Ph.D. student at a well known Canadian university that an undergraduate student could elect to specialize in either "soft-rock" or "hard-rock" geology, without so much as taking a single course in the other subjects, let alone having to follow a certain basic list of core courses. Now it seems that even the "softies" can get by without courses in paleontology. The trend for sedimentologists to teach stratigraphy can only produce yet another generation of specialists without a strong background in the fundamentals of stratigraphy, not only jeopardizing the quality of individual bits of work and of the entire knowledge base, but also accelerating the trend by ensuring that each year fewer and fewer biostratigraphers are spreading the gospel as teachers.

Stratigraphy is too important to be left to lithostratigraphers. Let us not forget the place that biostratigraphy, and other fundamental disciplines, play in the "house-of-cards" theory of geology, shown in the accompanying sketch.



The problem is a continuing one, but is reaching critical dimensions: witness the lack of biostratigraphers in the oil industry now, and the dearth of paleontology students and teachers in the universities. Its resolution needs concerted action by education lobbying. Increased employment of paleontologists-biostratigraphers is fundamental to the continued integrity of stratigraphy itself. Each extant biostratigrapher, in preparation for a continuing series of presentations to whatever powers may be, should be armed with a set of well-prepared geological examples of actual documented, or documentable cases where paleontology-biostratigraphy has made a difference, pointing out the economic implications. An inventory is needed, and I suggest that the Paleontology Division of the GAC might make a project of compiling such an inventory.

Reprinted from: Paleontology Division Newsletter
Geological Association of Canada
Number 23, December 1987

(Here, Here! Would not this be a reasonable type of project for AASP to sponsor, as well?--Ed)

Ravn's Ravings

The P-Word

As detailed in this year's first Newsletter, the field in which we work is not without its detractors. Our initial reaction to the kind of categorical critical attack leveled at a recent public forum is understandably defensive; we want to feel that palynology is unfairly put upon and misunderstood. Yet, I wonder if we are not wholly

blameless. I've always had a dark suspicion that people who claim to be misunderstood are those who do the least to make themselves understood (Richard Nixon is the holotype). We palynologists pride ourselves on being a small fraternity in which almost everyone knows almost everyone else on a first-name basis. We have our black-slapping meeting every year attended exclusively by ourselves. We have our own journals and our own newsletter read exclusively by ourselves. Not much in any of this invites recognition of palynology even by the geological community, much less by the public at large.

At almost every AASP meeting I've attended, the staff of the headquarters hotel has misspelled the name of our organization in some way (considered humorous only to ourselves). I wonder if one of the principal obstacles to a clearer public understanding of what we are and do is that umbrella word "palynology" under which we gather. When was the last time you were asked what you do for a living and had your answer understood? If your enquirer is magnanimous, when you say "I'm a palynologist," he or she nods knowingly and considers it to be some esoteric medical specialty that saves the lives of thousands of children. Most of the time, however, you get back a squinty look that lets you know you've been put in the category of those who hang around airports passing out literature that advocates the nuking of Ted Kennedy.

I first encountered this problem back in fourth grade, when we had something called "Career Day." Most American kids at the age of nine wanted to be doctors and nurses and firemen and teachers, but me, I wanted to be a palynologist. Don't ask me why. I probably heard about it on some newsreel, sandwiched between stories of how safe, clean atomic energy was going to save the world and how to hide under your desk with your hands over your face when the Atom Bomb exploded. Miss Broadaxe, my teacher, went around the room asking all my fourth grade colleagues what they wanted to be when they grew up. "A policeman!" exulted Tommy Tuttle. "A nurse," said Rachel Harwood. "A race car driver," beamed Alan Ludvigsen. "A lawyer," vowed creepy Jimmy Lynch, "so I can sue people and get real rich." "I dunno," said Artie Johanssen, "a crook, maybe." Artie Johanssen sat right in front of me, and was well on his way to achieving his life's ambition by beating me up after school every chance he got. Miss Broadaxe glowered at him, and figured it best to proceed directly onward as if Artie weren't there; not a bad idea when you could get away with it. Directly onward was me. "What about you, Robert?" she prodded.

"I'm gonna be a pailionogilist," I told her. There was a pause. You could have heard a pollen grain drop in that classroom. Then Miss Broadaxe fixed me with a glare that told me, "Not in my classroom, you're not," and I wound up staying after school writing "I will not be a

panogollist." a hundred times on the chalkboard under her watchful gaze. Then she let me go outside, where Artie Johanssen was waiting. But that is another story.

So, I became a palynologist. But, I still have the same old trouble explaining to nonpalynologists, of whom there seem to be quite a few, what I do. Even Mom, normally the heart and soul of understanding, doesn't comprehend. When I called the week before Easter with my customary annual late Valentine's Day greeting, her first question after identifying the strange voice on the line was, "Have you got a real job yet?"

I went in to the "Yes, Mom" routine, but was interrupted by her standard lament comparing the social progress of her son with that of her neighbors's children. "Remember Joe Dieming? He used to live right down the street in that blue house, only they painted it brown right before it burned down a few years ago. Anyway, he's now president of a bank. And Cynthia Burger? Well, she got married to Raymond Hamm, and they opened a self-service hardware store, and before you knew it, there was a whole chain of Hamm-Burger Hardware stores all over the place, and he retired at thirty-five and went off to live in the Bahamas. And remember Jimmy Lynch? He went to law school and became a lawyer, and now he drives around in a Rolls Royce, and they say he's going to run for the Senate. Why don't you go out and get yourself a real job, before it's too late?"

