



AASP NEWSLETTER

N. O. FREDERIKSEN, EDITOR

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1981 ANNUAL MEETING

The 1981 Annual Meeting in New Orleans was a resounding success, and the Board of Directors congratulated Don Benson, Meeting Chairperson, and his Local Committee, Terry Beach, Jeffrey Stein, Robert Ravn, Donald Cameron, Jackie Wooten, Ralph Morgan, Cassandra Williams, and George Hart, for an outstanding job.

Benson provided the following tentative figures to the Board at the end of the meeting:

Total registration:	159
Went on the riverboat cruise:	149
Attended the luncheon:	147
Profit after returning seed money to AASP:	\$2,236

AASP-CIMP MEETING IN DUBLIN, 1982

Enclosed with this Newsletter, on the second to last page, is a form to be filled out by those interested in attending the joint AASP-CIMP meeting in Dublin, Ireland, September 13-15, 1982. The Board of Directors hopes that as many of our members as possible (and also, of course, non-members as well) will attend this meeting, which, after all, is our annual meeting for 1982.

Students (and their professors) are reminded that the possibility of receiving the L.R. Wilson Award is a powerful incentive for giving a paper (see the item in the present Newsletter about this year's winner). The winner of the Wilson Award doesn't have to be an AASP member.

Bernard Owens notified the Board of Directors at the New Orleans meeting that, in response to the First Circular, 50 people have said they want to give papers (this includes invited speakers), and more than 100 people have said they expect to attend. Owens expects about 120 people to be there.

Note that the official deadline for preregistration and for room reservations has been changed to November 14, 1981. But

if you don't get this Newsletter until later than that, please send the form to Owens as soon as possible with a note explaining that you got the Second Circular late.

Those who are interested in arranging a charter flight to Dublin, please contact Jack Burgess, who is coordinating this meeting for AASP.

Following is some material from the Second Circular concerning the joint AASP-CIMP meeting:

INTRODUCTION The second joint meeting of the C.I.M.P. and A.A.S.P. is to be held in Dublin from 13th-15th September 1982, hosted jointly by Trinity College, Dublin and the Geological Survey of Ireland. All palynologists are warmly invited to attend.

THEME Papers and demonstrations on the theme "The Palynology of the North Atlantic Margins" will be given preference for inclusion in the programme. It is anticipated that topics such as the comparison of the eastern and western North Atlantic margins, development of the North Atlantic, and the palaeogeography and palaeoclimatology of the North Atlantic realm will be discussed.

KEYNOTE SPEAKERS

P.C. Reid (IMER, Plymouth) "North Atlantic dinoflagellate cysts from continuous plankton records and implications to the fossil record".
J. Bujak and G.L. Williams (Geol. Survey Canada) "Cenozoic Palynostratigraphy of the North Atlantic Basin and Margins".
G. Norris (Univ. of Toronto) "Arctic Tertiary marine and terrestrial palynofloras; problems of correlation to lower latitudes and palaeoclimatic interpretation".
C. Deegan (I.G.S., Edinburgh) "Geological evolution of the North Atlantic".
H.J. Sullivan (Amoco, Canada) Title to be announced later.
Contributions on other topics will be welcomed.

VENUE All sessions will be held in Trinity College Dublin.

PROGRAMME Registration will begin on Sunday 12th September. Lectures, demonstrations and working group meetings will take place on 13th-15th incl.

CONFERENCE LANGUAGES The conference languages will be English and French.

PUBLICATION Abstracts of papers presented will be printed and distributed before the meeting. Papers read at the meeting will be considered for publication in Palynology subject to normal A.A.S.P. publication procedures. Abstracts must be submitted by 1st March 1982.

REGISTRATION FEE The conference registration fee will be 25 Irish pounds for professional members and 10 Irish pounds for students.

ACCOMMODATION Limited accommodation (in single rooms only) will be available in Trinity College. Numerous hotels are situated within easy walking distance of the College.

ACCOMPANYING MEMBERS No programme is being arranged for accompanying members, but there is much of interest for visitors in Dublin and the surrounding area. Further information may be obtained from the Irish Tourist Board, Dawson Street, Dublin 2.

THIRD CIRCULAR The third and final circular will be sent in early 1982 to participants who have returned the attached registration form. Many tourists visit Dublin in September, and accommodation in central Dublin can only be guaranteed for those returning their registration form and deposit by 1st October 1981.

