THE GEOCHEMICAL NEWS

Quarterly Newsletter of The Geochemical Society

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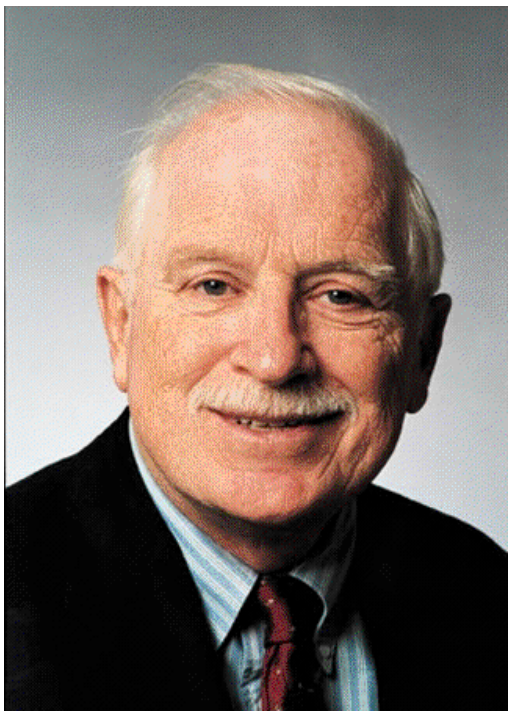
Stumm and Morgan Win Stockholm Water Prize

Werner Stumm



James J. Morgan

In this issue:

9th V.M. Goldschmidt Conference
Harvard University, Cambridge, MA, U. S. A.
August 22-27, 1999

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(see page 9 for more information)

THE GEOCHEMICAL SOCIETY

The **Geochemical Society** is a nonprofit scientific society founded to encourage the application of chemistry to the solution of geological and cosmological problems. Membership is international and diverse in background, encompassing such fields as organic geochemistry, high and low-temperature geochemistry, petrology, meteoritics, fluid-rock interaction, and isotope geochemistry. The Society produces a ***Special Publications Series***, ***The Geochemical News*** (this quarterly newsletter), the ***Reviews in Mineralogy and Geochemistry Series*** (jointly with the Mineralogical Association of America), and (jointly with the Meteoritical Society) the journal ***Geochimica et Cosmochimica Acta***; grants the **V.M. Goldschmidt, F.W. Clarke** and **Clair C. Patterson Awards**, and, jointly with the European Association of Geochemistry, the **Geochemistry Fellows** title; sponsors the **V.M. Goldschmidt Conferences**, held in North American in odd years and elsewhere in even years, jointly with the European Association of Geochemistry; and co-sponsors the Geological Society of America annual meeting and the spring meeting of the American Geophysical Union. The Society honors the memory of our first President, F. Earl Ingerson, and our first Goldschmidt Medalist, Paul W. Gast, with the **Ingerson** and **Gast Lectures,** held annually at the Geological Society of America Meeting and the V.M. Goldschmidt Conference, respectively. The Geochemical Society is affiliated with the American Association for the Advancement of Science and the International Union of Geological Sciences.

Members of the **Organic Geochemistry Division** are individuals with interests in studies on the origin, nature, geochemical significance, and behavior during diagenesis and catagenesis of naturally occurring organic substances in the Earth, and of extraterrestrial organic matter. GS members may choose to be affiliated with the OGD without any additional dues. The OGD presents the **Alfred E. Treibs Award** for major achievements in organic geochemistry, and **Best Paper** awards (student and professional) in organic geochemistry.

Editor's Corner

Send us your best ideas for the gala 100th issue!

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Geochemical Society Awards and Honors for 2000

We have not yet finalized the award committees and chairpersons for the Geochemical Society's 2000 awards and honors, but it is not too soon to begin thinking about possible nominees. The next issue of *The Geochemical News*, as well as several issues of *Geochimica et Cosmochimica Acta*, will contain full details concerning the nominations procedures and the addresses of the new committee chairs. Preliminary information can be obtained from the Geochemical Society Secretary, David J. Wesolowski (email: dqw@ornl.gov; phone: 1-423-574-6903), or from the 1999 committee chairpersons listed below. The Geochemical Society is becoming an increasingly international organization, and the geochemical community is becoming increasingly diversified in many ways. Please take the time to think about deserving candidates for our awards who are representative of modern geochemistry. Remember that membership in the Society is not required of the nominators or nominees for any of our awards or honors.

(*Note that the Alfred E. Treibs Award, for outstanding lifetime achievement in organic geochemistry, is bestowed separately by the Society's Organic Geochemistry Division, and will be advertised at the appropriate time in this publication. Inquiries may be addressed to the OGD Secretary, Stephen A. Macko, University of Virginia; email:* sam8f@virginia.edu; *phone: 1-804-924-6849).*

V.M. Goldschmidt Award (Current Committee Chair: Miriam Kastner, Scripps Institute of Oceanography; email: mkastner@ucsd.edu; phone: 1-619-534-2065)

Recognizes major achievements in geochemistry or cosmochemistry, either a single outstanding contribution or a series of publications, that have had great and lasting influence on the field.

F.W. Clarke Award (Current Committee Chair: Samuel Traina, Ohio State University; email: traina.1@osu.edu; phone: 1-614-292-9037)

Reserved for an early-career scientist (no more than six years after receipt of Ph.D., or age thirty-five, whichever is later) who has made a single, fundamental contribution in geochemistry or cosmochemistry.

Clair C. Patterson Award (Current Committee Chair; Edward A. Boyle, Massachusetts Institute of Technology, email: eaboyle@mit.edu; phone: 1-617-253-3388)

Bestowed upon a scientist at any career stage who has made a particularly important and innovative breakthrough in environmental geochemistry, considered to be of fundamental significance.

Geochemistry Fellow Honorary Title (Current Committee Chair; Terry M. Seward, ETH Zürich; email: tseward@erdw.ethz.ch; phone: 41-1-632-2227)

Conferred jointly by the Geochemical Society and the European Association for Geochemistry, in recognition of a long period of sustained excellence in any aspect of geochemistry or cosmochemistry. Up to ten Fellows may be recognized each year.

Proposals Sought for *Reviews in Mineralogy and Geochemistry*

The *Reviews in Mineralogy* series of the Mineralogical Society of America is becoming a joint *Reviews in Mineralogy and Geochemistry* series with the Geochemical Society. As Executive Editor of the Geochemistry side of this series, I am soliciting proposals for new reviews of a geochemical nature. A full proposal should consist of the following information: 1) proposed title; 2) proposed volume editors/short course organizers; 3) a tentative list of potential contributors; 4) a statement as to whether the volume would be associated with a short course and proposed date and location for the course; 5) a financial plan showing that the costs involved have received some consideration. However, before submitting a formal proposal, I invite potential organizers to contact me to discuss their ideas. With your help, I hope to make this new Geochemical Society effort financially and scientifically successful.

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Announcing a *Geochemical Society Special Publication:*

In Memoriam of Professor David A. Crerar of Princeton University

The Geochemical Society has authorized the production of a Special Volume in memory of the many contributions of Dr. Crerar to geochemistry. As many of you know, David's very productive career was cut short by his death at the age of 49 in 1994 due to a rare form of Alzheimer's called Pick's disease. In his relatively short career he made pioneering contributions to many areas of aqueous and environmental geochemistry. The volume is in the early stages, i.e., manuscripts are being prepared by the authors, but we hope to have it available for purchase by mid to late 2000. Roland Hellmann and Scott A. Wood will function as volume editors. The articles in the volume are being written by David's former students, mentors and collaborators. It will be divided into three main sections: 1) hydrothermal geochemistry as applied to ore deposit studies; 2) kinetics and surface chemistry of water-rock interactions; and 3) environmental geochemistry. Princeton University has generously provided financial support to cover some of the expenses of production. It is hoped that many of you will purchase a copy of this volume when it becomes available, and it is not to early to reserve your copy (contact the GS Special Publications Editor, Scott Wood, swood@iron.mines.uidaho.edu).

Notes from the Business Manager

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Important!!! Poll of The Geochemical Society Membership:

There has been periodic discussion of splitting Geochimica et Cosmochimica Acta into two sections (one high-T/planetary, the other low-T/aqueous/environmental). Loosely related is the question of whether the Geochemical Society would be better organized in a series of Divisions analogous to the Organic Geochemistry Division. It would help the Board in its deliberations if you could take a few minutes to respond to the following questionnaire.

1. Should the Geochemical Society be composed of divisions, in addition to the currently very successful Organic Geochemistry Division?
2. Regardless of your answer to question 1, if you had to join a Division, what would be your preferred title for the Division?
3. Regardless of your answer to question 1, would you support the concept of a Student Division? If yes, should there be a student member of the Board of Directors?
4. Do you favor splitting the journal and offering each half for half price and the whole for slightly less than the sum of the parts to members? Institutional subscriptions would remain unchanged.

Please mail or e-mail your response promptly to our Business Manager, Lee Mobley at the address shown above.

ANNOUNCEMENT

The Organic Geochemistry Division of the Geochemical Society

Nomination Request for
the BEST STUDENT PAPER IN ORGANIC GEOCHEMISTRY

This award will be for the Best Student Paper published in 1998. Criteria for this award are as follows:

1) The paper must be published in the year prior to the award (for this award the paper must bear a 1998 publication date).
2) The paper can be submitted by the faculty advisor, a student, or other reader.
3) The nomination must be received by July 31, 1999.

The student must be the first author on the publication, and must have been enrolled as a student at the time the paper was submitted (not published). If the student has graduated, the date of graduation should be included in the nomination letter. Members-at-Large of the Executive Committee of the Organic Geochemistry Division will serve as judges. The award will be a certificate and a one year membership in the Geochemical Society with all rights and privileges, including a subscription to GCA.

1998 OGD Best Paper Awards

The Organic Geochemistry Division of the Geochemical Society is pleased to award the 1998 Best Student Paper published in the field of Organic Geochemistry for 1997, for the paper by Silvio Pantoja, entitled, “Hydrolysis of Peptides in Seawater and Sediment”, which appeared in *Marine Chemistry* 57:25-40. This award, in addition to a certificate, includes a one year membership in the Society with all rights and privileges.

The Organic Geochemistry Division of the Geochemical Society is pleased to award the 1998 Best Paper published in the field of Organic Geochemistry for 1997, for the paper by Timothy Eglinton, coauthored by Bryan Benitez-Nelson, Ann Pearson, James Bauer and Ellen Druffel, entitled, “Variability in Radiocarbon Ages of Individual Compounds from Marine Sediments”, which appeared in *Science* 277:796-799.

OGD Best Paper Committee:
David J. Burdige (Old Dominion University)
Melodye Rooney (Mobil Oil)
Katherine Freeman (Pennsylvania State University)

The Fifth International Symposium on the Geochemistry of the Earth's Surface (GES-5)

August 12-20, 1999, Reykjavik, Iceland

The Fifth International Symposium on the Geochemistry of the Earth'sSurface (GES-5) will be held in Reykjavik, Iceland, from Monday August 16 to Friday August 20. There will be a field excursion prior to the meeting from Thursday August 12 to Sunday August 15 and an afternoon excursion during the meeting. The symposium has been scheduled so that those interested can attend the Goldschmidt meeting in Boston, U.S.A (August 22-27), after GES-5 in Iceland.