I tried to defend myself. "I'm doing all right, Mom," I said. "I'm doing better than lots of people I used to go to school with. Remember Artie Johanssen?"

"What about him?"

"He's in prison."

There was a long pause, a lot like the one in the fourth grade classroom I still remember so vividly. Then Mom said, "Well, yes, but at least it's steady work."

I am convinced the cause of the trouble is the P-word. In Webster's it is defined as "a branch of science dealing with pollen and spores." Ignoring for the moment that that definition leaves out those who "deal with" acritarchs, chitinozoans and dinoflagellates, it still doesn't say much about what we do. For all the layperson could tell from that definition, we might be buying and selling pollen and spores. What unites us as a "branch of science" is mainly an extraordinarily nasty acid that dissolves silica. Of much more importance is what we do with the gunk left over after the acid has done its work. Some of us determine glacial environments with it, others age-date and correlate rock sections, still others figure out what pre-Columbian native Americans ate. Maybe we would be better off to place less emphasis on being Palynologists, and more on being archaeologists, or paleoenvironmentalists, or biostratigraphers. At the Halifax AASP meeting, Mike

Boulter said that he considered palynology to be a tool rather than a science; I think there's a lot of value in that view, and that it might help the nonpalynological universe understand us a lot better if we bore it in mind.

I even had a chance to put it to the test recently. On a plane trip, I had the good fortune to be seated next to a rotund gentleman who last bathed when Coolidge was President and announced without my asking that his name was Jack and then began to show me pictures of his kids. (He was especially proud of the one of little Stevie strangling the kitten.) Then he said that he sold industrial doorknobs for a living and wanted to know what I did. I almost blurted out the P-word, but stopped myself and said, "I'm a biostratigrapher."

His eyes narrowed to tiny dark slits as he surveyed me, and asked, "Who pays you people to hang around airports all the time? And how come you people want to send Jane Fonda to the moon?"

I think I'll go back to school and become a lawyer and sue lots of people and get real rich. Then again, maybe there's a good market for industrial doorknobs.

By the way, who does pay those people to hang around airports all the time? And how much? And where can I get in touch with this person?

Robert L. Ravn
Standard Oil Production Company
1 Lincoln Center
5400 LBJ Freeway
Dallas, TX 75250

MEETINGS OF INTEREST

DINO 4: 1989 -

FOURTH INTERNATIONAL CONFERENCE ON MODERN AND FOSSIL DINOFLAGELLATES

Dates

The Fourth International Conference on Modern and Fossil Dinoflagellates will be held from Monday, April 17, to Saturday, April 22, 1989 (not to be confused with the Fourth International Conference on Toxic Dinoflagellates to be held during June, 1989, in Sweden). Registration will begin on Sunday, April 16.

Place

The venue will be the Marine Biology Laboratory (MBL) at Woods Hole, Massachusetts, which is also the site of the Woods Hole Oceanographic Institution. Woods Hole is a small village on the southwestern corner of Cape Cod, which, in addition to its reputation as a world center for marine research, is of considerable his-

torical interest as a 300 year-old fishing and farming community.

Accommodation and meals will be at the Swope Center on the MBL campus, which is located adjacent to Eel Pond and approximately 150 yards from the Whitman Auditorium, site of the technical sessions. Additional motel facilities are available within walking distance of the MBL. We have planned a compact, informal meeting site to foster prolonged and stimulating contact among conference participants.

Travel Considerations

Boston is easily accessible by air, with Boston's Logan International Airport being served by most major air carriers. The town of Woods Hole is located approximately 75 miles south of Boston, with easy access provided by regular bus service (round trip ticket approximately \$20-25 US) directly to Woods Hole from Logan Airport. Rental vehicles are also available from several companies at Logan Airport for those participants wishing to drive. The conference may also provide van service as necessary to accommodate special needs or to help those with extremely late or early flight arrival times.

Program

The formal program will consist of structured sessions during which topics of mutual interest to both biologists and paleontologists will be discussed. Sessions will combine invited and contributed oral presentations. Session topics are broadly defined to encompass all aspects of dinoflagellate research and include Ecology, Paleoecology, Oceanography and Biogeography, Morphology and Classification, and Evolution. The Keynote Address will be given by Prof. Andrew Knoll of Harvard University. One or two additional "special" presentations of interest to all are being planned. A special session dedicated to Neogene Dinoflagellates is being organized by John Wrenn and Martin Head.

An area dedicated to poster displays will be available at the Swope Center, as will facilities for informal evening discussion groups. A workshop on Neogene Dinoflagellates will be held on Saturday, April 22. One or two additional workshops can be scheduled. Please write by June 1 and include your proposed topic if you are interested in organizing a workshop; limited microscope and projection facilities can probably be arranged for these sessions.

Social Program

There will be a mid-conference excursion via ferry across Vineyard Sound to the historic island of Martha's Vineyard, located about two miles southeast of Woods Hole and visible from the town. We are tentatively planning a bus tour and group dinner on the island. The ferry dock is within short walking distance from the Swope Center. A traditional New England

clambake and lobster feast will be held on the beach to celebrate the closing of the conference on Friday night. No special accompanying guest program is being planned; the Cape Cod region is a popular tourist area with abundant historical and recreational opportunities including Woods Hole itself, Plymouth and Heritage Plantations, the islands of Martha's Vineyard and Nantucket, wildlife sanctuaries, boating and fishing tours, historical homes and whaling villages, and the endless dunes and beaches.

