THE GEOCHEMICAL NEWS

Quarterly Newsletter of The Geochemical Society

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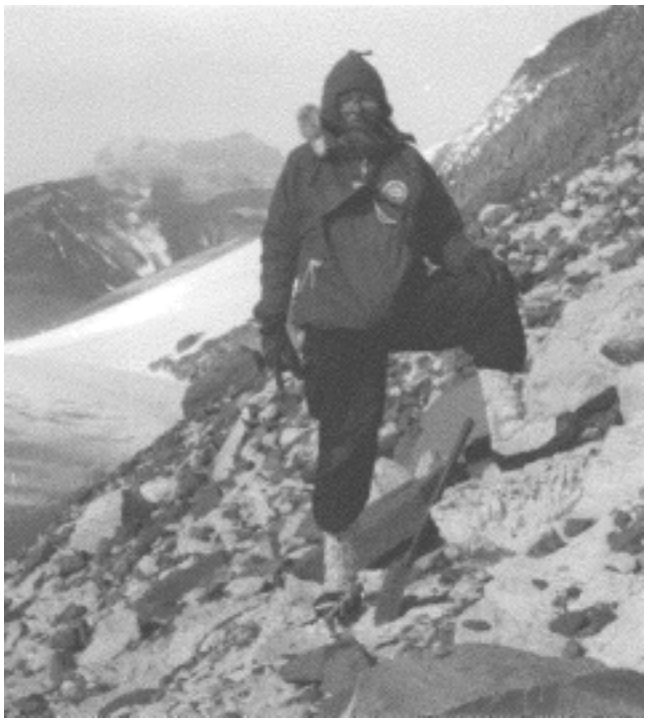

Life Keeps Getting Better

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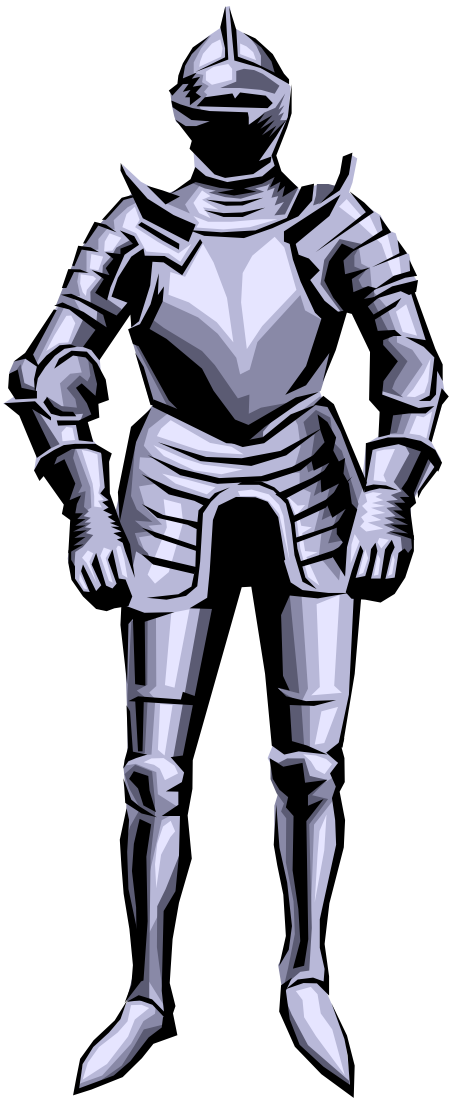

A Portrait of Sir Keith O'Nions

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Goldschmidt 2000
Oxford, U. K.
September 3-8, 2000

http://www.campublic.co.uk/science/conference/Gold2000

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 the journal ***Geochimica et Cosmochimica Acta*** (jointly with the Meteoritical Society); 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 Conference**, 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 American Geophysical Union spring meeting. 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

Happy New Millennium!

Neil C. Sturchio, Editor
The Geochemical News
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President's Corner

Dear Colleagues:

1999 was another great year for geochemistry, capped off by the scientifically-invigorating Goldschmidt Conference in Cambridge, Massachusetts. Our thanks go the local organizers, led by Stein Jacobsen, and to the Lunar and Planetary Institute who provided their usual sterling support. We have a lot to look forward to in 2000, especially the next Goldschmidt Conference, to be held in Oxford, England from September 3-8, 2000. Check http://campublic.co.uk/science or details or contact Keith O'Nions at conference@campublic.co.uk. I encourage all of you to attend what promises to be a fine meeting.

As you know, Frank Podosek will be replacing Karl Turekian as Editor of Geochimica et Cosmochimica Acta, effective January 1, 2000. Frank started receiving manuscripts on October 1, 1999 and the overlap will continue until the last manuscript handled by Karl has been accepted. The Society owes a vote of thanks to Karl for his strong leadership.

The Geochemical and Meteoritical Societies have been fortunate to have attracted outstanding editors to the helm of Geochimica et Cosmochimica Acta, and next Editor is no exception. We are most fortunate that Frank Podosek has agreed to serve. Frank is a broad and deep scholar with significant contributions in low temperature, high temperature, and planetary geochemistry, and is unusually well placed to edit a journal of such breadth. He intends to return to the system of Associate Editors used by Denis Shaw and Gunter Faure, and has a capable international group of scholars to assist him. I welcome Frank to his new role, and wish him the success that I am sure he will achieve in maintaining and improving Geochimica et Cosmochimica Acta as one of the world's pre-eminent earth and planetary science journals.

One of the most important things our Society does is confer awards on its most accomplished members. Awards honor both the individual receiving the award and the Society by pointing to the importance of our field. Please be proactive in nominating individuals for the Clarke, Goldschmidt, Treibs, and Patterson medals of our Society. There are many more deserving candidates than there are opportunities to honor. Pay special attention to overlooked groups, by discipline, gender, age etc.

This is my last message as President of the Geochemical Society. On January 1, 2000, Mike Hochella will take over as President and I will be put out to pasture as past President. The transition should be seamless. It has been my great pleasure to work with Mike over the past two years and I can assur e you that the Society will be in firm, wise hands under his Presidency.

We will also have our first female and also European-based Vice President in the person of Judith McKenzie. This election represents a conscious effort to internationalize the governance of our Society and to increase the gender diversity of its leadership. Becky Lange is incoming Treasurer, and I am sure will fill the shoes of our very capable Don Elthon, who is retiring from trying to stop the President spending money after six years. Thank you, Don, for a job well done.

Best wishes for the New Year and all of 2000. Here's to an outstanding meeting in Oxford!