GES is a Working Group of the International Association of Geochemistry and Cosmochemistry (IAGC). Past meetings of the Working Group have been held in Granada, Spain (1986), Aix-en Provence, France (1990), University Park, Pennsylvania, USA (1993), and Ilkley, Yorkshire, England (1996).

Symposium themes

1. Geochemical record of terrestrial environmental change
2. Human geochemical impact on the terrestrial environment, local to global
3. Environmental geochemistry and health
4. Chemical weathering and climate, river catchment, and global cycles
5. Organic geochemistry
6. Marine and sedimentary geochemistry
7. Chemistry, physics and mineralogy of weathering processes
8. Geochemical thermodynamics and kinetics
9. Geochemistry of crustal fluids
10. Geochemistry of catastrophic events

For further information regarding the conference and to be added on the mailing list for further announcements, send an e-mail to the organizers (ges5@raunvis.hi.is) or visit the web site at http://www.raunvis.hi.is/ges5.html

C O N T A C T

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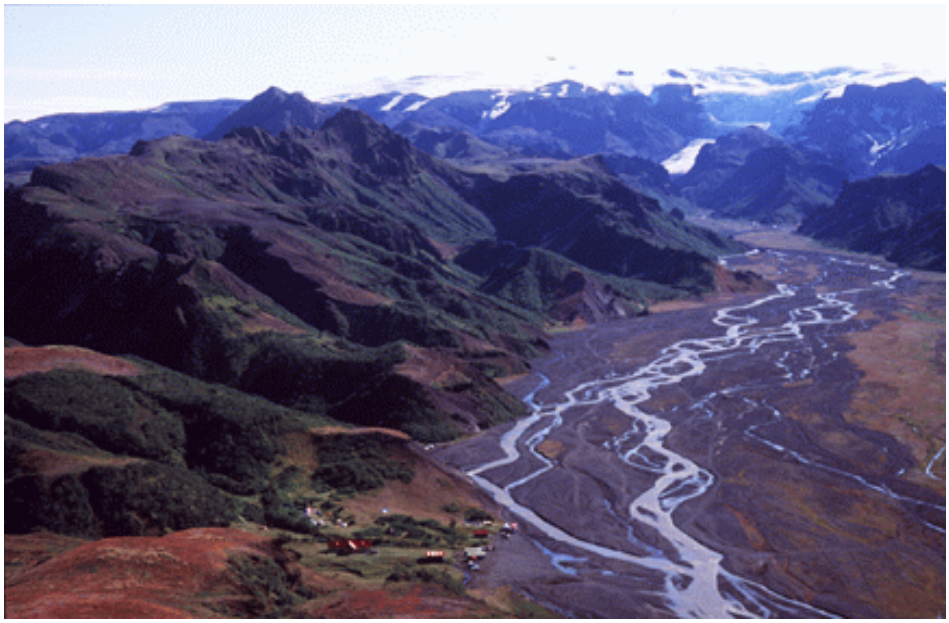

THE SYMPOSIUM IS SPONSORED BY:

University of Iceland
International Association of Geochemistry and Cosmochemistry

Symposia Reports

American Chemical Society National Meeting
Anaheim, California, March 21-25, 1999

Chemical Structure and Preservation Processes of Organic Matter in Soils and Sediments, a symposium organized by Sylvie Derenne (LCBOP, Ecole Nationale Supérieure de Chimie de Paris) and Heike Knicker (TU München), took place March 22-23, 1999. This was one of four Geochemistry Division Symposia held during 217th American Chemical Society National Meeting and Exposition.

Twenty five oral presentations were given during the three half-day sessions. The speakers came from Germany, USA, France, Australia, and UK. About 30 to 50 people were in attendance at all time. The papers presented were categorized roughly into three groups: new developments in soil/sediment organic matter (OM) characterization techniques; actual applications of the characterization techniques in solving environmental problems; and theories of OM preservation in soils and sediments.

The characterization technique papers, presented mostly during the Monday morning session, discussed variety of techniques, including chemical digestion techniques, physical fractionation techniques, various types of GC-MS and NMR, TMAH, TEM, and C-XANES, and some of their applications. Many presentations repeatedly emphasized that OM we are dealing with is a mixture of many complex compounds. The session concluded that we need to combine diverse techniques to fully characterize the OM in soils and sediments: no single analytical technique is capable of fully portraying the complex nature of this mixture.

The application papers were presented mostly during the Monday afternoon session. The studies again elucidated the need to use multiple analytical techniques for each sample or each study area. They also made clear the intimate relationship between fine-grained mineral fractions (clay minerals and alumino-hydroxides) and OM. Suggestions were made that we not only characterize the present composition of minerals and OM, but also study the history of decay processes.

The preservation mechanism papers, most of which were presented during the Tuesday morning session, discussed the nature of the intimate mineral-OM relationship. The mechanisms proposed can be divided into two categories, physical protection and chemical protection. The physical protection mechanisms proposed include the encapsulation by refractory OM and isolation into nanopores on mineral aggregate surfaces. The chemical protection mechanisms include ion binding on mineral surfaces and between clay silicate sheets.

Participants agreed that the analysis of soil- and sediment-bound OM is one of the most challenging tasks of analytical chemistry. The organizers closed the session by acknowledging that more needs to be done before we fully understand the nature of OM in soils and sediments.

Whereas one of the organizers' intentions was to bring soil scientists and sedimentary geochemists together to exchange the state-of-art, as described in the original call for papers, most presentations discussed OM in soils. This was somewhat unfortunate especially because the "monolayer equivalent theory" established for the preservation of OM in continental shelf sediments through the work of L. Mayer, R. Keil, and J. Hedges were extensively discussed during the Tuesday morning session.

The organizers are planning to put together extended versions of the presented papers as an *Organic Geochemistry* Special Issue.

Yoko Furukawa
Naval Research Laboratory

The Role of Water in Organic Reactions symposium was held on March 24-25 in Anaheim, CA. The symposium was co-sponsored by the Fuel and Geochemistry Divisions of ACS and organized by Dr. Michael Lewan of the U.S. Geological Survey in Denver and Dr. George Cody of the Geophysical Laboratory at the Carnegie Institution of Washington. The symposium was held at the Disneyland Hotel, and more than 20 papers were presented in 4 sessions, covering two full days.

As one might expect from the title of the symposium, the talks focused on how water is involved in reactions among common geologic organic materials, a field that has grown immensely over the last several years. For example, theoretical work on hydrothermal abiotic synthesis of the organic building blocks of life been ongoing for a number of years, while experimental studies such as the ones presented at this symposium have only become the subject of intense study in recent years. Several talks, notably those by session chair G. Cody, P. O'Day, and J. Brandes, addressed the strong likelihood that a variety of organic reactions leading to the emergence of life on the early Earth may have taken place in hydrothermal systems.

Another rapidly growing area of research in this area has a technological aspect. The conclusion of presentations by M. Katritzky, M. Siskin and R. Gläser is that water acts as solvent, reagent, and catalyst during reactions involving organic material. An emerging applied technology from such research is treatment of organic matter using sub- or supercritical water to facilitate the decomposition of waste without the presence of catalysts. As such, it represents a method for disposing of hazardous organic wastes in a relatively environmentally friendly manner.

Research on petroleum and natural gas formation, often using hydrous pyrolysis, was also well represented. Presentations along these lines were given by J. Seewald, T. McCollom, M. Koopmans, A. Schimmelmann, V. Burkle, R. Michels and C. Barker. Many of these talks described the nature and behavior of biomarkers, hydrocarbons and aromatic compounds, and the influence water has on reactions among the components of petroleum.

In summary, it is becoming clear that water not only acts as a medium for reactions among organic compounds, but because of its unique nature also can participate directly in chemical reactions in which organic material is created, destroyed and transformed. Furthermore, the presence of water in organic geochemical environments can facilitate the approach toward metastable or stable states among organic compounds in a variety of geologic environments.

Mitch Schulte
NASA Ames Research Center

Tom McCollom
Woods Hole Oceanographic Institution

The **Reactivity and Dynamics of Mineral Surfaces** symposium, comprising 32 talks and 6 posters, was organized by Carrick Eggleston and Steve Higgins (University of Wyoming). The papers comprised a good mix of theory, experiment, and observation that reflected the general excitement of this rapidly developing field. Many papers presented results of conventional powder-reaction experiments and attempted to rationalize these in terms of surface-complexation models or molecular theories. The applications of atomic-force microscopy, various spectroscopic methods (X-ray absorption, FTIR, DRS, and SHG), and X-ray reflectivity are becoming increasingly important in mineral-fluid interface studies. The mechanistic understanding that can be derived through analysis of solution chemistry in powder-reaction experiments is limited. It is clear that molecular-scale, crystal-plane-specific measurements and associated theory are powerful complements to the powder-reaction approach. Progress is being made in understanding protonation-deprotonation equilibria at mineral-fluid interfaces, metal ion adsorption, and diffuse layer characteristics, as well as the behavior of simple organic compounds. Nonetheless, as the level of understanding increases, so in some cases does the apparent complexity of the phenomena being studied.

Neil C. Sturchio
Argonne National Laboratory

Podosek Succeeds Turekian as GCA Editor

Frank Podosek will succeed Karl Turekian as Executive Editor of *Geochimica et Cosmochimica Acta* on January 1, 2000. Podosek received an A.B.degree in Physics from Harvard College in 1964 and a Ph.D. in Physics from the University of California at Berkeley in 1969. His Ph.D. research, advised by John Reynolds, dealt with dating of meteorites by use of the short-lived radionuclide 129I. Following a 4-year postdoctoral appointment with Jerry Wasserburg at Caltech, where he worked largely on lunar sample chronology during the Apollo mission era, Podosek went to Washington University in St. Louis, Missouri, where he is currently a Fellow of the McDonnell Center for Space Sciences and a Professor in the Department of Earth and Planetary Sciences. Podosek is coauthor of the book *Noble Gas Geochemistry* (1983) and has published mainly in the fields of meteoritics, isotope geochemistry and cosmochemistry.

Although Podosek's term does not formally begin until January 1, 2000, authors submitting manuscripts to GCA on or after October 1, 1999, are requested to send them to St. Louis rather than to New Haven. Electronic submission will be encouraged. Information for contributors will be posted on a website, tentatively named gca.wustl.edu, which should be operational by early September.
cosmochemistry.