Tentative Costs

Our current estimate for the total cost of the conference is approximately \$550 US. This includes registration fee, room (double occupancy) and meals, clambake, conference materials, daily cocktail hour, coffee breaks, and wine with dinner.

Additional costs for optional activities: (1) the mid-conference excursion will be optional (cost has not been determined but should be about \$40-50 US for the ferry and ride, bus tour and dinner); (2) attendance at the Saturday workshop(s) will necessitate an additional night's lodging. This will cost about \$75 US for the room and meals.

These figures may change as final arrangements are made. Please use them accordingly and expect some changes!

Organizing Committee

Dr. David K. Goodman, ARCO Research (Chairman)
 Dr. Donald M. Anderson, WHOI (Meeting Site)
 Dr. Sarah P. Damassa, Palynological Consultant
 (Program)
 Dr. Leonard N. Ford, UNOCAL Research
 (Treasurer)
 Dr. Martin J. Head, University of Toronto
 (Neogene Symposium and Workshop)
 Dr. John H. Wrenn, Amoco Research
 (Neogene Symposium and Workshop)

Additional information

The Second Circular, including the call for papers, will be mailed in June 1988, and the abstract deadline for all presentations will be October, 1988. Notification of speakers will be completed by November. The Second Circular will also contain registration materials as well as information and maps for Woods Hole and the MBL, topics for additional workshop sessions, and other necessary data. If you have questions or wish to be added to the mailing list for DINO 4, please write:

David K. Goodman, DINO 4
 ARCO Oil and Gas Company
 2300 West Plano Parkway
 Plano, TX 75075 U.S.A.



SECOND SYMPOSIUM ON NEOGENE DINOFLAGELLATES

First Announcement

The Second Symposium on Neogene Dinoflagellates will be held under the auspices of the Fourth International Conference on Dinoflagellates, at Woods Hole Oceanographic Institution, Woods Hole, Massachusetts (April 16-22, 1989). Papers on all aspects of Neogene and Quaternary dinoflagellate are welcome. The half-day symposium will include two invited talks and as many as 10 contributed presentations.

A summary volume of the papers presented will be published after the meeting. Additional papers, not presented at the Symposium, will be considered for inclusion in the Neogene dinoflagellate cyst volume. The official language of the Symposium and Neogene Dinoflagellate Volume is English.

A workshop on dinoflagellate cysts will also be held in conjunction with the Neogene Symposium. This will be an opportunity to discuss taxonomy, and to examine and compare palynological material under the microscope. All participants are encouraged to bring microscope slides for this scientific "show and tell."

Palynologists interested in contributing to one or more of these Neogene dinoflagellate events are requested to complete and return the "Call for Papers" form at the rear of this Newsletter.

Symposium deadlines are:

Expression of interest (by returning the "Call for Papers" form)	Why not right now?
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Title submission:	August 26, 1988
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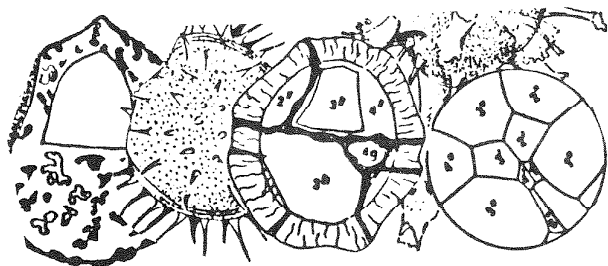
Abstracts:	October 31, 1988
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Manuscripts for Volume (first draft):	March 31, 1989
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The co-convenors of the Second Neogene Dinoflagellate Symposium and Workshop are:

Martin J. Head
Department of Geology
University of Toronto
Canada M5S 1A1

John H. Wrenn
Amoco Production Co.
P. O. Box 3385
Tulsa, OK 74102



ATTENTION! ALL PALYNOLOGISTS!

Can you recognize what and when advancing thermal maturity is contributing to the destruction to your potential hydrocarbon reservoirs? Are you contributing thermal data to petrologists working with both clastics and carbonates? Can you, or do you, recognize when the drill bit has penetrated thermally mature strata? Have you recognized the lack of, or decreasing, porosity and permeability that may be, in part, attributable to paleogeothermal histories? Are you interested in assisting in drilling fewer dry holes?

If these questions are of interest or concern to you, plan to attend the following:

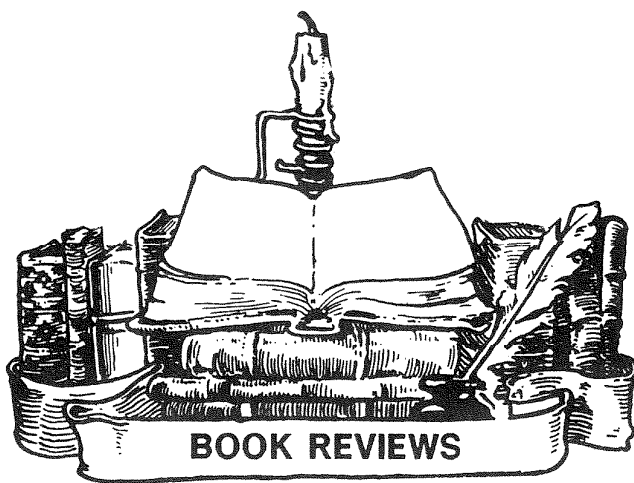
JOINT TSOP/AASP SYMPOSIUM

A joint symposium between The Society For Organic Petrology (TSOP) and the American Association of Stratigraphic Palynologists (AASP) will be held in Houston on Wednesday, November 9, after the TSOP Annual Meeting. The Tentative title of the Symposium will be "Temperature, Mineralogical Alterations, and Related Phenomena in the Processes of Organic Maturation, Hydrocarbon Phases, and Reservoir Creation and Destruction."