EXCURSIONS Two post-conference excursions will take place, one to the Lower Palaeozoics of S.E. Ireland, the other to the Devonian and Lower Carboniferous of S. and S.E. Ireland. Both excursions will leave Dublin by coach on the morning of Thursday 16th September, and will return to Dublin by 6 p.m. on Saturday 18th. The cost of the excursion will not exceed 80 Irish pounds.

L.R. WILSON AWARD FOR BEST STUDENT PAPER,
NEW ORLEANS AND DUBLIN MEETINGS

Professor L.R. Wilson has contributed an endowment to the AASP Foundation for the purpose of providing a cash award for the best student paper presented at the AASP annual meeting. This award has been combined with the Association's Best Student Paper Award, and will be called the L.R. Wilson Award.

The Award will consist of:

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

This year's L.R. Wilson Award was presented to Loretta Satchell for her paper "The Stratigraphic Distribution of Broad-leaved and Conifer Pollen in Miocene Volcanic Sediments: A Continuous Pollen Record in the Sucker Creek Formation, Oregon." Loretta is a candidate for the Ph. D. degree in botany at Michigan State University. The cash award this year was \$200.

A competition for the award will also be held at the Dublin meeting, and the cash prize will be increased to \$300. Eligibility requirements for the award were stated in the January 1981 issue of the AASP Newsletter. The criteria to be used for judging student papers will be available to participants by year's end from the program chairperson of the Dublin meeting.

FUTURE AASP MEETINGS

The midyear meeting of the Board of Directors will be in Reston, Virginia, at the Sheraton International Hotel, on Thursday and Friday, April 22-23, 1982.

The 1982 Annual Meeting will be in Dublin (see article about this meeting elsewhere in this Newsletter, and the form on the next to last page).

Harold Kaska reported to the Board that the 1983 annual meeting will be at the Airport Hilton in San Francisco. 150 rooms have been reserved. A special symposium is planned on "West Coast Tertiary Palynology," in honor of Professor Harry D. MacGinitie, of the University of California, Berkeley. Lanny Fisk and Estella Leopold will organize and chair the symposium.

Norm Frederiksen reported to the Board that a contract has been signed with a convention consultant to handle the hotel arrangements and registration for the 1984 annual meeting in the Washington D.C. area. The field trip for this meeting will be to classic Cretaceous and Tertiary units of the Maryland and Virginia coastal plain.

Plans for annual meetings beyond 1984 are not yet firm. El Paso, San Antonio, and Boston are possibilities.

ANNUAL MEETING GUIDELINES

A new edition of "Criteria and Guidelines for AASP Annual Meeting Site Selection" is available. These Guidelines, originally written by Harry Leffingwell and Don Engelhardt, have been revised by Jack Burgess and John Clendening and are based on 14 years of experience in planning and conducting AASP annual meetings. The Guidelines also include a timetable to help planning during the several years preceding each meeting. For those considering hosting an annual meeting, the Guidelines are a must. Write John Clendening for a copy.

NAPC III

Sarah Damassa reported that some papers to be given at the North American Paleontological Convention III will be published in the Convention Proceedings. Manuscripts must be limited to 6 pages. Meeting abstracts and hotel information will appear in a supplement to the March 1982 Journal of Paleontology. The convention will be in Montreal on August 5-7, 1982. For further information see the April 1981 and July 1981 issues of AASP Newsletter.

INTERNATIONAL PALYNOLOGICAL CONFERENCE

The First Circular about the 1984 International Palynological Conference in Calgary will be sent with the next ICP (International Commission for Palynology) Newsletter, which is supposed to be mailed out in November 1981. In case you don't get your copy of the ICP Newsletter, write Roger Jan du Chene, Secretary-Treasurer of ICP.

DUES NOTICE

Members are reminded that according to the AASP Bylaws, annual dues are to be paid by January 1. Please fill in the form on the last page of this Newsletter and send it to John Clendening with your dues.

The Board of Directors encourages all members to pay for three years at a time. This saves you trouble and possibly the necessity of having to be pestered later on by the Secretary-Treasurer if you are delinquent. Most importantly, members who pay several years in advance allow our Association to cut operating costs significantly. According to John Clendening, 105 members have paid through 1982, 44 through 1983, and 4 through 1984. The Board of Directors thanks these people for helping out the Association in this way and hopes more members will do the same.