The Integration of Organic Geochemistry and PVT Studies in Petroleum Exploration and Production

ACS Spring Meeting, San Francisco, 26-31 March 2000

Bulk-oil analysis utilized by petroleum engineering in reservoir management has recently gained acceptance amongst the organic geochemistry community as an exploration and oil characterization tool that is quite complementary to existing techniques. Similarly, organic geochemical analysis is gaining acceptance in reservoir management to address diverse problems from oil fingerprinting to wax management. The Symposium will cover topics related to the integration of PVT properties and organic geochemistry in petroleum exploration and production. Papers covering all aspects of this integration are encouraged. Some suggested topics include integration within basin modeling, multi-phase migration, hydrocarbon alteration, petroleum generation, primary and secondary expulsion, and reservoir continuity. Papers covering fluid inclusions and modeling of solids precipitation are also encouraged.

Dr. Gordon Macleod, Shell E&PTech Co., 3737 Bellaire Blvd., Houston, TX, 77025 USA gmac@shellus.com

Dr. Peter Meulbroek, Woods Hole Oceanographic Institute, 360 Woods Hole Rd. MS#4, Woods Hole MA 02543 USA pmeulbroek@whoi.edu

First Latin American Workshop On Reservoir And Production Geochemistry

7-9 November 1999
Melia Havana Hotel, Havana, Cuba

The Latin American Association of Organic Geochemistry invites you to the 1st Latin American Workshop on Reservoir and Production Geochemistry to be held from November 7 to 9, 1999, in Havana, Cuba. Cuba is pleased to host this meeting that will be an important forum for the exchange of new findings within Reservoir and Production Geochemistry. The City of Havana is the perfect setting for this workshop. The climate is exceptionally good and gives the opportunity to enjoy the colonial center and the beaches at the east of Havana, as well as the famous and beautiful Varadero beach.

Organizing Committee
José Orlando Lopez Quintero (CEINPET)
Ana Aguilar Labrada (CEINPET)

Scientific Committee
Luiz A. F. Trindade (CENPES - Brazil)
Caroline Magnier (IFP - France)
José R. Cerqueira (CENPES - Brazil)

Languages:	Spanish and English	
Registration:	Saturday, November 6th	
Work session:	Sunday, November 7th	
Work session:	Monday, November 8th	
Excursion to Varadero Oilfield:	Tuesday, November 9th	
Registration fee ($US):	200	
Hotel accommodation fees ($US):	Sea view	Garden view
Double, breakfast included, per person	71	63
Single, breakfast included, per person	100	98

The scientific program will include oral presentations. Topics will include but are not limited to:
Compartment characterization
Fluid - rock interactions
Reservoir secondary processes (biodegradation, cracking, mixing, etc.)
Enhanced recovery
Formation damage

To participate in the working sessions abstracts must be submitted no later than June 1st, 1999. Abstracts can be written in English or Spanish. To participate in the workshop authors must submit an abstract comprising at least 250 words. The abstract should contain a title, authors names and addresses, a clear statement of the results achieved, and their significance. Send your abstract preferably by FAX, E-mail or saved on a 3.5 diskette along with 2 printed copies.

For further information please contact us:

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Ninth Annual V. M. Goldschmidt Conference

August 22–27, 1999 Cambridge, Massachusetts

http://cass.jsc.nasa.gov/meetings/gold99/

Sponsors

Geochemical Society
European Association of Geochemistry
Lunar and Planetary Institute
Harvard University
National Aeronautics and Space Administration

The Ninth Annual Goldschmidt Conference will be held at Harvard University, Cambridge, Massachusetts, August 22–27, 1999. The conference will be hosted by the Department of Earth and Planetary Sciences. Professor Stein B. Jacobsen is the Conference Chair.

The Goldschmidt Conference is an annual international conference of geochemists, and is held alternately in Europe and North America. The meeting is a forum for presenting and discussing new chemical and isotopic measurements, experimental and theoretical results, and discoveries in geochemistry and cosmochemistry.

The program committee welcomes your suggestions for potential symposia topics, and solicits volunteers to act as symposia organizers. Please send your suggestions for topics and offers to organize to goldschmidt@eps.harvard.edu.

Schedule

March 5, 1999	Second announcement mailing, including logistical and registration information and call for abstracts
May 21, 1999	**Abstract deadline**
June 28, 1999	Final announcement mailing
August 22–27, 1999	Ninth Annual Goldschmidt Conference
August 28–29, 1999	Field trips

Contact

Stein B. Jacobsen, Department of Earth and Planetary Sciences, Harvard University, Cambridge MA 02138 (phone: 617-495-5233; fax: 617-496-4387; e-mail: goldschmidt@eps.harvard.edu).

Black Carbon in the Environment: Combustion Residues - Sources and Fates, Characterization, and Biogeochemical Implications

Symposium during the
9th V. M. Goldschmidt Conference
22-27 August 1999, Cambridge, MA, USA

Black carbon, produced by incomplete combustion of fossil fuels and vegetation fires, is relatively resistant to degradation and occurs ubiquitously in natural environments, including soils, sediments, seawater and the atmosphere. In recent years, geochemical and biological studies of different forms of black carbon (such as plant chars, charcoals, and soots) received increasing attention due to potential importances in a wide range of biogeochemical processes. For example, black carbon may represent a significant sink in the global carbon cycle, affect earth's radiative heat balance, be a useful tracer for earth's fire history, be a significant fraction of carbon buried in soils and sediments, and be an important carrier of organic pollutants.

Black carbon is presently being studied in a variety of widely separated scientific fields, with the result that essentially no generally accepted analytical protocols, terminologies and conceptual approaches exist. The aim of the symposium is to bring together a broad collegium of scientists ranging from geochemists to biologists and paleoenvironmentalists, to discuss the biogeochemical roles of black carbon in natural environments. In addition to stimulating interdisciplinary approaches, an additional goal of this symposium will be to encourage establishment of a collection of black carbon reference materials and to facilitate their comparative analysis by a range of commonly used techniques.

This emerging field of biogeochemical research will be addressed in two days of oral and poster presentations, including a special session dedicated to discussing potential comparison exercises. This symposium should attract a large number of participants from a broad and diverse background in carbon biogeochemistry, certainly including soil, sediment, and marine geochemists and biologists.

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John Hedges
University of Washington, School of Oceanography, USA
Tel. +1 206 543 0744 E-mail: jihedges@u.washington.edu

Information: http://cass.jsc.nasa.gov/meetings/gold99/

Abstract deadline: May 21, 1999

EU Large-Scale Geochemical Facility

The University of Bristol is host to the EU Large-Scale Geochemical Facility (Est. 1st April 1998) which is funded by the European Commission Training and Mobility of Researchers (TMR) programme.

The facility contains a number of modern analytical instruments that allow: major- and trace-element analysis of rocks and minerals (EMPA, ICP-MS +/- laser ablation, ICP-AES), Nuclear Magnetic Resonance, Fe3+/Fe2+ (Mossbauer) and CO2 - H2O (Fourier Transform Infra-Red spectrometry); and scanning electron microscopy with qualitative EDS. Analysis of surfaces can be performed with Auger Electron, Secondary Ion Mass and X-Ray Photoelectron Spectrometers. Four well-equipped experimental geochemistry laboratories allow users to carry out investigations that simulate a wide variety of geological conditions.

The aim of the Large Scale Facility programme is to fund visiting scientists from institutions in EU countries (+Iceland, Israel, Liechtenstein and Norway). All travel and subsistence expenses (except for UK researchers) and free access are provided. Visits are usually expected to last between 1 and 4 weeks.

The next application deadlines are: 15 June 1999 and 15 September 1999. Application forms and further information are available from the address below or from: http://eugf.gly.bris.ac.uk. For information and assistance contact: Ben.Williamson@bris.ac.uk; stuart.kearns@bris.ac.uk; or b.j.wood@bris.ac.uk.

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Organic Solids in Petroleum Production

Geochemistry Division Symposium
ACS Spring Meeting, San Francisco, 26-31 March 2000

-Geochemistry of paraffins: old and new views
-Asphaltenes: their molecular structure and analytical methods
-Gas hydrates: mature or still new topic?
-Geochemistry of diamondoids or newly-formed polymers
-Analytical techniques for studies of organic production solids

Abstracts should be filed electronically on http://www.acs.org/meetings/abstract/abinfo.html and should be mailed to one of the Symposium organizers.

Dr. B. Artur Stankiewicz, Shell E&P Tech. Co., 3737 Bellaire Blvd., Houston, TX 77025; e-mail: artur@shellus.com

Dr. Erik Tegelaar, Baseline Resolution, Inc., 2000 Avenue G, Suite 810, Plano, TX 75074; e-mail: ETegelaar@brilabs.com

The Mineralogical Society of America

announces the 2000

Grant for Research in Crystallography

from the Edward H. Kraus Crystallographic Research Fund with contributions from the MSA membership and friends

and the

MSA Grant for Student Research in Mineralogy and Petrology

from an endowment created by contributions from the MSA membership

The Grant for Research in Crystallography is a $3500 grant for research in crystallography. There are no restrictions on how the grant funds may be spent, as long as they are used in support of research. The only restrictions on eligibility for the grant are that the applicant must have reached his or her 25th birthday but not yet have reached his or her 36th birthday on the date the grant is awarded, and that the person is not a MSA Counsellor. The award selection will be based on the qualifications of the applicant, the quality, innovativeness, and scientific significance of the proposed research, and the likelihood of success of the project. The next award will be made in January, 2000.

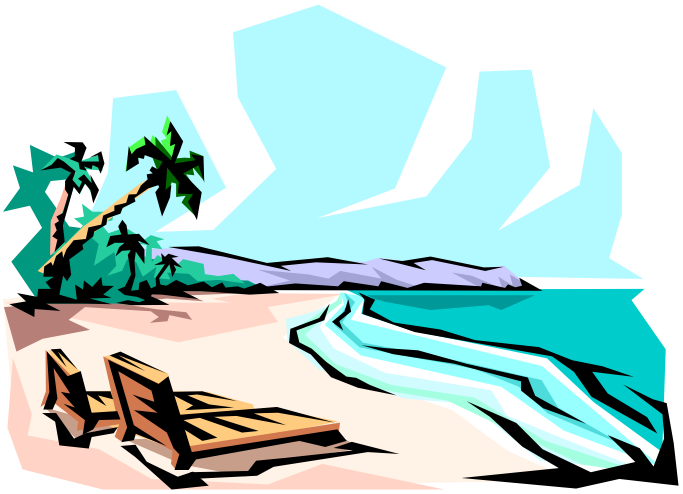
MSA Grant for Student Research in Mineralogy and Petrology is a $3500 grant for research in mineralogy and petrology. Students, including graduate and undergraduate students, are encouraged to apply. There are no restrictions on how the grant funds may be spent, as long as they are used in support of research. The award selection will be based on the qualifications of the applicant, the quality, innovativeness, and scientific significance of the research, and the likelihood of success of the project. The next award will be made in January, 2000.

Application forms for both grants may be obtained from the MSA worldwide web home page, http://www.minsocam.org/insideMSA/Grantfrm96.html, or from Dr. J. Alex Speer, MSA Business Office, 1015 Eighteenth St NW Ste 601, Washington, DC, 20036-5274, USA (202-775-4344, fax 202-775-0018, j_a_speer@minsocam.org). Completed applications must be returned to the MSA Business Office by June 1, 1999.