Mike Drake
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Tucson, AZ 85718 USA
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Geochemical Society Business

Please address all inquiries and correspondence concerning memberships, subscriptions, address changes, and charitable contributions to the Geochemical Society's Business Manager:

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fax: (614) 486-7065
e-mail: geochsoc@pubcon.com

visit the Geochemical Society website
http://www.geochemsoc.org

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(*and thereafter as well, if your library holdsa paid paper subscription to GCA)

Central Oxford , England

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V.M. Goldschmidt Award

The V.M. Goldschmidt Award shall be made for major achievements in geochemistry or cosmochemistry, consisting of either a single outstanding contribution, or a series of publications that have had great influence on the field. The award will normally be given annually at the V.M. Goldschmidt Conference. Current members of the Geochemical Society Board of Directors and past recipients of the award are ineligible for nomination. Nominations should specify the name, address, and chief fields of specialization of the nominee, and be accompanied by a curriculum vitae and bibliography of the nominee, limited to two pages each, and up to three supporting letters. Nominations should also be accompanied by a letter from the nominator giving name, address, phone number, signature, and a brief summary of why the candidate is suitable for the award. Awards are based solely on scientific merit, without regard to citizenship or membership in the Society.

Past Recipients: P.W. Gast (1972), R.M. Garrels (1973), H.E. Suess (1974), H.C. Urey (1975), H.P. Eugster (1976), S. Epstein (1977), G.J. Wasserburg (1978), H. Craig (1979), C.C. Patterson (1980), R.N. Clayton (1981), K.B. Krauskopf (1982), S.S. Goldich (1983), A.O. Nier (1984), J.B. Thompson (1985), C.J. Allégre (1986), W.S. Broecker (1987), H.C. Helgeson (1988), K.K. Turekian (1989), E. Anders (1990), A.E. Ringwood (1991), S.R. Hart (1992), S.R. Taylor (1993), H.D. Holland (1994), R. Berner (1995), A.W. Hofmann (1996), D. Lal (1997), W. Stumm (1998), J.L. Bischoff (1999)

Nominations for the 2000 V.M. Goldschmidt Award should be submitted before December 31, 1999, to:

Dr. Heinrich D. Holland
Dept. Earth Planet. Sci.
Harvard University, 20 Oxford Street
Cambridge, Mass. 02138
USA

Tel: 1-617-495-5892
Fax: 1-617-495-8839
Email: holland @eps.harvard.edu

F. W. Clarke Award

The F.W. Clarke Award shall normally be made annually at the V.M. Goldschmidt Conference to an early-career scientist for a single outstanding contribution to geochemistry or cosmo-chemistry, published either as a single paper or a series of papers on a single topic. Candidates must have held a recognized doctorate or its equivalent for no more than six (6) years, or be not more than thirty-five (35) years of age, whichever anniversary date is later in the year of the nomination deadline. Current members of the Board of Directors and past recipients of the award are ineligible for nomination. The Clarke and Patterson medals cannot be awarded for the same accomplishment. Nominations should specify the name, address, and chief fields of specialization of the nominee, and be accompanied by a copy of the paper(s) for which the nominee is being considered for the award, and up to three supporting letters. Nominations should also be accompanied by a letter from the nominator giving name, address, phone number, and signature, together with a brief statement explaining the significance of the nominee's work. This letter should also specify the nominee's date of birth and final degree received, the degree advisor's name, the year granted, and the name of the granting institution. Awards are based solely on scientific merit, without regard to citizenship or membership in the Society.

Past Recipients: D.A. Papanastassiou (1972), H. Ohmoto (1973), L. Grossman (1974), D. Walker (1975), J.R. Wood (1976), B. Mysen (1977), D.J. DePaolo (1978), A.C. Lasaga (1979), R.W. Potter (1980), J.F. Minster (1981), P.J. Patchett (1982), E.B. Watson (1983), A. Mackenzie (1984), E.M. Stolper (1985), M.D. Kurz (1986), E. Takahashi (1987), F.M. Phillips (1988), R.J. Walker (1990), D. Sherman (1991), E. Klein (1992), Y Zhang (1993), C. Agee (1994), R. Lange (1995), P.M. Dove (1996), J. Blundy (1997), M. Humayun (1998), A.M. Scheidegger (1999)

Nominations for the 2000 F.W. Clarke Award should be submitted before December 31, 1999, to:

Dr. Donald B. Dingwell
Bayerisches Geoinstitut
Universität Bayreuth
Bayreuth, D-95440
Germany

Tel: 49-921-55-3708
Fax: 49-921-55-3769
Email: Don.Dingwell @uni-bayreuth.de

Clair C. Patterson Award

The Clair C. Patterson Award, for a recent innovative breakthrough in environmental geochemistry of fundamental significance, published in a peer-reviewed journal, will normally be made annually at the V.M. Goldschmidt Conference. The award has no age or career stage restrictions, but the Clarke and Patterson medals cannot be awarded for the same accomplishment. Members of the Geochemical Society Board of Directors and past recipients of the award are ineligible for nomination. Nominations should include the name, address, and chief fields of specialization of the nominee, and be accompanied by a curriculum vita of not more than two pages, a list of no more than 10 peer-reviewed publications relevant to the accomplish-ment being recognized, and up to three support letters. Nominators should include a letter of not more than two pages, giving name, address, phone number, signature, and a brief description of the nominee's contribution to environmental geochemistry. Awards are based solely on scientific merit, without regard to citizenship or membership in the Society.

Past Recipients: M.L. Bender (1998), R.L. Edwards (1999)

Nominations for the 2000 Clair C. Patterson Award should be submitted before December 31, 1999, to:

Dr. Malcolm T. McCulloch
Australian National University
GPO Box 4
Canberra, ACT 020
Australia

Tel: 61-6-249-4227
Fax: 61-6-249-5443

Email: malcolm.mcculloch@ucd.ie

Alfred E. Treibs Award

The Organic Geochemistry Division (OGD) of the Society bestows this award, for major achievements in organic geochemistry. A separate nominations call will be announced, and inquiries may be made to OGD Secretary Steven A. Macko, Dept. Environmental Science, University of Virginia, Charlottesville, Virginia 22903, USA (Phone: 1-804-924-6849; Fax: 1-804-982-2137; Email: sam8f@virginia.edu).

Call for Nominations for EAG-GS Geochemistry Fellows for 2000

The European Association for Geochemistry (EAG) and the Geochemical Society (GS) established in 1996 the honorary title of Geochemistry Fellow, to be bestowed upon outstanding scientists who have, over some years, made a major contribution to the field of geochemistry. Existing and new Urey, Goldschmidt and Treibs Medal winners become Fellows automatically. Up to 10 new Fellows will be elected each year. Membership in either organization is not a factor in consideration of Fellows candidates. Current members of the Fellows Selection Committee, the GS Board of Directors, and the EAG Council are ineligible for nomination. Any member of either organization may nominate Fellows by right.

Nominations should include the name, address, telephone number and email address of the nominee, a citation of no more than two pages describing the contributions the individual has made to geochemistry, and up to three letters of support from members of either society, along with the nominator's name, address, telephone number, and signature.