EDITORIAL

This is the first issue of the Newsletter for which I am editor. I want to thank Doug Nichols for introducing me to the technicalities of the job, and I want to complement him on behalf of the Association for his two years of producing an informative, imaginative, and sometimes amusing product. Good show, Doug!

NEW BOARD OF DIRECTORS

The 1981 Ballot Committee, chaired by Carol Chmura Meyer, announced the new Board of Directors, who duly took office at the end of the New Orleans meeting:

President: Lew Stover
President-Elect: Doug Nichols
Secretary-Treasurer: John Clendening
Managing Editor: Vaughn Bryant
Directors at Large: Carol Meyer (1)
David McIntyre (1)
Ray Christopher (2)
Rex Harland (2)

- (1) Now serving the second year of a two-year term
(2) Newly elected to a two-year term

SECRETARY-TREASURER'S REPORT

John Clendening reported at the New Orleans meeting that as of September 13, 1981, AASP had 622 individual members, 109 institutional members, and thus 731 total members in good standing. He also had 76 members on the roster who were delinquent for 1981, but some of these have since paid their 1981 dues. In short, the total carried on the roster as of September 13, was 807 members.

86 new members (77 individuals and 9 institutions) were enrolled between September 1980 and September 1981.

Clendening also reported on the financial status of AASP Inc., which can be briefly summarized as follows:

Total assets, Sept. 1980	\$26,005.77
Income since Sept. 1980	17,102.47
Disbursements	22,352.71
Current assets	20,755.53

Members who want (1) detailed minutes of the 1981 annual meeting of the Board of Directors, (2) a detailed Annual Treasurer's Report, and (or) (3) a detailed Annual Membership Report, can get them by writing John Clendening. The latter two reports were handed out to the members attending the annual meeting luncheon in New Orleans.

AASP COMMITTEES

The Board of Directors appointed the following committees for 1981-82:

<u>Committee</u>	<u>Chairperson</u>
Nominations	Sarah Damassa
Ballot	Carol Chmura Meyer
Audit	Don Engelhardt
Public Relations	Ray Christopher
Awards	Harry Leffingwell

MANAGING EDITOR'S ANNUAL REPORT (HIGHLIGHTS)

Vaughn Bryant reported that v. 5 of Palynology was distributed to members in good standing in September 1981. It cost about \$14,500 to typeset and print, of which about \$7,500 was recovered in page charges and reprint sales. Vaughn expects to have v. 6 ready to print by Spring 1982 and sent to the membership by Summer 1982.

AASP FOUNDATION

Bob Clarke, Trustee and Treasurer of the AASP Foundation, reports that between December 31, 1980, and September 15, 1981, the Foundation had income of \$22,900.99 from sale of publications, page charges and reprints, contributions, and interest from Treasury bills. Expenditures during the same period were \$17,126.51, from costs of publication and the cost of mailing publications. The Foundation's balance as of September 15, 1981, was \$9,659.95. Bob said that approximately \$7,500 is anticipated as income from page charges and sale of reprints from Palynology v. 5.

Bob also reminds everyone that the Foundation is still accepting members to the Century Club for the 1981-82 period. You can send your tax-deductible contribution of \$100 or more to Bob Clarke or Norm Norton, made payable to AASP Foundation, or write Bob or Norm; they will be happy to send you details about the Club.

FORUM

Comment, by Daniel Habib

I would like to make two technical comments on John Bebout's reference to my work in Text-Figure 2 (p. 161) of his article on the spore-morph stratigraphy of the Mid-Atlantic Outer Continental Shelf Cretaceous (in Palynology, v. 5, 1981).

1. The lower boundary of my Tricolpites minutus zone is not late Aptian, as shown in Bebout's Text-Figure 2. In my 1977 paper that he refers to, this boundary is of middle Albian or late early Albian age (Habib, 1977, fig. 5), based on direct correlation with the calcareous nannofossil Prediscosphaera cretacea zone of H. Thierstein. Since my 1977 paper, Jacques

Sigal indicated to me that the foraminiferal age of this boundary corresponds with that of the nannofossils (and my evidence) at site 105. It seems a shame to make the age of this boundary ambiguous, since it correlates so well with other fossils in five DSDP sites that drilled through the mid-Cretaceous in the western North Atlantic.