9th V. M. Goldschmidt Conference
Harvard University, Cambridge, MA, U. S. A.
August 22-27, 1999

ABSTRACT DEADLINE: MAY 21, 1999

(see page 9 for more information)



31st International Geological Congress
Rio de Janeiro, Brazil, August 6-17, 2000

Symposium Coordinators Needed! Don't Hesitate!

The Geochemical Society is sponsoring or co-sponsoring the following Special Symposia at this meeting *(one Coordinator is needed for each symposium):*

1. Evolution of the atmosphere-hydrosphere-biosphere
2. New results from Mars Pathfinder and Mars Global Surveyor (with CCP)
3. Weathering and climate (with INQUA)

The Geochemical Society is co-sponsoring the following General Symposia at this meeting (*one Coordinator is required from each of our ranks):*

5. Fission tracks, thermoluminescence and cathodoluminescence (with IAGC)
6. Recent advances in mass spectrometry for geological research (with IAGC)
7. Regional geochronology (with IAGC)
8. Stable and radiogenic isotopes in metallogenesis (with IAGC)
10. Chronology of the early solar system (with CCP)

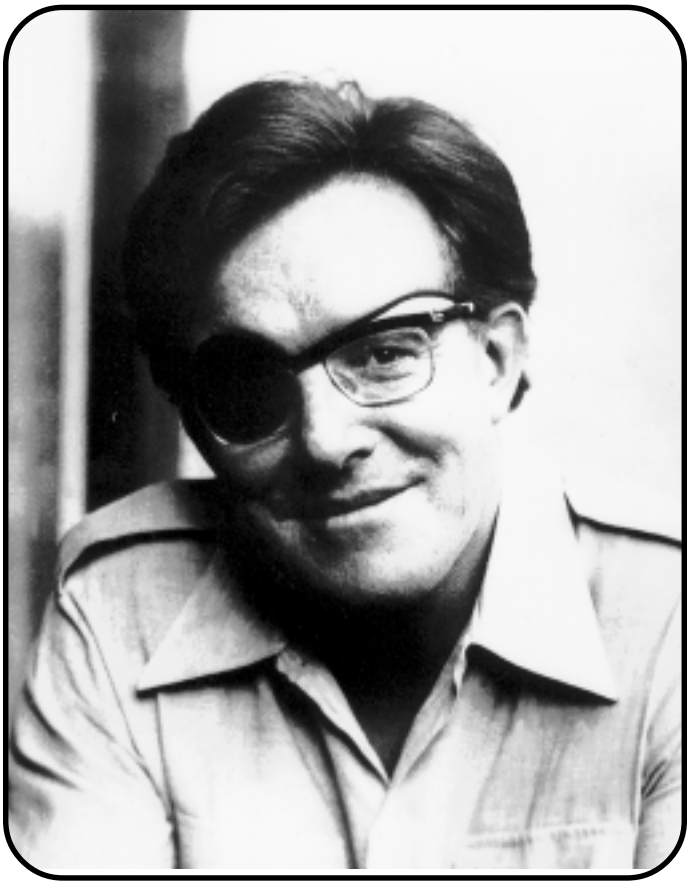
Anyone wishing to volunteer for these interesting, important, and rewarding tasks in an exotic location should get in touch with the International Secretary, Ross Taylor:

email: Ross.Taylor@anu.edu.au
Fax: 61-26-249-0748

For further information about the 31st International Geological Congress, contact:

Secretariat Bureau, 31st International Geological Congress. Av. Pasteur, 404, Anexo 31 IGC, Urca, Rio de Janeiro, RJ, CEP 22.290-240, Brazil. Tel: +1 55 21 295 5847; Fax: +1 55 21 295 8094; E-mail: 31igc@31igc.org.br

In Memoriam



Roger Chesselet (1926-1998)

On 28 December 1998, with the death of Roger Chesselet, the entire French and international community of marine and atmospheric scientists lost a valued colleague, an exacting mentor, and, for many of us, a dear friend.

Roger Chesselet was born on 16 July 1926 in Ixelles, Belgium, where he received his early education. During World War II he lied about his age to become part of the *maquis*, and eventually joined an Allied Commando unit under the command of Lord Louis Mountbatten, which was based in Scotland and where he trained. As part of this commando unit, Roger volunteered for seventeen missions in which he was dropped into several different countries, including into Germany itself. It was during the assault of his commando unit on Peenemunde, the German V-2 rocket base and where the first jet-engine airplane was developed, that he was wounded and lost an eye. In mid 1975 in the *Grand Place* in Brussels, I remember Roger pointing out to me window of the attic apartment where he was living after the war when Winston Churchill honored him and the surviving ramainder of his commando unit in a ceremony in the *Grande Place* .

Roger Chesselet received his "undergraduate" degree in Belgium, and in the late 1950s, came to Paris where he studied nuclear physics and embarked on a study of natural and artificial radioactivity in the sea. He was aided in these efforts by Jacques Cousteau who invited him to do his early sampling during cruises on "*La Calypso* ". For this early use of particulate radioactivity to study geochemical and biological processes in the sea and the marine atmosphere, he received his French Ph.D in 1965. It was during these student years that his artistic soul was also in part expressed as the first *directeur de scène* of the celebrated mime Marcel Marceau, with whom he became and remained very close, and who said of Roger, "He is a rare human being, a type who renders humanity immortal and everlasting."

During these years he worked in the *Service d'Electronique Physique* where he developed a probe for the direct measurement of artificial radionuclides that resulted from nuclear testing, and which rendered these explosions useful at least for their production of different elements whose varied geochemistries and half lives provided numerous tracers of marine and atmospheric processes. Roger thereby discovered the changes that took place in radioactive aerosols once incorporated into the surface ocean in their rapid adsorption onto particulate matter and their mediation via plankton to be rapidly transported to depth. This research interest in particles and their elemental and radioactive constituents from the high atmosphere to the ocean surface and through the water column to the underlying sediments gave him his characteristically global viewpoint on geochemical problems, and was to impel his involvement in global, international research projects for the rest of his career.

In 1961 Roger Chesselet was one of the very first researchers to join the ultimately world-famous *Centre des Faibles Radioactivités* at Gif-sur-Yvette under the direction of Jacques Labeyrie. He formed a dynamic group of young students and researchers who, with Roger, participated in regional French studies, and in many of the important global, international projects that began with the NSF-funded GEOSECS (GEochemical Ocean SECtion Studies) in the 1970s. Roger was was instrumental in its initial planning in the late 1960s and in making it a truly international program, as well as directly participating in its research on marine particles. In 1967 a half-year as Visiting Scientist at Lamont Geological Observatory, now Lamont-Doherty Earth Observatory where I first met him, was at least a part of the impetus for his subsequent involvement in GEOSECS. This participation made him one of the first to involve France and French scientists in these global, internatinal research projects.

He continued his interests in the study of atmospheric and marine particulates and radioactivity on a global scale by organizing an international symposium on these subjects in Nice in 1972, and, in the early 1980s, with his Gif research team, he was part of the the NSF-funded SEAREX (SEa AiR EXchange) program. Some of his colleagues in SEAREX attribute his early collaborative work with others on mineral aerosols as constituting the foundation for the Iron-Dust-Marine-Fertilization hypothesis subsequently proposed by John Martin.

Roger's entire professional career was as a scientist in the CNRS (*Centre National de la Recherche Scientifique*) in which he received its *Médaille d'Argent* in 1975, having received the French Academy of Sciences *prix Jules Richard* in 1970. In 1981 he was made Director of the *Programme Interdisciplinaire de la Récherche Océanographique* within the French INSU/CNRS (*Institut National des Sciences de l'Univers*) and in this

capacity led the participation of French science and scientists into world-class status and collaboration in both national and international, interdisciplinary, global marine studies. He collaborated in the direction and planning of marine science on an international level with his active participation through the 1980s until his illness in SCOR (Scientific Committee on Oceanic Research, an interdisciplinary body of the International Council of Science). During that time he served as Vice-President of SCOR from 1982 to 1988, and was the Chairman of a SCOR Working Group on "The Ocean as a source and Sink for Atmospheric Constituents". He played an early role in the the initiation of JGOFS (Joint Global Ocean Flux Studies). Indeed, some of his fellow initiators of that program refer to Roger Chesselet as the "Father of JGOFS", for it was at Roger's urging in 1986 that SCOR agreed to convene the first international workshop which resulted in the establishment of JGOFS. It was in his capacity within PIRO/INSU/CNRS that Roger encouraged the first CNRS-funded interdisciplinary marine study in JGOFS, the ECOMARGE (ECOsystêmes des MARGEs continentales) programme. In that JGOFS is still active and the scientific results of ECOMARGE and other projects in which he played a pivotal role are still being published, Roger Chesselet continues his influence on us.

It was certainly not just as a scientific colleague that those of us who knew and worked with Roger appreciated and loved him. I have extracted from messages received by myself and by the SCOR office, as well as from his funeral service, statements of appreciation and remembrance by a number of his colleagues, former students and friends (*). "He was really somebody important in our lives, and we will miss him." "Roger was a marvelous individual, as we all know — an excellent and enthusiastic scientist, an exuberant and extroverted individual with a great zest for life and the finer things in it, an outstanding French patriot and legitimate war hero and a great friend." "Roger liked good company, red wine, provocative science, and the flavor of human struggle within it all. I miss him..." "He was a marvellous and complex character, strong and gentlemanly, but with the swashbuckling air of a pirate and *bon vivant* ." "We have lost a great character, and an imaginitive scientist." "In reflecting on all the great times and experiences with him, I can feel how fortunate I have been to have had him enter into my life. There are few people whose spirit, passion and dedication to life and profession teach you something. Roger was such a person. He will be missed, but warmly remembered." "Working with him was fun because of his enthusiasm and sense of humor." "He caused us to dream and he greatly inspired our research by sharing with us his passion for the ocean. He has left us now, but he has left us his scientific vision of the marine world, and that will always stay with us as a guide."

Roger is survived by his wife, Kéty, a daughter Françoise and her son David, as well as by another daughter Valérie.

Pierre E. Biscaye
Lamont-Doherty Earth Observatory of Columbia University

(*) Peter Brewer, Jean-Claude Brun-Cottan, Patrick Buat-Ménard, Bob Duce, Jean-Claude Duplessy, Bob Gagosian, Francis Grousset, Joe Prospero, Mike Whitfield.

Conference on Stable Isotopes and Isotope Effects

June 20-25, 1999
Carry le Rouet, France

Geochemistry will occupy an important part of the conference, and presentations on paleoclimates and the ozone problem, by Harmon Craig, Sam Epstein, Jean Jouzel, Mark Thiemens are on the program. Francois Robert, Ludolf Schultz, and others will communicate on results from studies of meteorites and various other subjects. Discussions of the significance of measurements, specifically on ozone, will benefit by discussions of the theory of isotope effects, and anomalous or non-mass-dependent effects. Those subjects will benefit by participation of Jake Bigeleisen, Yasuhiko Fujii, Ralph Weston, and Max Wolfsberg, among others. Several important session are devoted to isotopic studies in life sciences. Some aspects of such works are not altogether unrelated fundamentally to topics in the two preceding sessions. Presence and contributions of Maryvonne Martin, Anette Giesemann, G.D Farquhar, Eric Galimov, Vern Schramm, Hanns-Ludwig Schmidt, Dan Yakir, and many others guarantees the interest of these sessions. How to achieve accurate, precise and reliable measurements, and the use of standards, will be the subject of lectures by P. De Bièvres and K. Froehlich.