Nominations should be sent no later than December 31, 1999 to:

Dr. Alexandra Navrotsky
University of California, Davis
4440 Chemistry Annex
Davis, California 95616
USA

Tel. 1-530-752-3292
Fax: 1-530-752-9307
Email: anavrotsky@ucdavis.edu

Geochemistry Fellows (excluding Urey, Goldschmidt, and Treibs Medalists)
1996 William Compston, Willi Dansgaard, John Edmond, John M. Hayes, Marc Javoy, Ho-Kwang Mao, Stephen Moorbath, John Reynolds, Jean-Guy Schilling, Nick Shackleton, Mitsunobu Tatsumoto, Werner Stumm, George Tilton, Grenville Turner, Heinrich Wänke, William White; **1997** Philip Abelson, Jan Bottinga, Ian Carmichael, Donald J. DePaolo, Bruno J. Giletti, Tom Krogh, Ikuo Kushiro, Gunter W. Lugmair, Fred T. Mackenzie, Alexandra Navrotsky, Michael O'Hara, Keith O'Nions, Denis M. Shaw, Edward M. Stolper, George W. Wetherill, Derek York; **1998** Thomas J. Ahrens, Francis Albarede, Michael L. Bender, Edward A. Boyle, Eric M. Galimov, John I. Hedges, Miriam Kastner, Yehoshua Kolodny, Charles H. Langmuir, Antonio C. Lasaga, James R. O'Neil, George Parks, James C.G Walker, David Walker, E. Bruce Watson, Bernard J. Wood, Jan Veizer, Ernst Zinner; **1999** Hubert L. Barnes, Gordon E. Brown Jr., C. Wayne Burnham, William S. Fyfe, Nobumichi Shimizu

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Director Candidates for 2000

The Geochemical Society has a 16-member Board of Directors, currently composed of 9 Officer-Directors and 7 Non-officer Directors. Non-officer Directors serving through at least 2000 are R. Keith O'Nions, Alexandra Navrotsky, Everett L. Shock and K. Vala Ragnarsdottir. Non-Officer Directors whose terms expire at the end of 1999 include Lynn M. Walter , Jochen Hoefs and Albrecht W. Hofmann, who is currently serving as an appointee for the unexpired remainder of a former Director's term. By a majority vote of the Board, the Executive Editor of *Geochimica et Cosmochimica Acta* will become an officer-director of the Society beginning January 1, 2000, when Frank Podosek of Washington University, St. Louis, Missouri, USA, assumes this office. Thus, the total number of non-officer Directors will be reduced to six.

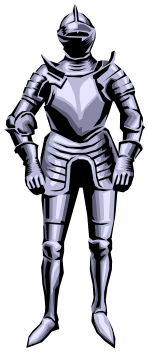
The By-Laws of the Geochemical Society require that its members be notified of the candidates for new Officers and Directors, who are proposed by the Nominations Committee and approved by the Board of Directors of the Society, well before the end of the calendar year in which the current Directors' terms expire. The purpose is to allow the general membership to nominate additional candidates for those positions that are up for election. Please consider the candidates listed below carefully and propose others only if you feel this is in the best interest of the Society. Additional nominations may be made by at least ten (10) members of the Society and the nominees must agree to serve if nominated. **If you are satisfied with the proposed slate of Directors for 2000, do nothing. Additional nominations must be submitted by December 1, 1999**, to the Secretary of the Geochemical Society (Dr. David J. Wesolowski, Chemical and Analytical Sciences Division, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, Tennessee, 37831-6110, USA (Tel: 1-423-574-6903; Fax: 1-423-574-4961; Email: dqw@ornl.gov).

Proposed Slate of new Directors of the Geochemical Society

Thure E. Cerling
Dept. Geology and Geophysics
University of Utah
Salt Lake City, Utah USA

Albrecht W. Hofmann
Max Planck Institut f. Chemie
Mainz, Germany

Keith O'Nions puts on his suit of armor and Sir Ronald Oxburgh enters the House of Lords



On June 12, 1999 the British Queen's Birthday Honours List included the names of earth scientists Keith O'Nions and Sir Ronald Oxburgh.

Keith O'Nions, Professor of the Physics and Chemistry of Minerals and Head of the Department of Earth Science at the University of Oxford, is soon to become a Knight Bachelor for services to the earth sciences. Knighthoods are purely personal honors. They do not give access to things one had no access to before and there are no sums of money associated. Knighthoods date back to the days of Saxon medieval chivalry and are conferred by the Queen via the touch of a sword on the shoulder. Knights Bachelors are not part of a particular order (such as the Order of St Michael and St George, for instance).

In addition, O'Nions will become Chief Scientific Adviser to British Ministry of Defence on January 4, 2000. This is a three-year position in Whitehall and during these three years, the position in Oxford is kept open for O'Nions. He will continue to advise his post-docs and will not move his residence to London. London is about an hour's journey from Oxford by car as well as by train. O'Nions wants to maintain his connection with the lab and the department in Oxford. He will have a car and a driver but intends to commute mainly by train.

Sir Ronald Oxburgh, Knight Commander of the British Empire and rector atImperial College of Science, Technology and Medicine in London received a life peerage. This means that he is now a baron and thus entitled to sit in the House of Lords. The British Parliament consists of the House of Commons into which people are elected and the House of Lords, which is occupied by people who either are hereditary peers or people who are appointed as life peers. If one is offered a peerage and accepts it, one is expected to devote part of one's time to the House of Lords. Quite a number of able scientists end up in the House of Lords.

Oxburgh graduated from the Universities of Oxford and Princeton and taught geology and geophysics at the Universities of Oxford and Cambridge. He was a visiting professor at UCLA at Stanford, CalTech and Cornell University. In May 1996, Oxburgh was appointed to the National Committee of Inquiry into Higher Education in the UK, better known as the Dearing Committee.

The United Kingdom has two well-known Chief Scientific Advisers and several other scientific advisors, such as the Chief Scientist at the Ministry of Agriculture, Fisheries and Food. Sir Robert May is the present Government's Chief Scientific Adviser and head of the Office of Science and Technology. He is on leave from his Royal Society Research Professorship at Oxford and Imperial College in London. Sir Robert May was awarded the 1998 Balzan Price for his work on biodiversity, together with Harmon Craig at Scripps [featured in *The Geochemical News* issue #98, January 1999] and Andrezej Walicki, a historian. Sir Robert May is currently responsible for advising the UK's Prime Minister, Cabinet and President of the Board of Trade on science issues.

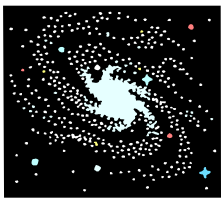
The Council for Science and Technology, on which O'Nions has served since 1998, also advises the Prime Minister on science and technology issues in the UK, for instance with regard to developments and funding of industries and universities, also from a European Union perspective. The Government's Chief Scientific Adviser is Chairman of this Council.

Sir Keith O'Nions will become the Chief Scientific Advisor to the Ministry of Defence. Sir Ronald Oxburgh, who was Head of the Department of Earth Sciences at the University of Cambridge between 1980 and 1988 and President of Queens' College from 1984 to 1989, occupied this post between 1988 and 1993 and was succeeded by Sir David Davies. The so-called "Fairclough Guidelines" which were drawn up in 1990 by the then Government's Chief Scientific Advisor, Sir John Fairclough, state the following about the new position of O'Nions: "The CSA's role is to provide scientific analysis and advice at the highest level within MoD across the whole range of defence programmes, including R&D and equipment procurement. The role also includes initiating and leading the debate of new defence technology issues of the future and overseeing the central scientific staff. Reporting to the Permanent Under Secretary, the CSA is responsible for briefing Ministers, Chiefs of Staffs and Permanent Under Secretary in connection with these roles. The tradition of filling the post from outside the MoD emphasises the need to retain a broad external perspective on all scientific issues that can affect defence."