2. My Psilatricolporites subzone ranges in age from Vraconian Albian to early Cenomanian, on good planktic foraminiferal evidence (Luterbacher, 1972, in DSDP v. 11). Incidentally, it was never named the Psilatricolpites zone (or subzone) as is indicated in Bebout's Text-Figure 2. I interpret this to be a typographical error.

Reply, by John Bebout

1. When I prepared my Text-Figure 2, I tried to reconcile Dan's figure 5 (which shows the base of his Tricolpites minutus subzone as occurring near the boundary of the early-middle Albian), and figure 6 (which shows the base of the subzone as occurring within Zone I of Robbins, et al.). Taken together, these two figures clearly indicate that the boundary between Zones I and IIA occurs within the middle Albian. There is increasing evidence, however, that this is not the case; this boundary probably belongs in the Aptian, perhaps even in the Barremian (Joseph Hazel, USGS, pers. comm.).

The issue is further confused by Dan's statement on page 358 of his paper that "The lower subzone is defined by the appearance of Tricolpites minutus (Brenner), which appears in the lowest sample of those comprising the Retitricolpites georgensis zone." But examination of his figure 2 clearly shows that the appearance of R. georgensis preceded the first appearance of T. minutus.

Nonetheless, I have no doubt that, in the western North Atlantic, the first appearance of T. minutus occurs within the Prediscosphaera cretacea nannofossil zone. The danger of defining a zone on the first appearance of a single species, however, is that when one recovers the fossil, how can one be sure what part of its total range is represented? In other words, does the first occurrence of T. minutus in the western North Atlantic correspond to its first occurrence onshore?

I would agree that the first occurrence of T. minutus, as a local event, is unambiguous and useful. Its relationship to the onshore zonation, however, is one which is not easily understood.

2. My reference to Dan's "Psilatricolporites" zone as "Psilatricolpites" was, indeed, a typographical error for which I take full responsibility.

BOOK REVIEWS

Historical Biogeography, Plate Tectonics, and the Changing Environment, Jane Gray and Arthur J. Boucot (Eds.), Oregon State University Press, Corvallis, Oregon; 1979, 500 p., \$59.75.

This impressive volume is the result of the 37th Annual Biology Colloquium held at Oregon State University in 1976. The 38 papers, some of which were prepared for the Colloquium, and others which were solicited for inclusion in this volume, are of varying length and quality. The majority of papers deal with some particular group of marine organisms.

There is a short Preface describing the history of biogeography in the literature and noting a "bias" toward marine invertebrates in recent biogeographic papers. The papers in this volume certainly reflect that trend. The Preface is followed by an unusual Editors' Disclaimer, in which Gray and Boucot recognize and warn the reader in advance about some of the deficiencies of the collected papers. These include differences in sampling method, sampling size, taxonomic units used, integration of all available information, both from a faunal/floral viewpoint as well as a time framework, and lastly, the method of data plotting. These are things all paleontologists should be aware of and think about whenever they themselves are writing or reading papers. It was also pointed out that some groups of organisms provide far more biogeographic resolution than do others.

The level of information in this volume varies from preliminary attempts at presenting biogeographic distribution in which many of the problems of incomplete and inconsistent data are recognized (e.g., "Biogeography of Ordovician, Silurian, and Devonian Chitinozoans" by S. Laufeld, p. 75-90) to more complete and general summaries of organisms (e.g., "The Role of Plate Tectonics in Angiosperm History" by D.I. Axelrod, p. 435-447). The method of presenting data also varies from paper to paper. Many authors plotted their data on modern geographic bases, while others used various plate tectonic reconstructions for the particular time interval being examined.

Most of the papers represent the work of a specialist on one group of organisms for a particular time period. Thus there are not any papers concerned with the total synthesis of information for a single time period. Perhaps as a result of this volume, we might see such synthesis type papers in

the future. Only a few papers examine the distribution of a group throughout its history (e.g., "Biogeographic Significance of Land Snails, Paleozoic to Recent" by A. Solem, p. 277-287).