The program will include a review of vitrinite reflectance, interpretation of vitrinite data from dispersed organics, and its application to petroleum exploration. Additionally, interpretation of fluid inclusions and their applications to paleothermal histories will be discussed, as will generation of organic acids and their role in the creation of secondary porosity, etc. Porosity of reservoirs undergo a complex multistage chemical evolution in response to increasing thermal stress and burial depth. This evolution will be described and related to thermal maturation of organic matter (kerogen, vitrinite, hydrocarbons) in shales associated with potential reservoir rocks. Data relating stage of porosity evolution to vitrinite reflectance will be presented for several basins. Petrographic criteria for recognition of incipient metamorphism of sandstones and carbonates will be correlated with R_o measurements. Special emphasis will be placed on the destructive phase of hydrocarbons and reservoirs.

There will be a panel discussion following the presentation of papers. Participants presenting papers will include John Clendening (Amoco Production Co., Houston), Francis Ting (West Virginia University), Dennis Prezbindowski (Consultant, Tulsa, Oklahoma), Ron Surdan (University of Wyoming), John Hayes (Consultant, Littleton, Colorado), Rick Tobin (Amoco Production Co., Houston) and Roger Sassen (Louisiana State University).

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Pollen and Spores: Form and Function

S. Blackmore & I. K. Ferguson (eds.). Academic Press, 443 + xii pp., illustrated. \$92.50.

This splendidly presented book continues the tradition of the Linnean Society of London, begun some two decades ago, of publishing contributions to symposia sponsored by the Society and collectively extending over a range of biological topics. As indicated in W. G. Chaloner's perceptive forward, the present volume (No. 12 in the Symposium Series) complements in many respects a previous symposium publication ("The Evolutionary Significance of the Exine," published 1976 as No. 1 in the current series) in that it seeks to address the functional morphological aspects of various spore and pollen groups and structures. Attended by more than 100 palynologists from 21 countries, the symposium was held at the British Museum (Natural History) during March 27-29, 1985; and the volume embodies a diverse and stimulating array of 28 papers derived from oral presentations, together with nine shorter contributions based on what are termed "selected posters." Given the diversity, it is perhaps surprising that the volume gives an overall impression of unity, of successful integration. However, few of the papers seriously research the question of functional aspects of form. A clear message does emerge: that form expresses a complex series of interactions between environmental, phylogenetic, and functional processes.

Relationships between form and function in pteridophytic spores are reviewed (Tryon) and spore apertural structures are discussed from an environmental standpoint (Lugardon). Direct form/function relationships are detailed for compound pollen (Knox & McConachie), for pollen clusters united by threads (Hesse), and for the "real" and "feeding" pollen of *Lagerstroemia indica* (Pacini & Bellani). Ontogenetic

development of morphological features that have a bearing on function are considered (Hideux & Abadie; Barnes & Blackmore), whilst Thanikaimoni and Le Thomas, Morawetz & Waha discuss form/functional relationships of pollen apertures.

There are several discussions of harmomegathy and interpretative reviews of the role of form in pollination by wind (Crame) and insects (Chaloner). In his investigation of exineless *Heliconia* pollen, Kress suggests that the exineless character expresses phylogeny rather than being of particular functional significance.

Fossil pollen, too, come under scrutiny (Taylor & Zavadá; Batten): functional interpretations are by analogy and are thought-provoking. Other articles focus more on descriptive morphology/structure or on techniques, with scant or only passing reference to form-function relationships. Nonetheless, they provide much useful data on various extant pollen, particularly on fine surficial and structural detail as revealed by SEM and TEM. It is unfortunate that in many instances such detail is not also illustrated by light micrographs. The latter often provide the paleopalynologist with the initial "inspiration" for investigating possible affinities of fossil pollen and spores.

Overall, there is much of interest, for both paleo- and neopalynologists, amongst this collection of papers. The articles could have been arranged in a more logical sequence, and a single contribution in French seems somewhat anomalous linguistically. The book constitutes an informative conspectus on current knowledge of the functional aspects of spore-pollen form; but, as emphasized in the Preface, so little is yet known and so much remains to be investigated.

Reviewed by:

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Studies in Palaeobotany and Palynology in Honor of N. F. Hughes.

Special Papers in Palaeontology 35. Edited by D. J. Batten and D. E. G. Boggs. 178 pp., UKL 30. Palaeontological Association, London. 1986.

As well as being well-known as a wine connoisseur and a diplomat Norman Hughes' ideas on palaeontological nomenclature have become legendary. They have caused him to be named publicly as a Luddite and continue to be laughed away by the establishment of the ICBN. He developed the methods of biorecords and comparison records in the 1970's and recently published a concise summary of his approach to naming pollen (in: Systematic and Taxonomic Approaches in Palaeobotany. Ed.: R. A. Spicer & B. A. Thomas, 1986.

Systematics Association, Oxford. The problems of data handling for early angiosperm-like pollen).