O'Nions was born in Birmingham on September 26, 1944. He received a B.Sc. in Geology from the University of Nottingham in 1966, then emigrated to Canada where he gained a Ph.D. from the University of Alberta at Edmonton. He moved back to Europe in order to take up a post-doc position in Oslo and subsequently was Demonstrator and then Lecturer in Geochemistry at the University of Oxford between 1971 and 1975. In 1975, he became Professor of Geology at Lamont-Doherty Geological Observatory. He accepted the post of Royal Society Research Professor in at the University of Cambridge in 1979. In 1995, he moved to Oxford where he became Professor of the Physics and Chemistry of Minerals as well as Head of the Department of Earth Sciences. He has served on numerous committees and in many professional associations and has been rewarded with many honors. He became for example a Fellow of the American Geophysical Union in 1979, when he also received the J.B. Macelwane Award. He became a Fellow of the Royal Society in 1983. In 1995, he was awarded the Arthur Holmes Medal by the European Union of Geosciences and the Lyell Medal by the Geological Society of London. He has been a member of the UK Natural Environment Research Council since 1981 and of the UK Council for Science and Technology since 1998. He has authored or co-authored close to 200 publications. O'Nions is a Director of the Geochemical Society (*see the interview beginning on p.10*).

Angelina W. M. G. Souren
Vrije Universiteit, Amsterdam

ISSOL '99 A Smashing Success



The 9th ISSOL Meeting/12th International Conference on the Origin of Life was held July 11-16 at the University of California, San Diego campus. Co-sponsored by the International Society for the Study of the Origin of Life (ISSOL) and the NASA Specialized Center of Research and Training (NSCORT) in Exobiology, U.C. San Diego, ISSOL '99 brought together several hundred scientists from a broad range of disciplines. During the week-long event, current results were highlighted in 17 overview lectures, 75 oral and 151 poster presentations. Professor Jeffrey Bada of the Scripps Institute of Oceanography and NSCORT chaired the local organizing committee.

The meeting addressed fundamental questions concerning where and how and in what form life originates. Presentations were broadly grouped in to four categories: (1) Organic carbon on the early earth before life; (2) Identification of the most primitive life forms, alive or in fossil records; (3) Catalysis and replication of RNA and its components; and (4) The search for extraterrestrial life. A mid-week, public lecture by Dr. Freeman Dyson prompted many questions from conference attendees and members of the local community. The talk, "Gravity is Cool: Or, Why Our Universe is Hospitable to Life", reflected the conference's perspectives of the possibilities for life's origins in many venues and was one of the highlights of the meeting.

In the first talks of the week, experimental simulations, theoretical modeling, and direct observation of interstellar materials provided three complementary approaches to address the sources and inventory of organic compounds on the pre-biotic earth. Many talks focused on laboratory creation of simple organic molecules, such as the nitrogen-bearing compounds produced though the interaction of volcanic gases with electric discharge (Rafael Navarro-González). George Cody presented a profusion of organic pathways observed in laboratory hydrothermal systems with or without mineral catalysts. Art Weber described effective catalysis of organic compounds in the formation of amino acids thioesters for prebiotic peptide synthesis. Characterization of organic compounds in meteoritic samples (George Cooper) and in interstellar media (Pascale Ehrenfreund) was also presented. Cometary sources of organic compounds was shown to be a viable possibility through a series of laboratory shockwave studies conducted by Blank and colleagues in which amino acids in an aqueous ("cometary") medium survived an impact and polymerized in the process. Entiameric excesses observed in meteorites and the origin of chirality (Sandra Pizzarello, Jeremy Bailey) were other well-represented topics.

The second theme of the meeting addressed the search for the most primitive life form on earth and the last common ancestor on our evolutionary tree. Two principal methods were used: direct study of whole organisms (fossil as well as extant life forms) and genome mapping. Primitive life forms in the fossil record (Manfred Schidlowski, Frances Westall) provided evidence of well-established microbial diversity in the early Archean. Bacteria and yeast cultured from >3 Ma Siberian permafrost horizons (Vladimir Dmitriev) had many of the functional characteristics of present-day organisms. Species evolution has been shown to differ from gene evolution, however. Steven Freeland summarized three processes that control the evolution of the genetic code: selection (i.e., protein error, as point mutations, mistranscription, or mistranlsation), chemistry (possible evolution of coded proteins through direct molecular interaction between RNA and amino acids), and history (a subset of the code may be pre-biotic). The genetic code carries with it a record of its own evolution, which we are in the early stages of deciphering. The tree of life as deduced from genome mapping is more web-like than tree-like and involves lateral transfers of information between branches (Karen Nelson, Eugene Koonin).

A significant number of Thursday presentations focused on the functions of RNA. The RNA World hypothesis is the notion that at some period during the early history of life, perhaps immediately preceding the advent of life related to the phylogenetic tree we now use based on DNA, RNA molecules performed the dual functions of genetic storage and enzymatic catalysis. The possibility that RNA can function in both of these capacities was demonstrated with the discovery of catalytic RNA in the early 1980's, and since then the number of chemical reactions that RNA has been shown to catalyze has increased steadily and with it the likelihood of an all-RNA metabolism.

The final day of the meeting focused on the search for extraterrestrial life. Ben Clark spoke of the potential for planetary interchange of biologic materials and argued that near-surface, lithic fragments are the only likely hosts of such materials that would be able to survive launch, interplanetary travel, and delivery. Gene MacDonald outlined selection requirements for candidate organic biomarkers used to indicate the presence of life and suggested we expand our classical choices (amino acids, purines, membrane components) to include osmolytes and other low water-activity products. John Rummel discussed the potential for hydrothermal energy-supported life on Europa and the future probe explorations proposed for 2003 and beyond. The meeting ended on a bright note, with predictions of discoveries that the Mars Polar Lander (Dec '99) and Europa Explorer (2003) expeditions may reveal in the search for exogenous life.

The meeting concluded with an awards banquet at the Torrey Pines Hilton Hotel in La Jolla. Molecular biologist Alan Schwartz (University of Nijmegen, the Netherlands) received the 2nd H. C. Urey Award for "sustained excellence in his research program dedicated to the study of the origin of life". Four new ISSOL Fellows were elected: Andre Brack (CNRS, France), Graham Cairns-Smith (University of Glasgow, Scotland), Sherwood Chang (Emeritus, NASA/Ames Research Center, USA), and Vitalii Goldanskii (NN Semenov Institute of Chemical Physics, Russia). Anthony Keefe (Harvard University Medical School) received the award for the best poster presentation.

For the complete list of presenters and abstract titles of the 9th ISSOL conference, see: http://exobio.ucsd.edu/science.htm. The 10th ISSOL meeting will be held in 2002 in Mexico City.