After two general papers - "Prologue: At Sea with Provinces and Plates" by J.W. Hedgpeth, p. 1-8, and "An Eclectic Overview of Plate Tectonics, Paleogeography, and Paleooceanography" by T.H. van Andel, p. 9-26, the volume is loosely arranged by Eras. The majority of papers (17) are concerned with some aspect of the Paleozoic. Articles for the Paleozoic cover ectoprote, brachiopods, fusulinids, conodonts, trilobites, rugose corals, various echinoderms and mollusks, terrestrial vertebrates and other organisms. I found this section the most interesting, especially for comparing the types of distributions of the various groups for the Ordovician-Devonian, the time interval that had the greatest representation of papers. The rest of the volume concerns the Mesozoic and Cenozoic and touches on such topics as ostracods, fossil birds, pinnipeds, planktic foraminifera, and other organisms.

There were also several papers of general interest here, and one that I found particularly thought provoking was "The Role of Biogeographic Provinces in Regulating Marine Faunal Diversity Through Geologic Time" by T.J.M. Schopf, p. 449-458. In this paper he examines how changes in endemism may account for the changes in faunal diversity through time. Unlike many of the other papers, this is a mathematical-model building essay. In the last paper, "Epilogue: A Paleozoic Pangaea?", p. 465-482, Boucot and Gray present arguments, including a period by period summary of data, for a Paleozoic Pangaeic reconstruction of the world with the Cambrian Pangaea centered more or less on the South Pole, and gradually moving north during the Paleozoic to its generally accepted Permo-Triassic location.

Following this last paper is an Appendix with a group photo and identification (a la A.A.S.P. Annual Meeting) of the Colloquium participants. After the Appendix is a Taxonomic Index, Author Index, and Biogeographic, Ecologic Index. The references cited in the papers are mostly to 1975, although a few are as recent as 1977. One minor error I noted was that the title page had a 1979 copyright date, yet in the "Epilogue: A Paleozoic Pangaea?" paper by Boucot and Gray, they cite a 1978 date for papers in this volume. Overall, the book is virtually free of typographical errors, and printed in double columns on 8 1/2" x 11" pages.

The question now is, should you spend \$59.75 for such a book? My answer is an enthusiastic yes! Regardless of your particular specialty, there is a wealth of data and information that can be applied to a variety of problems. Furthermore, many of the articles will surely stimulate your scientific curiosity and pique your interest. The editors are to be congratulated for assembling such a fine volume.

Reed Wicander

Palynostratigraphy of the Australian Early and Middle Cretaceous, by Roger Morgan. Memoirs of the Geological Survey of New South Wales, Palaeontology No. 18; vi + 153 p., including 38 pls., 30 figs. + 26 charts as microfiche. ISSN 0077-8699. \$20 (Australian). Order from: Department of Mineral Resources, Box 5288, GPO, Sydney, New South Wales, Australia 2001.

Morgan's study is a valuable contribution to palynologists (and other stratigraphers) interested in the Cretaceous of Australia, as well as to those of us who are concerned with "global" correlations and the paleogeographic distribution of palynomorphs. His efforts are concentrated on sections drilled in the Bromanga Basin of central-eastern Australia and on the western margin, and includes data previously published from DSDP sites 259, 261, and 263.

The book is bound handsomely in hardcover, and the paper quality of the pages is high. It is filled with data presented concisely in outline maps, tables, and range charts in 30 illustrations. Twenty-six additional charts in microfiche negative film are inserted in the back pocket. There are 38 plates illustrating dinoflagellates and acritarchs. They are of high quality throughout, except for some (Pls. 17, 21, 26, 35) which are too dark to be very useful. These are uniformly dark, which may be due to printing error.

On to the science. Morgan's effort can be divided into two main sections. The first is a taxonomic treatment of the microplankton. The 177 species encountered are listed alphabetically. Of these, 83 require taxonomic comment. One new genus, Yalkalpodinium, is proposed as well as 13 new species and 11 new combinations. The taxonomic discussion is of variable quality. Some species are discussed extensively, while others are discussed too briefly. For example, the illustrations

(especially Pl. 9, figs. 12-13) of Dingodinium cerviculum C & E suggest to me the presence of anterior intercalary tabulation on the dorsal pericyst. I agree with Morgan's statement (stated in the stratigraphy section, p. 54) that D. cerviculum and D. albertii are synonyms.

The morphotype of Druggidium deflandrei (Millioud) illustrated on Pl. 10, figs. 1-4 is indicative of this species' later evolutionary form (Barremian-Aptian) rather than its earlier form (Valanginian). Its outline is that of its descendant species D. rhabdoreticulatum Habib, although it had not evolved the ectophragm. Both these species were recorded by Morgan.