At the outset, as one who studies plants from the Tertiary, I must declare my own interest and sympathy for the alternative methods which Hughes has innovated, but they have never been fully tested publicly and so one cannot be sure that they are all Hughes cracks them up to be. Indeed, for this reason, I have never really understood why Hughes' many critics are so strongly opposed: it can't be for scientific reasons, for the methods have not been tested or even used yet. It's rather like a jury reaching a decision of guilty without being presented with any evidence from the defense.

So when I first heard of this *Festschrift* volume, my heart leaped for joy at the thought of Hughes' disciples helping to settle the matter once and for all. Surely, here of all places, the theory would be put to the test.

I am sadly disappointed. For not only is there still no concentrated testing of the biorecord approach to naming, but there is a lot of strong reluctance to even try, even from the majority of his disciples - in public, anyway.

It may be due to the psychological barrier of the kind demonstrated so commonly in Britain today through race relations. The white Anglo-Saxon is often heard to say: "I'm not racially prejudiced, BUT" Here, Truswell and Marchant (Australian Tertiary pollen) say: "While we have some sympathy for these views/...we have adhered to conventional binomial naming," and again, Batten (occurrence form and function of *Vancampopollenites*): "Many of the criticisms raised in his papers are entirely valid and some of the suggestions for dealing with palynological data are very reasonable, but I am unable to accept his main proposals." It is all for the sake of stability, we are told. Then, Chapman (species concept in Albian pollen) says: "The existence of high-capacity computers makes [the method] possible, but expensive in man hours for fossils as abundant as pollen and spores."

At least these three authors give some critical appraisal. Playford (Lower Carboniferous megaspores), Mortimer (*Lepidostrobohyllum* megaspores), Harding (Cretaceous dinocysts), and Dettmann (pore genus *Cyatheacidites*) completely ignore the issue. Well, Science is a free world, even if it's not stable. Two of the contributions, Penny (Cretaceous pollen from Egypt) and Smith (stratigraphic time correlation) do use biorecord data for their interpretations, but there is no demonstration of the working method used, so we still can't judge on its process and product. Penny's Table 1 comes close though, by showing very precise descriptive data for the observation records of the taxa mentioned in the text. He then goes and makes new species of existing form genera, according to the ICBN. One of the new species is even named *hughesii*.

Another of Hughes' contributions to palynological method, stratigraphic time-correlation, is well tested, however, by D. G. Smith's work on the Late Triassic of Svalbard. His biorecords have enabled palynological correlation within six sections and an optimum sequence of tops and bottoms of ranges (events) has been computed.

Two other papers deal with plant megafossils: Creber (gymnosperm vascular cambial activity) and Allen & Marshall (Devonian *Svalbardia* and "corduroy" plant). My emphasis above, on just one aspect of the *Festschrift*, gives a biased and unfair impression of the more general aspects of the papers included. They are all extremely well prepared, well illustrated and with some very useful ideas. The volume is well edited and produced to the high standard we have learned to expect from the Palaeontological Association (another of Hughes' creations).

Reviewing another book in this weeks *Nature* one of the authors here, Keith Allen, categorizes three kinds of publications with collections of papers of multiple authorship: general and more specialized conference volumes, and those whose editor has invited the contributions. *Festschriften* are a fourth kind, for the editor has a pre-determined invitation list. Often that gives an unsatisfactorily loose theme to the volume, but here Hughes' character shines through.

Reviewed by:

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Taxonomy and biostratigraphy of schizaealean spores from the Jurassic-Cretaceous boundary beds of the Aklavik Range District of Mackenzie

Robert A. Fensome, 1987, *Palaeontographica Canadica* No. 4, Canadian Society of Petroleum Geologists and Geological Association of Canada, Publishers, 49 pp, \$20.00 Can. plus postage (\$4.50 Can. inside Canada, \$6.75 Can. outside Canada).

If there is a Hell, my vision of suffering in Hell is being given a quest, a search having untold rewards at its end, a search requiring every ounce of your being to accomplish, a search requiring pain, suffering and ridicule to achieve, a search which will never end. For palynologists in search of answers, Hell must be the quest to classify and understand the biostratigraphy and paleoecology of the seemingly infinite number of Schizaealean spores. Their pretty appearance and easily recognized morphology are like the songs of the Sirens, a narcotic. Your life is to a greater or lesser degree consumed with the search to understand--that is, to plot a course to reach that rocky shore where the Sirens sing. For every presumed success, you are drawn into shallower uncharted waters littered with

manuscripts and publications of navigators that have passed this way before (see, for instance, original water stained copies of Couper, 1958; there are still a few around).

Some wayward navigators knew their business, others did not. Unfortunately, when you are exposed to the beauty of Schizaealean spores you lose nearly all sense of direction; good and bad palynology become one in the same. It is therefore appropriate and timely for Fensome to attempt to put us back on course in our search to understand this important group of fossils.

Anyone that has ever ventured into the morass of Schizaealean spore taxonomy will certainly understand the saintly characteristics required of Fensome in his study. Readers may not necessarily agree with his conclusions, but he has at least carefully documented his thought processes.

Fensome's work broadly falls into 3 sections: a geologic outline of the study area identifying the local and regional structure and stratigraphy and establishing beyond a reasonable doubt the presence of the Jurassic-Cretaceous boundary in his rocks; an outline of the systematics of the schizaealean spores encountered in the boundary beds of the Aklavik Range; and an in depth survey of the biostratigraphy of schizaealean spores in the Aklavik Range of the Northwest Territories, Canada and in our traditional reference point, northwest Europe.