Jen Blank
Dept. Geology & Geophysics
University of California, Berkeley

The Geochemical Society

Abbreviated Minutes of the Board of Directors Annual Meeting

The meeting was convened at the Sheraton Commander Hotel in Cambridge, Massachusetts, USA on August 22, 1999 and came to order at 10:20 AM

Present: Mike Drake (President), Mike Hochella (Vice President), Don Elthon (Treasurer), Dave Wesolowski (Secretary), Ross Taylor (International Secretary), Scott Wood (Special Publications Editor), Mike Lewan (OGD Chair), Steve Macko (OGD Secretary) Al Hofmann (Director), Lynn Walter (Director), Keith O'Nions (Director), Alexandra Navrotsky (Director), Vala Ragnarsdottir (Director), Neil Sturchio (Newsletter Editor), Mark Bloom (Website Coordinator), Lee Mobley (Business Manager), Mabel Peterson (GCA Manuscript Manager), Karl Turekian (GCA Executive Editor), Frank Podosek (GCA Editor-elect), Stein Jacobsen (representing 9th V.M. Goldschmidt Conference Organizing Committee), Hubert Staudigel and Charles Langmuir (representing GERM electronic journal), Giulio Ottonello (Geochemical Society of Italy), and Yukihiro Matsuhisa (Geochemical Society of Japan.

Treasurer's Report: Don Elthon reported that the liquid assets of the Society, as of 12/31/98 were $492K, and that there has been a steady growth in assets over the last five years. In addition to the traditional investment of reserves in certificates of deposit, an account was opened in 1998 with Solomon Smith Barney, with a balance of $258K as of 6/27/99, invested in conservative stocks, bonds and money market vehicles. Elthon estimates our year 2000 expenditures at approximately $144K, and income of $111K from dues, GCA royalties, interest, thus projecting a modest budget deficit. Recent significant increases in expenditures include the Business Office operation, student travel support for the Goldschmidt Conferences, the Newsletter, website development, and support of GS-sponsored meetings other than Goldschmidt.

Current and Future Goldschmidt Conferences: Stein Jacobsen reported that 660 abstracts had been received for the 1999 conference in Boston, and that approximately 600 registrants were expected. At this level of attendance, the conference budget was expected to achieve close balance between expenditures and registration fee receipts. Keith O'Nions reported that planning was well underway for the 10th conference in Oxford, U.K., Sept. 3-8, 2000. They are planning for a maximum attendance of 1200, and are hoping to identify substantial lodging at Oxford Colleges at reasonable rates. Mike Hochella, reported that initial planning is also well along for the 11th conference in Roanoke, Virginia, USA, in late May of 2001. The site of the meeting will be the Roanoke Hotel and Conference Center, owned and operated by Virginia Tech University, which has lodging and facilities for 500 to 1500 participants in up to 13 parallel sessions. This conference will be co-sponsored by the Mineralogical Society of America, in addition to GS and EAG. Al Hofmann reported that the EAG Council has approved a proposal, by Alex Halliday and Rainer Wieler of ETH Zürich and Jan Kramers of the University of Bern, for the 2002 conference to be held in Davos, Switzerland.

International Secretary's Report: Ross Taylor reported that he is serving as GS representative to the IGC meeting in Rio de Janeiro, Aug. 6-17, 2000, and that GS will co-sponsor 5 special and 9 general symposia. The Board then heard presentations by Giulio Ottonello of the newly-formed Geochemical Society of Italy and Yukihiro Matsuhisa of the long-established Geochemical Society of Japan (1150 members), which included suggested interactions with GS and EAG, and the possibilities of these countries hosting future Goldschmidt Conferences. The Board approved a motion requesting a proposal for a Goldschmidt Conference in Japan in the near future. The Board also discussed the possibility of co-sponsoring a smaller, topical symposium or workshop jointly with the Geochemical Society of Italy.

The Geochemical News: GS newsletter Editor Neil Sturchio discussed the expenses associated with production and mailing of the newsletter, suggesting that perhaps biennial publication would be more cost effective. The Board, however, expressed strong support for continuing quarterly production, praising Sturchio for the many improvements in the newsletter, including substantive articles, interviews with prominent scientists, and revenues from paid advertisements. Sturchio reported that the newly established board of Associate Editors are contributing significantly to the newsletter. There was some discussion of the possibility of EAG co-sponsoring the newsletter.

Special Publications and RIM&G: Editor Scott Wood reported that SP#6, dedicated to Joe Boyd, is now in print, and that manuscripts are due at the end of September for SP#7 in memory of David Crerar, reporting that Princeton University is contributing $2,000 to the production cost. Mike Hochella reported that planning was well under way for a future issue of the newly established *Reviews in Mineralogy and Geochemistry* Series (joint with MSA, and a follow on to MSA's Reviews in Mineralogy series) devoted to surface chemistry. Scott Wood presented a proposal by Randy Cygan of Sandia National Laboratories, USA and Jim Kubicki of Penn State University, USA, for a workshop and RIM&G volume related to molecular modeling theory and applications in the geosciences, with the workshop to be held in conjunction with the 2001 Goldschmidt Conference. Wood also presented a proposal for a new Special Publication dedicated to Werner Giggenbach. Decisions were deferred on these proposals, pending more detailed budget information and the establishment of a clear policy for the future of the Special Publication series, which has heretofore not sold well.

GS Business Office: Business Manager Lee Mobley discussed the demographics of the Society Membership and offered suggestions for increasing membership, which is holding steady at around 1500 worldwide, and improving member services. As a result, a letter is being sent to geoscience departments worldwide, encouraging increased student membership. Students are currently offered heavily GS-subsidized membership ($5) and

GCA subscription ($45) rates, relative to the professional rates ($25 and $122, respectively). Establishment of an institutional membership category was discussed but no decisions were made. The Board voted to set 2000 membership dues and GCA subscription costs for professional and student members at the same rate as 1999. Mobley then informed the Board that she would not submit a proposal for the continuation of the Business Office in Columbus, Ohio, USA. The Board then voted to authorize funding for the Geochemical Society business activities to be moved to St. Louis, Missouri, USA, and to be managed by Frank Podosek in conjunction with the GCA Editorial Office at Washington University.

Geochimica et Cosmochimica Acta Karl Turekian and Mabel Peterson reported that the journal remains healthy and the quality of papers remains high, and that GCA has approximately the same rejection rate and time from manuscript receipt to acceptance as other high quality scientific journals. Turekian reported that indexes for the 1997 and 1998 volumes have now been published, and the index for the 1999 volume will appear in the last issue of the volume, as in previous years. Two special issues, in honor of Werner Stumm and Claude Allègre, will appear in the 1999 volume, with the Stumm issue appearing in two parts due to the large number of excellent papers received. Turekian suggested that due to the increasing quality and coverage of the GS newsletter, some items might be transferred from GCA to this vehicle, such as citations and responses, memorials and book reviews. Finally, Turekian indicated that after October 1, 1999, new manuscripts will be handled by Frank Podosek, who assumes the Executive Editorship officially on January 1, 2000. Podosek then reported that negotiations were underway with Elsevier regarding staffing of the new Editorial Office at Washington University, that the current seven-member Editorial Advisory Board will be dissolved on December 31, and that a panel of up to 50 Associate Editors will be used to distribute manuscripts to expert reviewers in their respective areas and to make publication recommendations to the Executive Editor. Podosek has established a website URL, gca.wustl.edu, containing information for contributors, and will encourage electronic submission, review and editing of future manuscripts. Podosek then discussed the desirability of offering back-issues of GCA to GS member/subscribers on CD-rom, and a motion was approved empowering him to pursue this further.