The second main section concerns the stratigraphic application of microplankton and sporomorphs in separate zonations. New microplankton zones (and subzones) are proposed, named successively after Odontochitina operculata, Pseudoceratium turneri and Endoceratium ludbrookiae. These three zones are defined by the first appearance (FAD) and last appearance (LAD) datums of the nominative species primarily. The sporomorph zonation is presented as a synthesis of previously published Australian zonations, where Morgan has selected those which are most useful to his study and to widespread correlation. Morgan attempts to date these zonations independently on the basis of megafauna (including ammonite genera), calcareous nannofossils, and foraminifera, with variable success (as he indicates). Apparently, independent evidence of the Neocomian and part of the Aptian is not very good. I found his method of correlating his zonations with the European stages on the basis of biostratigraphic "events" exciting. These are correlations based on FAD or LAD of species that he selected (fig. 18). In the middle and late Albian these lines are near-horizontal, which indicates good chronostratigraphic correlation with the European stages. The evidence from the other fossil groups is supportive here. However, the Aptian "events" slant older toward the European stages. This leads me to consider the possibility that the Aptian age he assigns to the base of the O. operculata zone in Australia is at least one stage too young.

I recommend this book highly. It is well-organized and informative, and will be useful to both Australian and other palynologists. Morgan is to be complimented on this effort.

Daniel Habib

POSITIONS AVAILABLE

The British National Oil Corporation is looking for stratigraphic palynologists to work in Glasgow, Scotland. A strong geological interest would be useful for the work within an integrated team of specialists working principally on detailed projects. Dinoflagellate experience, particularly in the Jurassic and preferably in the North Sea, would be a distinct advantage. Curriculum vitae and names of referees to Roger Morgan or Mike Fisher, BNOC Stratigraphic Laboratory, 150 St. Vincent Street, Glasgow G2 5LJ, Scotland.

Applications are invited by the University of Oklahoma for a tenure track position in Upper Paleozoic stratigraphic palynology to begin August, 1982. The Ph.D. Degree is required and the person must have a strong academic background in both geology and biology. Preference will be given to persons with experience in the petrology of organic matter. Senior applicants will be considered but preference will be given to entry-level scientists. The position will include teaching at both the undergraduate and graduate levels and the development of a strong research program. The closing date for applications is December 15, 1981. To be considered for the position send a resume of experience and official transcripts of all college and university work, and arrange to have three letters of recommendation sent to: Dr. Patrick K. Sutherland, Chairman of Search Committee, School of Geology and Geophysics, University of Oklahoma, Norman, Oklahoma 73019. The reference letters should address teaching and research quality. The University of Oklahoma is an equal opportunity employer. The School of Geology and Geophysics has embarked on a five-year plan of development and expansion that will increase the number of faculty from 17 to 27. In addition, a new College of Geosciences has been formed effective July 1, 1981. Dr. William Banowsky, the President of the University, has undertaken a major fund-raising drive to construct a new Energy Center that will house the College of Geosciences, as well as various energy programs on the campus. The School of Geology and Geophysics has had a long tradition in palynology, with an outstanding research program developed by L.R. Wilson who recently retired. The library in palynology and palynological collections are among the best in the world.

Sohio Petroleum Company has an opening in our San Francisco office for an operational palynologist with Ph.D. or M.S. in geology. A minimum of four years of operational palynologic experience is required, with a solid background in Mesozoic dinocysts. Please send resume to: W. Walowek, Sohio Petroleum Co., 100 Pine St., San Francisco, CA 94111.

The Geological Research Group (R&D) of ARCO Oil and Gas Company is seeking qualified palynologists with advanced degrees and biostratigraphic experience in Tertiary and/or Mesozoic palynology to conduct research and technical service projects in domestic and international areas. These positions offer exciting opportunities for scientific and career growth in an expanding interdisciplinary research facility in Plano, a northern suburb of Dallas, Texas. Interested applicants should send a resume and letter stating research capabilities and interests to: R.P. Curry, ARCO Oil and Gas Company, P.O. Box 2819, Dallas, TX 75221.

NEW MEMBERS

Mitsuru Arai, Rua Visconde De Santa Isabel, No. 625, Ap. 503, Bloco 2 - Grajau - Rio De Janeiro - RJ, Brasil 20560
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