As topics covered and approaches, experimental or theoretical, sometimes depend on local traditions or "schools", one of the aims of the conference is to foster the encounter of comparable numbers of high level scientists from America, Europe and other parts of the world. From the present preregistration list this objective should be reached. This Conference enjoys the patronage of several French institutions and societies, of the German Arbeitsgemeinschaft Stabile Isotope e.V., and of the Atomic Energy Society of Japan.

It is planned that, whichever is their special field, attendees will stay at the Carry le Rouet, where they will be lodged in a holiday resort on an inlet of the Mediterranean sea, during the whole conference.

As the number of participants that can still be accommodated is limited, we urge those interested in attending, and presenting a poster communication, to communicate their intentions, as soon as possible, either to:

Mrs Laurence Boyer DRECAM Batiment 524, CEN Saclay F-91191 Gif-sur-Yvette, France; e-mail: boyer@drecam.cea.fr; Phone 33 (0)1 69 08 70 38; Fax 33 (0)1 63 08 22 89

or to

Dr. Edgar Soulie, Secretary of the Organizing Committee, SCM, CEA Saclay, F-91191 Gif-sur-Yvette, France; e-mail: bsoulie@drecam.cea.fr; Phone 33 (0)1 69 08 47 37; Fax 33 (0)1 69 08 66 40.

Werner Stumm and James Morgan Win Stockholm Water Prize

STOCKHOLM, SWEDEN - The Stockholm Water Foundation announced on March 22, 1999 that Professors Werner Stumm from Switzerland and James J. Morgan from the USA have been accorded the prestigious 1999 Stockholm Water Prize. Their profound and far-reaching research achievements in aquatic chemistry have improved the understanding of chemical and physical processes in the water environment and have led to the development of improved techniques for the treatment of wastewater and drinking water in societies around the world.

As the basis for honoring Professors Werner Stumm and James J. Morgan with the award, the Prize's Nominating Committee noted: *"For outstanding contributions to aquatic chemistry of great importance for the understanding of chemical reactions in the water environment and development of techniques for treatment of wastewater and drinking water."*

In addition, they also made important, fundamental discoveries in the chemical processes in soil and water related to acid rain, and the transport of metals and other substances in the water environment. In short, their work has improved the quality of drinking water, wastewater, and coastal and enclosed waters for people around the planet.

Dr. Stumm, 74, Professor Emeritus of the Federal Institute of Technology in Zurich, Switzerland, and Dr. Morgan, 66, the Goldberger Professor of Environmental Engineering Science at the California Institute of Technology in Pasadena, USA, met at Harvard University in 1960 and have for decades been the paramount scientists in the field of aquatic chemistry, which deals with the chemical behaviors of natural waters, and the processes that affect the distribution and circulation of chemical substances in these waters.

Stumm and Morgan's applied research focused on:

- Chemistry of surfaces in natural waters
- Water chemistry of iron, manganese, and phosphorus
- The chemical reactions of species (including pollutants) as they move through the environment
- Physicochemical (treatment) processes such as coagulation and filtration to remove particulates

For example, Professors Stumm and Morgan were among the first persons to recognize the importance of phosphorous in eutrophication, the oxygen-depleting, over-fertilization of lakes. They linked phosphorus inputs to eutrophication and also provided the scientific basis for technological processes to remove phosphorus from wastewaters. They also directed fundamental research on mechanisms for the removal of particles and associated pollutants from water supplies and wastewaters, and assisted in the application of these concepts into practice so much so that clean drinking water is of a high quality and that wastewater is properly treated in much of the industrialized world.

A common theme throughout their life achievements has been the value of fundamental research in the physical, chemical and biological processes involved in the cycling of iron and manganese in aquatic systems. The results have included new concepts and applications for such problems as acid mine drainage, the transport of particle-reactive pollutants in lakes, and the removal of iron and manganese in potable water treatment.

They also established aquatic chemistry as a core discipline for limnologists, oceanographers, ecologists, soil scientists, and environmental engineers. In 1970, they co-authored the seminal book Aquatic Chemistry, which was published again in 1989 and 1996 and is used in education all over the world, Together, Professors Stumm and Morgan have had an enormous educational impact as research supervisors, teachers and intellectual mentors. Through their "academic children and grandchildren," they have laid a scientific and educational foundation that will reach far into the next millennium.

The $150,000 Stockholm Water Prize, founded in 1990, is presented annually to an institution, organization, individual or company that has made a substantial contribution to the preservation, enhancement or availability of the world's water resources. The Prize recognizes outstanding research, action or education that increases knowledge of water as a resource and protects its usability for all life.

HM King Carl XVI Gustaf of Sweden will present the Stockholm Water Prize at a ceremony during the "World Water Week in Stockholm" in August. Professors Stumm and Morgan join a distinguished group of previous Laureates from Australia, Canada, Denmark, Great Britain, India, Israel, Japan and the United States who have represented disciplines ranging from technology and engineering to education and research.

Founders of the Stockholm Water Prize include Anglian Water, Aragon Fondkommission, Bacardi Limited, Compaq, General Motors, Grundfos, ITT Flygt, Kemira Kemwater, KPMG, Ragn-Sells, Scandinavian Airlines (SAS), SNECMA, Stockholm Water Festival, Swedish State Railways (SJ), Uponor Group, and the Water Environment Federation.

[The above was taken from a press release by the Stockholm International Water Institute. As this issue was being prepared for the press, we were informed of the sad news that Werner Stumm died on April 14, 1999. The next issue of The Geochemical News will contain a special memoriam to him.]

ALFRED E. TREIBS AWARD

Introduction of John M. Hayes for the 1998 Alfred E. Treibs Award

David J. Des Marais, Space Science Division, Ames Research Center, Moffett Field, CA 94035-1000

Ladies, gentlemen, officers, and members of the Organic Geochemical Division, I am pleased to present to you the 1998 recipient of the Treibs Medal, John M. Hayes, Director of the National Ocean Sciences Accelerator Mass Spectrometry Facility, Woods Hole Oceanographic Institution, and also Professor for the Practice of Biogeochemistry, Department of Earth and Planetary Sciences, Harvard University. This award recognizes a career that has been remarkable, not only for its substantial significance to organic geochemistry, but also for the breadth of its impact upon related fields. John's conceptual, analytical and experimental accomplishments have benefitted not only organic geochemistry, but also the fields of analytical chemistry, biochemistry, clinical chemistry, cosmochemistry, environmental chemistry, hydrology, microbiology, oceanography, paleoclimatology, precambrian paleobiology, sedimentary geochemistry and synthetic organic chemistry. And as if that were not enough, John has been recognized repeatedly as an exceptional teacher and textbook author!

John Hayes' list of accomplishments reads like a historical travelogue through the exciting times since the 1960's, when advances in analytical chemistry began seriously to challenge the mysteries of our biosphere, the earth, and the cosmos. John helped to heighten the wave of technological innovation and intensify the pace of discovery. As a graduate student at M.I.T. with Klaus Biemann, John's studies of organic compounds in meteorites contributed to the effort that ultimately placed a GC-MS on the face of Mars. While with Ed Anders at Chicago, he wrote a timely critical review that has since substantially raised the standard for research on the organic chemistry of meteorites. While at Bristol and later at Indiana University, Hayes explored the solar-wind-driven synthesis of simple organic compounds and, working with myself, created a model for the processing and accumulation of carbon, nitrogen and hydrogen in the lunar regolith.

John Hayes' contributions to the theory, methodology and application of stable isotopes to biogeochemistry have been his hallmark. Because stable isotopic patterns within organic mixtures reflect both the reaction mechanisms and the structure and function of reaction networks that created those mixtures, isotopes can be powerful probes of process. John's focus upon isotopes as indicators of process has kept him on the path to his substantial milestones. That focus arose naturally from his intense and enduring desire to understand the origins and history of organic compounds in Nature.

Hayes' early efforts both confronted the analytical challenges of molecular isotopic analysis and also demonstrated that organic biosynthesis can bequeath an isotopic signature to its products. Even before I first met John in 1970, he had already envisioned combining gas chromatography (GC) with high-precision isotope ratio mass spectroscopy in order to increase the sensitivity, specificity and speed of isotopic measurements of individual organic compounds. By the early 1980's, his group introduced "isotope ratio monitoring." Although their methods substantially reduced sample size requirements and achieved good precision, they were applied by others at that time principally to tracing isotopically-enriched compounds in mixtures. In a parallel effort, John's group demonstrated, first in acetic acid and then in long-chain fatty acids, that intramolecular isotopic patterns remember the biosynthetic processes that created the molecules. These breakthroughs not only promised that compound specific isotopic analysis would someday foster a revolution in organic geochemistry, they also revealed the mechanisms for some key reactions employed by synthetic organic chemists!

John joined J. W. Schopf and others in the U.C.L.A.-based interdisciplinary study that, in two sequential campaigns, explored and redefined the geologic record of the Precambrian biosphere. These efforts produced two definitive, award-winning treatises. Under John's leadership, the group reevaluated and augmented the known isotopic record of carbon and sulfur in Precambrian sedimentary rocks. The group contributed a systematic evaluation of the preservation of the record, and it uncovered new evidence for the stepwise oxidation of the Precambrian environment, the simultaneous presence of methane and oxygen in the late Archean atmosphere, and the biogeochemical significance of banded iron formations. John's parallel collaboration with Andrew Knoll's group at Harvard University greatly elaborated the carbon isotopic record of the Neoproterozoic, and documented perturbations in the biogeochemical carbon cycle that perhaps contributed to the Cambrian explosion of biological diversity.

By the late 1980's, renewed efforts by John Hayes' group to develop revolutionary new molecular-level carbon isotopic measurements had attained several major milestones. Teaming with Finnegan Corporation and with major financial support from Chevron, John's laboratory created hardware and novel protocols for analysis and data processing that achieved high precision measurements from subnanomolar quantities of carbon. High resolution capillary GC could now indeed be interfaced with high-precision isotope ratio mass spectrometry. A powerful new dimension had been added to the field of organic geochemistry.