Geochemical Society Website: Mark Bloom reviewed the current capabilities of the GS website, as well as the technical aspects of the server, software and internet connection, which is currently shared with the Mineralogical Society of America. The Board voted to approve the relocation of the website responsibilities to Washington University, to be managed by Frank Podosek as part of the GS business activities.

Electronic Publications: Charles Langmuir and Hubert Staudigel reported on the status of the new all-electronic publication, G^3 (which stands for Geophysics, Geochemistry, and Geosystems) which is co-sponsored by the American Geophysical Union (AGU) and GS, although GS has not provided financial support for the development of this new journal. Langmuir indicated that nine papers are currently in review and that 250 to 300 papers per year are anticipated. Langmuir reported that the all-electronic journal will feature rapid publication, low cost, and the ability to publish large data sets that are directly accessible, video and three dimensional material, color figures with rotation and animation, and direct electronic links to future addenda, comments and replies. Langmuir invited the Society to consider providing financial support for start-up costs and/or becoming co-publishers of the journal, but no decisions were made at the meeting. Scott Wood then briefly discussed another electronic journal, *Geochemical Transactions*, which is sponsored by the Geochemistry Division of the American Chemical Society and will be published by the Royal Society of Chemistry. The GS is supporting the development of this journal by appointing a GS member to the Editorial Board, currently Scott Wood.

Miscellaneous Items: The possibility of publishing abstracts of future Goldschmidt Conferences in GCA was discussed, but no decision was reached. The Board approved a motion to establish an Executive Committee of the GS, composed of the current President, Vice President, Past President, Treasurer and Secretary, which is empowered to make business decisions and to authorize non-recurring expenditures between meetings of the full Board of Directors. Finally, the Board voted to approach EAG with the suggestion that the chair of the GS Goldschmidt Award Committee serve as an ad hoc member of the EAG Urey Medal Committee, and similarly that the chair of the GS Clarke Award Committee serve on the EAG Houtermans Medal Committee, and finally that the chairs of the respective EAG committees would serve as ad hoc members of the GS committees.

The meeting adjourned at 5:45 PM.

David J. Wesolowski
Secretary, The Geochemical Society

Special Offer for Special Publications

The Geochemical Society publishes a series of high-quality, reasonably-priced *Special Publications*. The Geochemical Society is now offering the entire six-volume set at the special reduced price of $100, including shipping and handling. This price is available (through March 1, 2000) to members, non-members, and institutions and represents a significant savings over the current list price of US$215 for non-members and institutions and US$165 for members for the six-volume set. I hope that you will take advantage of this offer to add these handsome, useful volumes to your personal bookshelf. Perhaps more importantly, I encourage you to suggest that your institutional library purchase these volumes for their collection. Purchase of these volumes by your library will help ensure that they get into the hands of students and professional geochemists, and that the Geochemical Society will be able to continue to provide the important service of publishing such volumes in the future. See p. 26 for more information.

Scott A. Wood
Editor, Special Publications

A Portrait of Professor Sir Keith O'Nions

The following article is the result of conversations between Keith O'Nions and Angelina Souren (representing *The Geochemical News*), that took place at various locations in Oxford on September 8, 1999.

Introduction

It will be instantly evident to anyone who meets Keith O'Nions: here's a guy who really enjoys what he does. A pragmatist with a good sense of humor and plenty of energy. He sprints up and down the staircase at the Department of Earth Science, dashes into the truly remarkable Museum of Natural History next-door to show off the location of the poster session for the Goldschmidt 2000 Conference, and jokes easily with his co-workers. His office is simple and functional. Well-organized, with little clutter. A photograph here, some papers there. Behind his desk, two rows of books - an occasional geology text but mainly physics and chemistry publications - are within easy reach and span the width of the room. Above the books, less easy to reach, is a third row with folders and binders. Stacks of *GCA* and *EPSL* occupy low shelves elsewhere in the room. Cabinets with slide archives and other items also indicate that things are kept pretty much under control in this office.

O'Nions was born in Birmingham on September 26, 1944. His father was a printer and while neither of his parents had a university education - nor did anyone else in the family - they all saw the merit of education and encouraged him. In those days in post-war Britain, getting good grades and passing exams for Grammar School at age 11 was very important. O'Nions is married to Rita whom he met in Grammar School. The couple has three daughters. The eldest daughter is director of an Art Council dance centre. Lindsay, the middle one, graduated in modern languages (French and Italian) and has just returned from Japan where she spent a year teaching after she finished her studies. The youngest daughter is doing research in molecular biology.

O'Nions's professional career was significantly influenced and shaped by several people: Geoff Brown who was his science teacher in Birmingham, Roger Morton who taught him everything about field geology, Halfdan "Bud" Baadsgaard who was one of his Ph.D. advisors, Knut Heier and David Vincent, Wally Broecker, and Ron Oxburgh. His long-term research interests have been in isotope geochemistry, particularly to use isotopes in the study of oceanic and continental crust to investigate the origins of continents and the times of their formation. Among his present interests is the 30-40 Ma record of changes in palaeo-ocean circulation that is recoverable from ferromanganese sediments in the oceans. One of his greatest pleasures is seeing former students and post-docs succeed in geochemistry. Examples of people who put a smile on his face in this context, are Jo Hamilton who is currently Deputy Chief of CSIRO Petroleum in Australia, Steve Goldstein who's at Lamont-Doherty Earth Observatory, John Stone who teaches Cosmogenic Isotope Geochemistry at the University of Washington, Don Porcelli who's an associate scientist at CalTech and David Hilton, currently an assistant professor at Scripps Institution of Oceanography.

O'Nions first learned of the knighthood through a letter informing him that he was going to be proposed to the Queen, as a suitable candidate for a knighthood. The knighthood was made official a few weeks later, on June 12. On July 6, the UK's Defence Secretary announced the appointment of O'Nions as Chief Scientific Adviser to the British Ministry of Defence.

About the knighthood

AS: *What happens at the knighthood ceremony? When is it taking place? What is its significance for geochemistry?*

RKO: Well, this is all still hearsay of course, but apparently, as a male getting a knighthood, you still kneel before the Queen. And she then places the sword on the shoulder. Apparently, women don't get knighthoods; they can become dames and they don't have to kneel. I think it will happen in late November.

But you don't get a little brown envelope with 50-dollar bills in it. There is something on a ribbon, I believe, a medal. It is only a personal honour, has no wider significance. The main thing I've noticed so far is that a lot of people have started calling me Sir Keith, instead of just Keith. But the undergrads don't care about that at all and still just call me Keith, which I think, is great.