One begins to sense the meticulous mind of Fensome when reviewing the geologic outline. In summarizing our current understanding of the invertebrate paleontology and stratigraphy of the Jurassic-Cretaceous boundary beds in the northern hemisphere in general and in the Aklavik Range in particular, Fensome has produced one of the finest summaries of this interval that I have read in many years. There is little room for doubting that he has the Jurassic-Cretaceous boundary in his section.

The systematics section is probably what Fensome would like to be remembered for in this monograph. It is clear, detailed, precise text with many good illustrations; there is little room for interpretation of his descriptions. One of the more interesting points Fensome plays with in his remarks on p. 13 for *Cicatricosisporites* Pontie and Gelletich, emend. Potonie and Kremp 1954 and again on p. 15 for *C. abacus* Burger, emend. Fensome 1987 is the merging of *Cicatricosisporites*, *Costatoperforosporites* Deak 1962 and *Plicatella* Malyavkina 1949. This is certainly an important observation which will keep taxonomists busy for many years to come.

My greatest reservation about this work lies in the practice of defining, describing and circumscribing species. Inasmuch as Fensome is a master of "The Code" and all his taxa are correctly defined, I cannot fault this work. My problem with this study is more subtle in nature; it

expresses my personal biases with respect to Schizaealean spore taxonomy and may well raise the ire of more than a few palynologists busily creating species from single observations. More than half the 31 species described in this work are based on descriptions of fewer than 5 specimens; only 5 species are based on measurements taken from more than 30 specimens. Some taxa (e.g., *Concavissimisporites apiverrucatus* (Couper 1958) Doring 1965 - 3 specimens identified) are permitted to have laesurae that are either simple or bounded by a row of verrucae, whereas other taxa (e.g., *C. exquisitus* (C. Singh 1971) Fensome 1987 - 1 specimen and *C. ferniensis* (Pocock 1970) Fensome 1987 - 1 specimen) are separated by subtle differences in the shape of verrucae. Arguably, Fensome's most important and abundant Schizaealean spore *Cicatricosisporites abacus* (about 250 specimens identified) is either a masterly recognition of plasticity in the form of this taxon or the lumping together of several species from at least two genera. Whatever the case may be, terrestrial palynologists must come to grips with identifying, classifying and separating the significant features of spore morphology. Fensome has certainly given us something to think about.

The third section of this monograph, a scholarly synthesis of palynomorph biostratigraphy of the Jurassic-Cretaceous boundary, summarizes Fensome's research on the boundary beds in the Aklavik Range. Four zones spanning the Jurassic-Cretaceous boundary interval are defined, discussed in some detail and compared with the European biozones. From his synthesis, I cannot help but wonder whether one zone, the *C. abacus* interval zone, is too broadly defined. By Fensome's own admission, *C. abacus* is redefined to contain spores with apical thickenings (first appearance very latest Jurassic) and spores without apical thickenings (first appearance in slightly older late Jurassic strata). Likewise, on his composite range chart (Fig. 20) Fensome shows the first *Trilobosporites* Pant 1954 ex Potonie 1956, emend Fensome 1987 at the top of the *C. abacus* zone, immediately above the Jurassic-Cretaceous boundary. What he doesn't show on his range chart is *Trilobosporites*? sp. indet. (Plate 5, Fig. 6) found in the lower member of the Husky Formation (Volgian age). This is arguably *T. canadensis* Pocock 1962 *sensu* Pocock (1962) and not Fensome's rendition (Plate 5, Fig. 5) of this species. This then complicates the picture as presented by Fensome; *T. canadensis* (*sensu* Pocock) has similar apical ornament gradational with another older zone fossil *Goncavissimisporites montuosus* (Doring 1964) Fensome 1987 and therein leaves plenty of room for future research on this interval.

In technical and editing matters, this monograph is nearly flawless; one error is identified in the accent for Deck on page 13, another is found in the pagination cited for the Pocock (1962) reference. While not specifically wrong, I am a little put off by the lack of a contour interval in Figure 1, the difficulty in comparing

macrofossil zones in Figures 2 and 4 and the relatively advanced understanding of northwestern Canadian geology required before reading Fensome's section on Tectono-stratigraphic Setting.

Whatever my personal biases may be, Fensome is above all a realist when it comes to studying these complex spores; he knows we are still a long way from resolving all the issues of Schizaealean taxonomy and biostratigraphy. In the short term, the clarity of this monograph should be Fensome's trademark; it is the kind of taxonomic study we should all be striving to produce. In the long term, when all is said and done, the retention of his species and zones will be the issue.

This monograph is a must for navigators in that quest for knowledge of uncharted shores.

References Cited

- Couper, R. A., 1958. British Mesozoic microspores and pollen grains, a systematic and stratigraphic study. *Palaeontographica*, Abt. B, 103, pp. 75-179.
- Pocock, S. A. J., 1962. Microfloral analysis and age determination of strata at the Jurassic-Cretaceous boundary in the western Canadian plains. *Palaeontographica*, Abt. B, 111, pp. 1-95.

Reviewed by:

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Archaeobacteria '85.

Otto Kandler and Wolfram Zillig (eds.), includes the papers from a 1985 conference, first printed in Systematic and Applied Microbiology, and then reprinted as this book by Gustav Fisher Verlag in 1986 for \$95.00 (434 pages). Sixty-four papers and 34 abstracts are included from 267 authors. The book is the second comprehensive survey of research on archaeobacteria and it covers the subjects of evolution, ecology, physiology, biochemistry, fine structure, and molecular genetics.