John's substantial contributions to isotopic biogeochemistry reached well beyond his analytical achievements to include new measurements and concepts for interpreting phenomena both in the rock record and in the marine environment. Working with other prominent organic geochemists, John demonstrated how isotopic comparisons between sedimentary porphyrins and bulk organic

Continued on page 16

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carbon could resolve contributions from primary producers and consumers in an ecosystem. This capability revealed the magnitude of isotopic discrimination by the primary producers in ancient environments. His group's pioneering measurements of Cretaceous sediments indicated that compound specific isotopic analyses can clarify important relationships between aquatic biota and their environment. His group's extensive collaborations with other geochemists have begun to realize this potential across a broad spectrum of environments and geologic ages. Isotopic patterns can be related quantitatively to ambient levels of aqueous CO2, and they can delineate molecular contributions by specific populations of algae and bacteria. These developments bode well for biological paleooceanography. Thus it comes as no surprise that John moved to Woods Hole Oceanographic Institution in 1996 to pursue these initiatives and, perhaps, to add novel perspectives using ^{14}C.

John's leadership has included a substantial stewardship to the scientific community. He is or has been a member of the editorial boards of three journals, and he was an associate editor for another. He has served several times as an officer for professional societies. He chaired two Gordon Research Conferences.

Through it all, John also made exemplary contributions to others as an educator. He has written two textbooks. He supervised eleven M.S. research theses, more than twenty PhD. dissertations, and more than thirty postdoctoral associates. The excellence of his mentorship has been formally recognized by Indiana University, and it has been sought recently by Harvard University.

When I enrolled in that mass spectrometry course that was offered by that new professor back in 1970, I met a man who opened vast new perspectives and opportunities for me. John Hayes has done the same for all those students who followed, and he has done it for the field of organic geochemistry. For that, and for so much more, we are eternally fortunate and grateful.

Acceptance of the 1998 Alfred E. Treibs Medal

John M. Hayes

Department of Geology and Geophysics, Woods Hole Oceanographic Institution
Woods Hole, MA 02543

Department of Earth and Planetary Sciences, Harvard University

and, from 1970 until 1996,
Biogeochemical Laboratories, Departments of Chemistry and of Geological Sciences, Indiana University

I am very grateful for David's kind introduction, and I thank you all, ladies and gentlemen, for joining us today. I'm extremely grateful to the Geochemical Society for this award, and would like to reflect briefly on my thoughts.

Our field is compact enough that we know the Treibs medalists as colleagues. In our own work, each of us has experienced both the significance and the difficulty of their accomplishments, and this increases our respect for them. For me now, nothing is sweeter than joining that group.

I'm particularly grateful to those who nominated me. They're probably the same people who did the work for which *I* am now being honored. That turn of events is representative of my good fortune, and I am well aware that my luck is running at levels usually found only in Greek myths. At a time like this, such awareness inspires genuine humility.

It was by luck rather than merit that I was born and raised in this century's fortunate country. I attended public schools and repeatedly encountered good teachers who squandered attention and talent on me and my classmates. I enrolled as a student in chemical engineering at Iowa State University in the Fall of 1958, but soon abandoned engineering and embarked on a rather aimless undergraduate career that featured mainly English and chemistry. I was brought into line when James Lowrie, my undergraduate adviser, commented on my senior honors thesis, which compared 20th century novels from Britain and the United States. He said, "You know, Mr. Hayes, I think you should probably pursue your interests in chemistry!"

Lawrence Bartell, a professor of chemistry in whose labs I had worked as an assistant, wrote a letter that got me admitted at MIT even though I didn't have a regular major in chemistry. I rewarded his risk by failing MIT's qualifying exam in organic chemistry, which was doubly unfortunate because I had decided that I wanted to study under Klaus Biemann, a natural-products organic chemist working on developments in mass spectrometry. It was agreed that Klaus would accept me as a student if I made up my deficiencies in one semester. Even witnesses to those events would probably testify that I began to work then with some energy and diligence.

I got into geochemistry through meteorites and the lunar program. My interest was probably stimulated by childhood experiences in Butte, Montana, where our family lived just down the hill from the mineral museum at what was then the Montana School of Mines. As I entered graduate school, Brian Mason had just published an article on carbonaceous chondrites in *Scientific American*. I suggested to Professor Biemann that I would like to do a Ph.D. thesis on the organic constituents of these meteorites. His first reaction was negative, but the excitement – and the funds – of space research brought him around. In the Biemann labs, new mass spectroscopic techniques were developed in response to specific needs created by research in natural products organic chemistry and biochemistry. Whatever I did with meteorites, I would have to focus on the problems first and on the methods second. Even if this

were the only lesson that I had learned from him, I would still owe my career to Klaus. Within a year, we were participating in small, semi-annual workshops with Harold Urey, Edward Anders, and others who were using the examination of meteorites to prepare for analyses of the returned lunar samples. This immersion in the vibrant controversy and excitement of a rapidly developing field sealed my fate.

Actually, I had been introduced to mass spectrometry and isotopes by Ben D. Holt, a member of the staff at Argonne National Laboratory. I was employed in Ben's lab during the summer before I entered graduate school. In elementary school, I had been one of those kids who saved money in order to buy a particularly good ruler. For some reason, I loved to measure things, and the intricacy of isotopic analyses was extremely attractive. Luckily, I did not become addicted at that point.

Isotopes also came up in my biochemistry class, since metabolic pathways are dissected using isotopic tracers. My instructor pointed out that isotope effects could skew the results of such experiments. At the same time, our meteorite working group was discussing means of reconstructing the origins of organic compounds. *n*-Alkanes were the hard case. These compounds are devoid of structural intricacy but widely distributed. I suggested that it would necessary *only* to measure the abundance of carbon-13 at each position along the alkyl chain. Any pattern would be related to the pathway of synthesis. A biosynthetic product, for example, would have two subsets of carbon positions related to the methyl and carboxyl positions in the acetate that had served as the biosynthetic feedstock. Harold Urey encouraged me, there was a brief discussion of the impossibility of the measurement, and we moved on to considerations of optical activity. I soon discovered that Phil Abelson and Tom Hoering had already measured intramolecular patterns of isotopic order in amino acids and, eight years later, I just about jumped out of my skin when I saw that Eric Galimov, from theoretical considerations, was producing whole maps of intramolecular isotopic distributions.

The Army cut it short, but I had a brief, three-month postdoctoral interval with Ed Anders at the University of Chicago. Ed's example of brilliantly concentrated scholarship provided me with a durable model for the study of geochemical problems, and I have always been grateful that he let me in the door for such a brief stay. After spending a few months in uniform at Fort Sam Houston, Texas, I was assigned by the Army to complete my active duty as a military detailee at NASA's Ames Research Center. When he accepted the Treibs Medal two years ago, Keith Kvenvolden mentioned our overlap there. This was another example of my good luck: not only was I not sent into combat, I was instead sent to work with colleagues like Keith and Sherwood Chang.

I spent a wonderful year as a postdoc in Bristol, not only with Geoff Eglinton, but also with James Maxwell, Colin Pillinger, Harry Draffan, and Paul Abell. James was already a friendly tyrant, and I remember particularly how underwhelmed he was with my writing style. Though we are about the same age, he has always been ahead of me in geochemistry, and I have always sought to meet his standards.

In January, 1970, I took a job as an assistant professor of analytical chemistry at Indiana University. In the Fall of that year, Warren Meinschein got the Department of Geology to offer me a joint appointment. The present Biogeochemical Laboratories at Indiana University, well represented at this meeting and now led by Lisa Pratt, Simon Brassell, and Arndt Schimmelmann, are the evolutionary product of the program that Warren started and which I joined. In fact, it took about a decade for me to make the journey from the physical sciences to the natural sciences, from chemistry to geoscience. It was the field work that tipped the balance. Bill Schopf enlisted me as the organic geochemist in the Precambrian Paleobiology Research Group and sent me into the field with Malcolm Walter and Hans Hoffman to collect samples from the Archean of Western Australia, South Africa, and similar spots. As I kicked the kangaroo turds off rocks that made a geologic hammer ring like a bell, it dawned on me that (a) there might be a contamination problem here and (b) the geologic post office had driven several kilometers of rock across any message that I might want to read. In the labs at Bloomington, we were picking apart molecules in order to measure the intramolecular patterns that I had dreamt about years earlier. Now these guys wanted us to deal with organic material that was just short of graphite. I observed, however, that Malcolm and Hans could stand on those outcrops and extract more information from them than I had ever thought possible. The challenge was clear. How could we, as geochemists, deal similarly with the uncertainties? How could we take whatever record nature had left us and extract from it at least *some* reliable information?

Returning to Bloomington after a year in Earth and Space Sciences at UCLA, I moved gradually from the Department of Chemistry to the Department of Geological Sciences and started to work toward a combination of molecular and isotopic lines of inquiry. It is, I think, the success of that basic idea that underlies this award. We could never have succeeded without two steadfast lines of support: continuous funding from the National Aeronautics and Space Administration and continuous cooperation and encouragement from everyone at Indiana University. All the good ideas in the world would otherwise have come to nothing. I take my hat off to all who sustained those lifelines. Development of our instrumental facilities was also required. After numerous proposals had been turned down, that development was ultimately made possible by funding from Chevron and from Finnigan MAT. In each case the involvement was more than financial. Martin Schoell and I traveled independent routes, geological and chemical, to the concept of compound-specific isotopic analysis (a term which Martin originated). Martin not only got Chevron to support our work, he was the first to apply the techniques to problems in petroleum geochemistry, and he provided invaluable encouragement and advice as we proceeded. Notably, he and Bob Carlson prepared the series of *n*-alkanes that we all use as isotopic standards. At Finnigan, both Karleugen Habfast and Willi Brand provided technical guidance as well as hardware. Since our association began in 1969, and since I have learned so much from him, I regard Karleugen as one of my postdoctoral advisers.

But there was always another member of the team who was even more important to me. As I make a few concluding remarks, I want to ask Steve Studley to come and stand with me. Steve joined the Biogeochemical Laboratories in 1971, so his tenure at Bloomington now exceeds mine. He has written software, built and maintained computers, and built, operated, torn down, moved, and maintained more mass spectrometers than I can count. His excellence shaped our work, making it possible to attempt and to succeed with developments that opened new vistas in organic geochemistry. But his marvelous capability is only part of the picture. He is a superb teacher and has been a consistent and reliable adviser and friend to me and to all of the members of the group. He has maintained our standards of isotopic abundance, technical excellence, and personal integrity. He has *always* been there, and this award is as much his as mine.

Gordon Research Conference on Rock Deformation: Grain Boundaries, Interphase Boundaries, and Surfaces in Rocks

New London, New Hampshire, 8-13 August 1999

Brian Evans (MIT) and Ernie Rutter (Manchester)

A cutting edge is, by definition, the junction of two interfaces. And, interfaces, in general, are regions of transition, turbulence, and mixing. They are sources and sinks for defects, nucleation sites for phase transitions, initial flaws that generate (or suppress) fracture, and surfaces where frictional sliding occurs. They are the sites of reactions, fast diffusion pathways, and regions whose properties vary quite substantially from the bulk material on either side. In both figurative and scientific terms, they are where the action is. During the last 20 years, a remarkable flowering of knowledge about interfaces and surfaces in metals, ceramics, and minerals has occurred. New techniques including electron microscopy, Auger microscopy, and atomic force microscopes allow observation of surfaces and grain boundaries at the atomic scale. Ab initio calculations of interface regions can now be done using realistic potential energy descriptions. As these techniques and descriptions have been applied to mineral interfaces, it has become clear that interfacial properties and mechanisms are critical for understanding geodynamic processes, petrologic reactions, transport properties, and resource recovery.