About his career

AS: *How did you end up in earth science?*

RKO: I was always very attracted to physics and chemistry, but when I was at school - I think I was fourteen years old - I found Arthur Holmes's Principles of Geology in the school library and read it and was captivated by it. Really the most beautifully written treatises on physical geology. So I got very interested in the subject, collected fossils and minerals and so on. By the time I was leaving high school, I really wanted to do geology. It was a relatively easy step after that to go into geochemistry or geophysics, because I was fairly well inclined in those directions anyway. The obvious thing was to do something like geochemistry or mass spectrometry, which combines a fair amount of physics and chemistry with the earth.

I never met Arthur Holmes, by the way. Which is a pity, because it was really the quality of his writing and presentation that attracted me into the subject. There are a good many other books that one comes across in the earth sciences, which are the biggest turn-off you can imagine. It is interesting how one is so influenced by one's very first encounters.

AS: *You did fieldwork in Norway several times, for instance together with Jacques Touret at whose department I did my Master's. You also worked in Norway for a while. What's your connection to Norway?*

RKO: When I was an undergraduate at Nottingham, I did some fieldwork in South Norway with Roger Morton. I graduated in geology, having done geology and physics and then went to Canada to do a Ph.D., on a sheer whim. I was always interested in going to North America. I was just writing my finals when I saw an advertisement from the University of Alberta and I just thought, "I'll do it!" So I wrote to them, asked if they could offer me a scholarship and so on. I emigrated to Canada, to the University of Alberta in Edmonton. I did my Ph.D. and stayed for a one-year post-doc.

The thesis work was in geochronology, on a field area in South Norway. Geochronology was important in the 1960's, but it rapidly became fairly boring. However, at that time it was rather important for studies of metamorphic cooling and so on. I worked on a field area that I'd had an acquaintance with, as an undergrad at Nottingham, through Roger Morton, who was doing field geology there and then moved to Canada, to a professorship at the University of Alberta. Most of my real knowledge of field geology - which is not bad for a geochemist! - came from Roger Morton.

Jacques Touret, who's a fluid inclusion specialist in Amsterdam these days and with whom I've spent time in the field, was also very helpful to me. I met him when I was an undergraduate doing my field mapping. I was absolutely awe-struck by Jacques Touret and his beautiful French accent. He had a little Citroën deux-chevaux, with a jeep-type body on it, and he drove this thing from France through Sweden to Norway. But I was so impressed, because he knew the names of rocks and could recognise them, describe them and also appeared to understand them.

The way I actually got to work in Norway as a post-doc was via Knut Heier, who had just returned from the ANU in Canberra and became the director of the Mineralogical Museum in Oslo. He was my external examiner on my Ph.D. and he offered me a post-doc in Oslo. It was a very nice post-doc; it was called Unger Vetlesen Postdoctoral Fellowship, which was only available for Americans and Canadians. It was paid in US Dollars and I qualified because I was a Canadian Immigrant.

The interesting thing is that just before I left Canada in 1970, I had a letter from David Vincent who was the professor of geology in Oxford. I'd had some correspondence with Oxford because I was hoping to get a post-doc there. He wrote me a letter and offered me a junior teaching position; it was called 'demonstrator'. That now is 'called assistant lecturer'. Anyway, he offered me this teaching position, completely out of the blue. This was only a couple of days after I'd accepted to go to Oslo. Obviously, a job in Oxford is clearly better than a post-doc in Norway, but back then I thought, "Well, I can't be unethical about this. I've accepted this position in Oslo and that's it." So I wrote back to Oxford, "Very nice of you to offer but I've accepted a position in Oslo so I must refuse." I got a letter back from Oxford that said, "Well, that's fine, we understand, but on your way to Oslo, why don't you just visit the department here in Oxford to say hello?" I did that and it was clear that they knew Knut Heier very well in Oxford, because he'd been a post-doc there in the 1950's, with Ross Taylor and all these people. So Rita and I went to Norway and after a few days, Knut Heier called me in his office and said, "Listen, you got a two-year post-doc here but I've been talking to David Vincent; we're very good friends. We think it would be much better for your career if you stay here six months and then take that job in Oxford." During those six months our first daughter was born and we carted our baby off to England. Things were like that in those days. It is very nice to have people concerned about your career, in a very unselfish manner. I have this enormous gratitude both to Knut Heier and David Vincent (who's now 80 years old). That's the extent of the Norwegian connection.

From 1975 to 1979 I went to Lamont. With three small children, the youngest one of which was only three months old. We had loads of luggage and we went to New York on the Queen Elizabeth II, because we could take the baby in the pram and the luggage. In 1975 it still cost about the same to go by ship as it cost to go by plane. So we arrived in New York and Wally Broecker came to meet us in the Geochemistry Panel (van), as they called it - it was basically an old wreck. I think we arrived on July the 5th, because I remember we spent July the 4th on the boat. Wally is an exceptionally generous man and comes down to the dock in New York to meet us. I can see Wally Broecker at the docks, while we're standing with the three kids and a great big heap of luggage. There are signs everywhere saying, "The porters are free. Do not tip the porters." It's the porters' job to get your luggage, then to take you to passport check and off the boat. I see Broecker down there... and this red-capped porter comes along and says, "How much are you gonna give me to move your luggage?" I thought, "Uh-Oh. Here we are. New York. It says that they are free and not to tip them, but it's probably a bit corrupt here." So I thought, "I will have to offer quite a lot of money". Remember, this was 1975. So I say, "I'll give you twenty dollars". He looks at me and says, "Forget it!" And walks away. And eventually, it costs me sixty dollars to get my luggage from one end of the quay to the other!

About janitors, carpenters and life in general

AS: *Who was Louis? I've heard that whenever you went back to Lamont, Louis would be the first person you went to see and sometimes the only person you would see.*

RKO: Louis was a janitor, a PuertoRican, I think. He became the janitor of Geochemistry. He was one of these naturally able people but in a formal sense was not highly educated. He was a natural leader and he immediately took control of Geochemistry. Working at 5 o'clock in the afternoon, cleaning until midnight, he controlled everything. Very funny guy. He really adopted all the young people and everybody went to Louis for help - even Wally. He became a part of the greater Geochemistry family. Geochemistry at Lamont always had an independent air, tended to take a different and unconventional view compared to the rest of Lamont. Mostly because Wally Broecker is rather different. Having a janitor who was almost a godfather was really completely in concert with the way Broecker ran Geochemistry in those days. Louis was so well-loved by everybody. When I left Lamont, one of the

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great disappointments was to leave Louis behind. Just after I left, they got contract janitors in at Lamont and Wally promptly appointed Louis as a member of the scientific staff. Louis retired about four years ago and they all organised a surprise retirement party for him. People flew back from all over the world, from as far away as Australia to go to the retirement party of the janitor at Geochemistry. He was marvellous. He'd always find a beer in the cupboard or in a drawer. He was an absolutely wonderful guy.