Archaeobacteria cannot be separated from eubacteria on morphology alone. Morphologically, they include cocci, rods, spirilla, and sarcinae (H. Aldrich et al., D. Boone et al., T. Miller and M. Wolin, K. Stetter et al.). Unusual morphologies are boxes and plate-like colonies (F. Rodriguez-Valera et al., T. Zhilina). In terms of energy, they utilize molecular S, hydrogen, or organic compounds (G. Fuchs and F. Stupperich, K. Stetter et al.). Included are aerobes and anaerobes, autotrophs and heterotrophs. All together, 30 or 40 species are known (T. McGill et al., C. Woese and G. Olsen).

Most microbiologists consider the archaeobacteria to be a separate kingdom from the eubacteria. The differences between the two groups lie in biochemistry (membrane lipids - T. Langworthy and J. Pond, M. de Rose and A. Gambacorta; cell wall saccharides - P. Kreisl and O. Kandler), and in molecular genetics (nucleotide sequences in ribosomal RNA components - T. McCloskey, P. Willekens et al.). Because of these differences, most microbiologists divide the living world into 3 kingdoms - Archaeobacteria, Eubacteria, and Eukaryotes (C. Woese and G. Olsen).

Adaptations to extreme environments may account for many of the biochemical differences between the archaeobacteria and the eubacteria. The archaeobacteria are bacteria adapted to extreme environments - places where oxygen is so sparse it cannot be detected (methanogens) (D. Boone et al.), where salt is so concentrated that water is sparse (halophiles) (R. Tindall and H. Trueper), where temperatures are so high (>66 degrees C) that other organisms cannot maintain the integrity of their proteins (thermophiles) (R. Stetter et al.), where pH is low, or around geysers that deposit molecular S (S-dependent thermophiles) (T. Brock).

This book is kept lively by the debate over the phylogenetic significance of the different morphologies of ribosomes. J. Lake and his co-workers consider only methanogens to be archaeobacteria; they exclude the thermophiles and halophiles. C. Woese, who first articulated the concept of archaeobacteria along with G. Fox in 1977, is very critical about these ideas on ribosomal morphology in his paper with G. Olsen on phylogeny. G. Stoeffler and M. Stoeffler-Meilicke analyze species that invalidate distinctions based on morphological differences, and then showed that preparation technique affects morphology. R. Cammarano et al., find a genus intermediate between the S-dependent thermophiles and the methanogens. F. Gropp et al., gracefully recommend that small and simple molecules such as some ribosomal proteins may be less useful for phylogeny than large and complex molecules such as ribosomal RNA. Interestingly for us microscopists, this issue highlights the fact that molecular evolution is just as complex as morphological evolution. Interpretations on relatedness seem to depend on the particular molecule studied. On the basis of ribosomal proteins, the halophiles separate from the S-dependent thermophiles and the methanogens; on the basis of ribosomal RNA, the S-dependent thermophiles separate from the methanogens and the halophiles (A. Matheson et al.). These phylogenetic splits are important because these generalizations affect our viewpoint on the early evolution of life on earth (R. Gehrmann et al., D. Search).

Phylogenetic interpretations are found in many of the papers and most stress the characteristics shared between archaeobacteria and eukaryotes (fln4 and RNA replication - P. Forterre et al., F. Gropp, et al.) (cell wall polymers - P. Kreisl and O. Kandler, D. Searcy)

(ribosomes - P. Cammarono, et al.). On the other hand, few papers mention similarities with eubacteria, perhaps because one major direction of much of the research is on how different the archaeobacteria are from the eubacteria, and another direction is on whether archaeobacteria evolved before the eubacteria (C. Woese and G. Olsen). My research impinges on this latter issue because I find good morphological evidence of iron-oxidizing bacteria in the 3.8 Byr Isua Iron Formation, and for animal protists or multicellular animals in the 1.9 Byr Rove shale in Ontario. This last evidence can only be correct if eukaryotic algae had a longer history than is now generally accepted. According to today's models, eukarotes began with endosymbiosis, which can be thought of as "who swallowed whom." The paper by C. Stumm et al., on methanogens within anaerobic amoeba and protozoa highlights the endosymbiosis of archaeobacteria in eukaryotes.

To determine when archaeobacteria evolved may prove to be a major problem for morphologists. Because archaeobacteria look like bacteria, they cannot be separated on morphology. Instead, chemical biomarkers must be used. Hans Pflüg has a well illustrated palynological paper on microfossil morphology and biomarker chemistry. His photographs emphasize the fact that many Precambrian microfossils have typical bacteria-like morphologies, and his laser mass spectra show a variety of carbon peaks in a 3.4 Byr Swartkoppie chert sample. The earliest chemical evidence for archaeobacteria is distinctive isoprenoid ethers in the 2.7 Byr Soudan shale (J. Kahn and P. Haig). Another useful archaeobacteria biomarker that has not yet been analyzed in the oldest rocks is the Ni-containing prophyrin that may be a residue of methyl-Co M reductase from methanogens (n. Ankel-Fuchs et al., J. Hahn and P. Haug). The kinds of rocks to study for microfossil remains of archaeobacteria would be salt deposits and black shales from anoxic mud of oceans, lakes, and hot springs, especially volcanic ones that contain S-bearing minerals. The halophytic bacteria are commonly brightly colored orange or red from their carotenoids (B. Tindall and H. Trueper), and they should be obvious in salt deposits. The S-dependent thermophilic bacteria might leave sulfide or sulfate (K. Stetter et al.) minerals as remains. Methanogenic bacteria probably leave Ni-bearing porphyrins as residues (D. Ankel-Fuchs et al.); they may also be the major producers of biogenic-methane (G. Zellner and J. Winter).