As you may know, Gordon Conferences are unique in providing structured and unstructured time for discussions amongst the participants. The invited presentations, given by experts in the field, give current overviews of the state of the science and projections into the future of research. Discussions during the sessions can be far-ranging and allow the participants to debate and discuss the cutting edge of research in this area. Afternoons are intentionally reserved for informal discussions. Two poster sessions are designed to allow focused presentations of detailed research results of all the participants.

We have included the schedule for the conference below, and I hope you agree with us that the quality of the speakers is truly outstanding. Applications to the conference are handled by the Gordon Research Committee. Admission to the conference is "first come, first serve" but there is a limit of 130 participants. Thus, it is important for you to fill out the application at your earliest convenience. Encourage others who might be interested to apply early too. Participants who do so receive a discounted rate. You may apply by email by visiting the application part of the main Gordon Conference Site at http://www.grc.uri.edu/apply.htm. We have established a web page for our conference at http://web.mit.edu/mok/www/Gordon . If you would like more information, drop by. We welcome your comments on the web page; send them to the web master, Uli Mok, at mok@mit.edu. You are encouraged to establish links to this web page from other sites. If you have questions please feel free to email to brievans@mit.edu or to Ernie.Rutter@man.ac.uk.

We hope to see you in New Hampshire this August for this exciting conference.

Brian Evans
Ernie Rutter

PROGRAM:
Grain Boundaries, Interphase Boundaries, and Surfaces in Rocks

8 August
Grain Boundaries, Interfaces, and Surfaces
- The Structure of Grain Boundaries and Surfaces in Minerals (Kohlstedt)
- The Importance of Grain Boundary and Surface Processes in Geophysics (Duba)

9 August
Interface Structure: Observations and Calculations
- Atomic Force Microscopy Observations of Mineral Surfaces (Dove)
- TEM Observations of Grain Boundaries (Fitz-Gerald)
- Point Defects and Diffusion in Silicates: Simulations and Experiments (Freer)

The Effects of Surface Properties on Friction and Fracture
- Fluids, Fractures, and Surface Energy (Lockner)
- Surface Adhesion, Asperities, and Friction (T. Tullis)

10 August
Interactions between Fluids and Mineral Surfaces and Interfaces
- Nucleation and growth kinetics of secondary phases on mineral surfaces (Nagy)
- Fluid-rock Interaction, Weathering, Roughness and Fluid Permeability
- The Water/silicate Interface and its Effect on the Transport Properties of Rocks (Pride)

Production of Fluid Seals, CO2 Sequestration and Resource Recovery

Posters: Fracture, Friction, Transport Properties, and Resource Recovery

Summary by Session Chair

11 August
Grain Boundary Diffusion and Migration:
- Mechanisms and Kinetics of Grain Boundary Diffusion (Farver)
- Migrating grain and phase boundaries (Means)
- Grain Size Reduction by Dynamic Recrystallization (de Bresser)

Posters: Diffusion, Recrystallization, Creep and Magmatic Processes

Summary by Session Chair (Dresen)

12 August
Interactions Of Grain Boundaries And High-Temperature Fluids
- Grain Boundary Structure during Pressure Solution and Capillarity-driven Neck Growth (Hickman)
- Diffusion Deformation in Partially Molten Rocks (Dimanov)
- Melt migration and Deformation (Cooper)
- Phase Transformations and Melting: Mechanisms and Kinetics (Watson)

Meetings Calendar

May 26-28, 1999: Geological Association of Canada-Mineralogical Association of Canada Joint Annual Meeting, Sudbury, Ontario. Contact: P. Copper, Dept. of Earth Sciences, Laurentian University, Sudbury, Ontario P3E 2C6, Canada. Tel: 1+705- 675-1151, ext. 2267; Fax 1+705-675-4898; Email: gacmac99@nickel.laurentian.ca

May 31-June 4, 1999: AGU Spring Meeting, Boston, Mass., U.S.A. Sponsor: AGU. Contact: AGU Meeting Department, 2000 Florida Avenue, NW, Washington, DC USA. Tel: 1+201-462-6900; Fax: 1+202-328-0566; E-mail: meetings@kosmos.agu.org; Web Site: http://www.agu.org/meetings

June 13-18, 1999: Gordon Research Conference on Origins of Solar Systems, Henniker, NH, USA; Contact: Alan Boss, DTM-CIW 5241 Broad Branch Road, NW, Washington DC 20015-1305 USA; e-mail:boss@dtm.ciw.edu ; WWW: http://www.grc.uri.edu/

June 20-25, 1999: Conference on Stable Isotopes and Isotope Effects, Carry le Rouet, France. Contacts: Mrs Laurence Boyer DRECAM Batiment 524, CEN Saclay F-91191 Gif- sur-Yvette France, e-mail 'boyer@drecam.cea.fr' Phone 33 (0)1 6908 7038, Fax 33 (0)1 6308 2289; or Dr. Edgar Soulie, secretary of the organizing committee, SCM, CEA Saclay, F-91191 Gif-sur-Yvette, Cedex, France. e-mail bsoulie@drecam.cea.fr' , Phone 33 (0)1 6908 47 37. Fax 33 (o)1 6908 6640

June 21-24, 1999: International Gemological Symposium, San Diego, California. Abstract (poster) deadline: October 1, 1998. Contact: Dona Dirlam, Gemological Institute of America, 5345 Armada Dr., Carlsbad, CA 92008 USA. Tel: 1+760-603-4154; Fax: 1+760-603-4256; E-mail: ddirlam@gia.edu

July 11-16, 1999: Meteoritical Society 62nd Annual Meeting, Johannesburg, South Africa. Contact: W. U. Reimold, Dept. of Geology, University of the Witwatersrand, Private Bag 3, P.O. Wits 2050, Johannesburg, South Africa. Tel: 27 11 716 2946; Fax: 27 11 339 1697 Email: 065wur@cosmos.wits.ac.za

July 18-23, 1999: The Fifth International Conference on Mars, Pasadena, CA, USA; Contact: Arden Albee, Grad. Office, Mail Stop 02-31; California Inst. of Technology, Pasadena, CA 91125, U.S.A.; Tel: +1-626-395-6367; Fax: +1-626-577-9246 ; E-mail: 5thMars99@caltech.edu

July 19-30, 1999: IUGG '99: The 22nd General Asembly of the International Union of Geodesy and Geophysics, The University of Birmingham, UK, Abstract Deadline: January 15, 1999. Will include programs of the International Associations of Volcanology and Chemistry of the Earth's Interior (IAVCEI), Seismology and Physics of the Earth's Interior (IASPEI), Meteorology and Atmospheric Sciences (IAMAS), Physical Sciences of the Ocean (IAPSO), Geomagnetism and Aeronomy (IAGA), Hydrological Sciences (IAHS), and Geodesy (IAG).To receive the Second Circular (May/June, 1998), Contact: IUGG99, School of Earth Sciences, The University of Birmingham, Edgbaston, Birmingham BIS 2TT, UK; Fax: 44121414 4942; Email: IUGG99@bham.acMk.; Web Site: http://www.bham.ac.uk/IUGG99/

Aug. 4-13, 1999: XVIII International Union of Crystallography, Congress and General Assembly, Glasgow, Scotland, UK. Abstract Deadline: March 1, 1999. Sponsors: Glasgow Development Agency, International Union of Crystallography, University of Glasgow, others. Contact: G. Houston, Northern Networking Congress, Central Office, Bellway House, 813 South Street, Glasgow, G14 0BX, Scotland, UK. E-mail: crystal@glasconf.demon.co.uk; Web Site: http://www.chem.gla.ac.uk/iucr99/

Aug. 8-13, 1999: Gordon Research Conference on Rock Deformation: Grain Boundaries, Interphase Boundaries, and Surfaces in Rocks, New London, New Hampshire, USA. Brian Evans (MIT) and Ernie Rutter (Manchester), co-chairs; brievans@mit.edu or Ernie.Rutter@man.ac.uk; http://web.mit.edu/mok/www/Gordon

Aug. 12-20, 1999: 5th International Symposium on the Geochemistry of the Earth's Surface (GES-5), Reykjavik, Iceland; Contact: S.R. Gislason or G. Xander, GES-5 Conference Secretariat, Science Institute, University of Iceland, Dunhagi 3, 107 Reykjavik, Iceland; Tel: +354 525 4800; FAX: +354 552 8911 ;e-mail: ges5@raunvis.hi.is; WWW: http://www.raunvis.hi.is/ges5.html

Aug. 22-25th, 1999: International Association on the Genesis of Ore Deposits (IAGOD) 10th Quadrennial Symposium "Mineral Deposits: Processes to Processing", London, UK; Contact: cjs@nhm.ac.uk; http://www.nhm.ac.uk/mineralogy/course/

Aug. 22-27, 1999: 9th V. M. Goldschmidt Conference, Cambridge, Massachusettes, USA. Contact: Stein Jacobsen, Dept. Earth & Planetary Sci., Harvard University, Cambridge, MA, 02138, USA; tel. 617-495-5233; fax 617-496-4387; e-mail: goldschmidt@eps.harvard.edu; website: http://cass.jsc.nasa.gov/meetings/gold99/

Aug. 22-27, 1999: 4th International Symposium on Subsurface Microbiology,Vail, Colorado. Abstract deadline and discounted registration deadline: March 1, 1999. Contact: American Society for Microbiology. Tel: + 1 202 -942-9248; E-mail: meetinginfo@asmusa.org; Web Site: http://www.asmusa.org/mtgsrc/issm'99.htm

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Sept. 6-10, 1999: 19th International Meeting on Organic Geochemistry, Istanbul-Turkey, Contact: Conference Chairman: Prof. M. Namik Yalcin (TUBITAK Marmara, Research Center, Gebze-Kocaeli, 41470 Turkey); Conference Secretariat: Mr. Cengiz Soylu (TPAO Research Center, Mustafa Kemal. Mah. 2. cad. No. 86, Esentepe-Ankara, Turkey. Tel: +90 (312) 2843490; Fax: +90(312)2843491; E-mail: ogc99@petrol.tpao.gov.tr); Web Site: http:// www.nemrut.mam.gov.tr

Sept. 11-16, 1999: European Research Conference The Deep Earth: Theory, Experiment and Observation, Acquafredda di Maratea, Italy. Contacts: John Brodholt (UCL, London, UK), George Helffrich (U. Bristol, Bristol, UK). To receive first circular, register at URL: http:// slamdunk.geol.ucl.ac.uk/~brodholt/euroconference.html See http://www.edinet-gdp.com/villadelmare/vdm.htm for hotel information.