My complaints with the book are trivial - too many spelling errors suggest that non-European authors never saw galleys. The index is useless - blank pages should have been included for people who need to track a particular issue. At the very least, the authors own key works would have made a more useful index. The order of papers in the volume is haphazard and probably represents the order in which papers were received.

Two papers stand out from the rest. The B. Tindall and H. Trueper article on ecophysiology is extremely well written and can stand as a role model for discussing data that are incompatible with your own. The paper by T. Miller and M. Wolin on methanogens in human intestines is really fascinating and explains how some people are methane-producers.

The archaeobacteria certainly are fascinating microbes. This volume is useful for a lot of different disciplines, including palynology. Biochemistry is beginning to be used by more and more palynologists. Although this book covers truly obtruse biochemistry and molecular genetics, at least it was written by authors who knew the readers will include scientists in other fields in need of simple definitions.

Reviewed by:

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Physical geology, seventh edition.

S. Judson, M. E. Kauffman, and L. D. Leet. Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632, 1987, 484 pp. No price given.

This is the seventh edition of this standard physical geology textbook which first appeared in 1954. The basic organization of the book remains unchanged from the sixth edition published in 1982. There are 20 chapters and four appendices. The first seven chapters cover minerals, origin and occurrence of rocks and weathering. The next four chapters are concerned with geologic time, structural geology, earthquakes, and plate tectonics. Chapters 12 through 17 cover surficial geologic processes, while the final three chapters discuss energy, materials, and astrogeology.

The major change in this edition is the use of color in many of the text figures and photographs. Furthermore, the authors have added boxes for the first time. Both of these additions have become "de rigueur" in current physical geology books and in this case, blend well with the text rather than overwhelming it. The other changes in this edition include an opening quotation for each chapter and a general overview of the chapter. A chapter summary, review questions, and supplementary readings are also included for each chapter.

The additions and updating of familiar features of this book should keep it competitive for yet another edition.

Reviewed by:

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Origins of Life

I. Dyson, Cambridge University Press, 32 East 57th Street, New York, NY 10022, 1985, 81 pp. \$7.50.

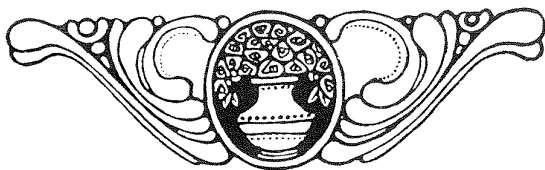
This short book is based on the Turner Lectures delivered by the author at Trinity College, Cambridge, in 1985. The lectures were given to a general university audience and as the author states, "the readers of this book are likewise expected to be educated, but not expert."

In the first chapter, Dyson introduces the six individuals he considers contributed most to his thinking about the origins of life. The second chapter deals with the leading theories on the origin of life and the experimental background from which they arose. Chapter 3 is the most technical chapter and it is here that Dyson presents his own mathematical model for the origin of life. Dyson places the Oparin theory of the origin of life in a mathematical framework so that its consequences can be calculated. Within this framework, Dyson suggests life actually began twice. The first time with cells and the second with genes. The fourth and last chapter discusses some of the questions left open by his model and the implications of his model for the later stages of biological evolution.

All in all, this is a fascinating book that requires careful reading and thought by the reader concerning one of the most fundamental questions of science and philosophy.

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AASP NEWSLETTER TECHNICAL SECTION

Dinoflagellate Toxins and Whale Mortalities

In late November, 1987 several massive humpback whales washed ashore in Massachusetts. In less than two months, the death toll reached 17 for the humpbacks and two for the smaller minke whales. In more "typical" times, a dead humpback whale might be found in these waters once every 18 months or so, so this was clearly a catastrophic event. This situation was different from those one often reads about where living whales swim onto beaches and resist the efforts of humans to force them back into deeper waters. In late 1987, the whales were dying before they reached the shore.

Dr. Joseph R. Geraci, the marine pathologist investigating the mortalities, was convinced that the deaths were not viral or bacterial in origin, but instead were the result of some toxic insult. Donald M. Anderson from the Woods Hole Oceanographic Institution was contacted to see if there might be any connection between these whale mortalities and the toxic red tides that often occur in New England waters and cause paralytic shellfish poisoning or PSP. After careful examination of mackerel that the whales had been eating, it has now been confirmed that the mackerel contained saxitoxin in their viscera and that the large number of fish consumed by these whales as they prepared for a long migration to the south was probably sufficient to cause their deaths. The only known source for saxitoxin in the region are the dinoflagellates that bloom during the summer months and cause PSP.

A number of mysteries remain about this episode, perhaps the most important one being that it is not known where the mackerel obtained the toxin. The year 1987 was one with virtually no outbreaks of saxitoxin-related shellfish poisoning in New England and northeastern Canada. It is now believed that the mackerel accumulated the toxin gradually through time, perhaps in sub-lethal doses that were then sequestered in the liver and kidneys (the fish flesh was always completely toxic). This is a rather striking example of the potency of the dinoflagellate toxins, and an indication of the manner in which they can affect different levels of the food chain, even massive 40-ton humpback whales.

(Thanks are extended to Donald M. Anderson for providing this timely overview at my request--The Editor.)