Sept. 12-15, 1999: Third International Workshop on Orogenic Lherzolites and Mantle Processes, Pavia, Italy. Web Site: http:// www_crystal.unipv.it

Sept. 13-15, 1999: Symposium devoted to the 100th anniversary of Prof. D.S. Korzhinski: Physico-chemical aspects of endogenic geological processes, Moscow, Russia. Contact: Dr.V.L.Rusinov, Institute of Geology,Petrography,Mineralogy and Geochemistry(IGEM), Russ.Acad.Sci., Staromonetnyi, 35 Moscow, 109017,Russia; Fax: 007-095-2302179; Tel: 007-095-2308479; e-mail: rusinov@igem.msk.su

Sept. 21-25, 1999: 3rd International Symposium on Applied Isotope Geochemistry (AIG-3), Orléans, France. Abstract and registration deadline, April 30, 1999. Contacts: Jean-Pierre Girard, Phone: 33 (0)2 38 64 32 15, Fax: 33 (0)2 38 64 39 25; Marie-Odile Gérault, Phone: 33 (0)2 3864 3707; Fax: 33 (0)2 3864 3990, BRGM, 3, avenue Claude Guillemin, BP 6009, F-45060 Orléans Cedex 02, France, E-mail: aig3@brgm.fr.

Sept. 26- 30, 1999: The Society for Organic Petrology (TSOP), 16th Annual Meeting, Salt Lake City (Snowbird Resort), Utah, USA.; Information: Jeff Quick, Utah Geological Survey, 1594 West North Temple, Suite 3110, Salt Lake City, Utah 84114-6100 USA. Phone 801-537 3372; fax: 801-537-3400, e-mail: nrugs.jquick@state.ut.us; http://www.tsop.org

Sept. 26 - Oct. 1, 1999: XIVth International Symposium on Environmental Biogeochemistry (ISEB). Earth System Interfacial Processes from Molecular toGlobal Scale. Huntsville, Ontario, Canada. Contact: Prof. Grant Ferris, Dept. of Geology, Univ. of Toronto, 22 Russell Street, Toronto, ON, M5S 3B1,Canada; E-mail: ferris@quartz.geology.utoronto.ca; http://opal.geology.utoronto.ca/ISEB_XIV/

Sept. 26 - Oct. 1, 1999: Migration '99: Chemistry and Migration Behavior of Actinides and Fission Products in the Geosphere, Incline Village, Lake Tahoe, CA USA; Contact: Migration '99, Dr. Cynthia Palmer, Lawrence Livermore National Laboratory, P.O. Box 808, L-231, Livermore, CA 94551-9989, USA; Phone: +1-925-422-5693; FAX: +1-925-422-2105; e-mail: palmer2@llnl.gov; WWW: http:// www.aer.wsu.edu/migration/migration.html

Oct. 3-6, 1999: Workshop on Alkenone-Based Paleoceanographic Indicators, Woods Hole, MA, USA. Contact: Ms. Virginia (Gini) McKinnon, Dept. of MarineChemistry and Geochemistry, WHOI, MS #4, Woods Hole, MA 02543-2164, USA.; Tel: +1-508-289-2394; Fax: +1-508-457-2164; E-mail: vmckinnon@whoi.edu

Oct. 4 - 6, 1999: 22nd Annual Meeting of the German Working Group of Stable Isotopes (ASI), Gottingen, Germany; Contact: Dr. A. Reineking and R. Langel, Isotopenlaboratorium für biol. u. med. Forschung, Georg-August-University of Göttingen, Burckhardtweg 2, D-37077 Göttingen, Germany; e-mail: areinek@gwdg.de or rlangel@gwdg.de; Tel.: 0049-551-398113 or 398104; Fax: 0049-551-398110

Oct. 25-28, 1999: GSA Annual Meeting, Denver, CO USA, Contact: Becky Martin, GSA Meetings Department, Box 9140 Boulder, CO 80301-9140 USA. Tel: +1-303-447-2020, ext. 164; Fax: +1-303-447-1133. http://www.geosociety.org

November 7-9, 1999: First Latin American Workshop on Reservoir and Production Geochemistry, La Habana, Cuba. Sponsor: The Latin American Association of Organic Geochemistry (ALAGO). Abstract deadline: April 30,1999 Contact: Dr. Jose Orlando Lopez Quintero, Centro de Investigaciones del Petroleo, Washington 169, Cerro - CP 12000 La Habana, Cuba. Tel: +53-7-577309; Fax: +53-7-666021; E-mail: ceinpet@ceniai.inf.cu

Dec. 13-17, 1999: AGU Fall Meeting, San Francisco, Calif., U.S.A. Sponsor: AGU. Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA. Tel: +1-202-462-6900; Fax: +1-202-328-0566; E-mail: meetinginfo@kosmos.agu.org; Web Site: http://www.agu.org

March 26-31, 2000: Organic Solids in Petroleum Production, ACS Spring Meeting, Geochemistry Divisision Symposium, San Francisco, CA, USA. Contact: Dr. B.Artur Stankiewicz, Shell E&P Tech Co., 3737 Bellaire Blvd., Houston, TX 77025, USA; E-mail: artur@shellus.com. Dr. Erik Tegelaar, Baseline Resolution, Inc., 2000 Avenue G, Suite 810, Plano, TX 75074, USA; E-mail: ETegelaar@brilabs.com. Web Site: http://www.acs.org/meetings/future/newsanfran.htm.

March 26-31, 2000: The Integration of Organic Geochemistry and PVT Studies in Petroleum Exploration and Production, ACS Spring Meeting, GeochemistryDivision Symposium, San Francisco, CA, USA. Contact: Dr. Gordon Macleod, Shell E&P Tech Co., 3737 Bellaire Blvd., Houston, TX 77025, USA; E-mail: gmac@shellus.com. Dr. Peter Meulbroek, Woods Hole Oceanographic Institute, 360 Woods Hole Rd, MS#4, Woods Hole, MA 02543, USA; E-mail: pmeulbroek@whoi.edu . website: http://www.acs.org/meetings/future/newsanfran.htm

April 16-19, 2000: Eighth International Symposium on Experimental Mineralogy, Petrology and Geochemistry (EMPG VIII), Bergamo, Italy; Web Site: http://imiucca.csi.unimi.it/~spoli/empg.html

May 30-June 3, 2000: AGU Spring Meeting, Washington, D.C., U.S.A. Sponsor: AGU. Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA. Tel: +1-202-462-6900; Fax: +1-202-328-0566; E-mail: meetings@kosmos.agu.org; Web Site: http://www.agu.org/meetings

June 21-24, June 2000: GREEN3, 3rd International Symposium on Geotechnics Related to the European Environment, Federal Inst. for Materials Research and Testing (BAM), Berlin, Germany; Contact: Dr. Paul H. McMahon, Civil and Environmental Engineering Subject Group, Faculty of Technology, Bolton Institute, Deane Road, Bolton BL3 5AB; E-mail: pm4@bolton.ac.uk; Web Sites: http://www.acs.bolton.ac.uk/~pm4 and http://www.technology.bolton.ac.uk/civils/

July 9-12, 2000: Catastrophic Events and Mass Extinctions: Impacts and Beyond, Institute of Geochemistry, University of Vienna, Austria. Co-sponsored by the Lunar and Planetary Institute, ESF-IMPACT Programme, Austrian Federal Ministry of Science and Transport, Geological Survey of Austria, Vienna Convention Bureau, City of Vienna. Web Site: http://cass.jsc.nasa.gov/meetings/impact2000/

July 12-14, 2000: ACCURACY 2000 - 4th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences, Amsterdam, The Netherlands. Email: accuracy@frw.uva.nl; http://www.gis.wau.nl/Accuracy2000

July 16-22, 2000: ICAM 2000: 6th International Congress on Applied Mineralogy, Gottingen & Hannover, Germany. Sponsors: International Council for Applied Mineralogy, German Mineralogical Society, Commission for Applied Mineralogy, others. Abstract Deadline: September 1, 1999. Contact: ICAM 2000 Office, P.O. Box 510153, D-30631 Hannover, GERMANY. Tel: +49-511-643-2298; Fax: +49-511-643-3685; E-mail: ICAM2000@bgr.de; Web Site: http://www.bgr.de/ICAM2000

July 18-22, 2000: International Association of Volcanology and Chemistry of the Earth (IAVCEI) General Assembly 2000, Bandung, INDONESIA. Abstract Deadline: February 29, 2000. Sponsor: IAVCEI. Contact: Secretariat, Volcanological Survey of Indonesia, Jalan Diponegoro 57, Bandung 40122, INDONESIA. Tel: +1-62-22-772606; Fax: +1-62-22-702761; E-mail: iavcei@vsi.dpe.go.id; Web Site: http://www.vsi.dpe.go.id/iavcei.html

Aug. 6-17, 2000: 31st International Geological Congress, Rio de Janeiro, BRAZIL. Sponsors: International Union of Geological Sciences (IUGS), Brazilian Geological Society, The Brazilian Ministry of Mines and Energy, others. Abstract Deadline: September 1, 1999. Contact: Secretariat Bureau, 31st International Geological Congress. Av. Pasteur, 404, Anexo 31 IGC, Urca, Rio de Janeiro, RJ, CEP 22.290-240, Brazil. Tel: +1 55 21 295 5847; Fax: +1 55 21 295 8094; E-mail: 31igc@31igc.org.br

Sept. 3-8, 2000: Goldschmidt 2000, Oxford, UK. Sponsors: Geochemical Society, European Association for Geochemistry, The University of Oxford. Contact: P. Beattie, Cambridge Publications, Publications House, PO Box 27, Cambridge UK CB1 4GL. Tel: +44 -1223 -333438; Fax: +44- 1223-333438; E-mail: Gold2000@campublic.co.uk; Web Site: www.campublic.co.uk/science/conference/Gold2000/

Nov. 13-16, 2000: GSA Annual Meeting, Reno, NV USA. Contact: GSA Meetings, Box 9140, Boulder, Colo. 80301-9140. Tel: +1-303-447-2020, ext. 164; Fax: +1-303-447-1133; Web Site: http://www.geosociety.org/meetings/index.htm

Dec. 15-19, 2000: AGU Fall Meeting, San Francisco, Calif., U.S.A. Sponsor: AGU. Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA. Tel: +1-202-462-6900; Fax: +1-202-328-0566; E-mail: meetins@kosmos.agu.org; Web Site: http:/www.agu.org/meetings

Sept. 17 - 21, 2001: 7th International Conference on Paleoceanography (ICP7), Sapporo, Japan. Abstract Deadline: March 10, 2001 Co-Conveners: Hisatake Okada (Dept. of Earth and Planetary Sciences, Graduate School of Science, Hokkaido University, Sapporo, 060-0810, Japan. Phone: 81-11-706-3537. Fax: 81-11-746-0394. E-mail: oka@cosmos.sci.hokudai.ac.jp), Itaru Koizumi, and Tadamichi Oba

Nov. 5-8, 2001: GSA Annual Meeting, Boston, MA USA. Contact: GSA Meetings, Box 9140, Boulder, Colo. 80301-9140. Tel: +1-303-447-2020, ext. 164; Fax: +1-303-447-1133; WWW: http://www.geosociety.org/meetings/index.htm

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