Another extremely interesting person I met while I was there was a guy called Rusty Williams. Rusty Williams had got a B.A. in History. I think his father had been a carpenter and he therefore also had carpentry skills. So I hired him at Lamont as a carpenter to build my labs and he eventually became a member of the Lamont Buildings and Grounds staff. This guy had the most outrageous sense of humour. He was absolutely hilarious. He was in control if you like of the comedy side of the Geochemistry as Louis was in control of the other. So Geochemistry, during the years I was there, had two major figures who between them created a rare cultural environment. One was the janitor and the other was the carpenter, a véry intelligent man. Sadly, Rusty Williams died of cancer just a few weeks ago. But this guy was also a part-time cop and one day... - he had a bizarre sense of humour, absolutely bizarre - I walked into his office and he produced a gun! He pulled a gun out on me, like this, and he pulled the trigger... Anyway, it clicked. And he said, "It's okay, you were quite safe. Look, the bullet was in the next one." That was his sense of humour. He was the only person I knew in the 1970's, in America, who thought Monty Python's Flying Circus was the funniest thing in the world. That humour was a bit too early for most Americans. He was absolutely hilarious. It's very sad that he just died but at least Louis is still around. Louis lives down in New Jersey and does a bit of venture capital work, so to speak.

I really had a charmed career. I mean, I've been in good places, had a good time, but I think probably, of all the places I've been, Lamont was the most exciting. This was simply because it was the first complete Lab I built by myself. I was there with a bunch of other people, such as Jo Hamilton who is now in Australia and Norm Evensen who is up in Toronto and we just had this fantastic time with really bizarre characters like Louis and Rusty plus this rather anarchic Geochemistry group run by Wally. It was a very warm and welcoming environment. It had very few rules, compared to most University structures. It was successful, socially, scientifically, and was probably the most special time of my career. You know, I left there in '79 and went to Cambridge, but I've always felt a great deal of warmth for Lamont. One of those places that I've always enjoyed going back to.

About fieldwork and adventures in Africa

AS: Do you like fieldwork? Do you still get into the field?

RKO: I do. I adore it. Because I have had this interest in geology from an early age, I knew lots of names of minerals, rocks and fossils and that sort of stuff. But if I have a reputation at all in science, it is really as a geochemist in mass spectrometry and it sometimes comes as a shock to people when I go in the field and identify things. I was actually very well trained as a field geologist. I still do go out into the field but in a different capacity, not in terms of doing proper field geology, of course. For example, I'm going to Iceland next week and I've been in China in the summers of 1998 and 1999, collecting loess. I did teach the first-year geological field trip here in Oxford a couple of years ago. In the 1980's, I was working in Northwest Scotland with Mike O'Hara, a well-known petrologist. It was actually wonderful to be in the field with a really first rate field geologist. That's a great great experience. Mike's a superb observer.

AS: I am sure you have a few stories about fieldwork adventures, like most earth scientists. What are yours?

RKO: When I was at Lamont, we had a research grant from the National Science Foundation to do some chronology on the Modipe gabbro in Botswana. It was at the time thought to be the oldest gabbro showing a remnant magnetisation from which the earth's field strength about 2.5 Ga ago could be estimated. Jo Hamilton was a graduate student in Oxford and came to Lamont as a post-doc and now works for CSIRO in Australia. We went off to South Africa together and we rented a VW minibus, a combi as it's called in South Africa. As a matter of interest, it did not have a seat belt in sight. We headed off into Botswana and managed to collect big samples of gabbro so we had huge twenty-kilo pieces of gabbro all over the floor of the minibus. We completed the fieldwork and then decided that we would drive on to Rhodesia (now Zimbabwe). I had worked in Rhodesia when I was in Oxford. We left, and there we went along this dirt road and Jo Hamilton was driving. The rear end of the Volkswagen started to move and then it rolled over and over and over and over. These great big lumps of gabbro just went flying out through the windows and everywhere. By some miraculous method, I ended up going out of the back window of the Volkswagen although I was sitting in the front seat. I ended up outside, unscathed, a bit bruised, and these big lumps of gabbro were strewn down the highway. Rather a dirt road on the edge of the Kalahari Desert! Petrol was pouring out of the van and Jo Hamilton was sitting white-knuckled in the van, upside down but otherwise still in good shape. I've got a picture of that somewhere. Our suitcases had burst open, clothes were all over the place, but of course my first preoccupation was to go and pick up these rocks. So I was going up and down the road, building up a pile of rocks. By this time, a whole group of Africans had collected around us and were rather mystified. Here was a vehicle upside down with Jo Hamilton shaking and I was collecting a pile of rocks. Anyway, quite a big group of Africans had collected around us and one of them came forward and spoke pretty good English and said, "How are you?" I was a bit surprised because they were pretty basic people. And he said, "Would you like to come back to my house for some tea?" We said yes, because we got to get police help and that sort of thing. I don't think we had tried to contact the police by that stage. You could only contact them by getting somebody else that happened to drive past. So we went of to one of these rondavels - round mud huts with a thatch roof - standard African style. We went back with him and he said, "My wife will make some tea." But his English was quite good. We went into the rondavel and he produced an English china tea set. And Twinings tea. In an African rondavel in Botswana! And he confessed he'd actually been in, I think it was Imperial College, at some stage. So we were sipping Twinings tea in a mud hut at the edge of the Kalahari.

Anyway, the police arrived and they were furious with us, really gave us a big dressing down but did agree to put our rocks in their pick-up - we had a ton of rocks - and they took us and our rocks to a place called Palapye. Which is one of the railway junctions where the train comes from Rhodesia through Botswana to South Africa. And there were we were in Palapye, with a pile of rocks at the side of the road and we were thinking, "Shall we get the train to Rhodesia or shall we go back to Johannesburg?" We went to the local store, which was run by a white South African and he was sympathetic to our plight. He said, "I'll get your rocks back for you". He produced some big sugar sacks. We packaged these things up in big sugar sacks and labelled them all up to Lamont-Doherty Geological Observatory. He said, "Don't worry about the rocks. You guys look after yourselves, get yourselves sorted out. I'll get your rocks back." How about some money? No, no, I'll get your rocks back. This was a store in the middle of nowhere and we thought, "Nice bloke, but we're never going to see these rocks again." But they did show up at Lamont and we think the guy in Palapye must have paid for their transport. Isn't that amazing?

By the way, we hired this minibus from Budget Rent-a-Car in Johannesburg and we had to call them and say, "Eh, the car is in Botswana." Jo Hamilton would not pass a Budget Rent-a-Car place, for years after that. He would always cross to the other side of the road.

Actually this was quite a troubled trip, because when we left Johannesburg, we got on a 747 to fly back to London and we were just off the runway when there was a flash of light outside the window and the engine blew up and dropped off. We had to dump our fuel and land on foam on the runway. And then we had two days in Johannesburg. Yes, that was a quite an eventful trip.

About moving back to Europe, about putting things back into society and his new appointment

AS: Why did you leave Lamont?

RKO: The Royal Society in Britain gives a small number of professorships; they're called Royal Society Research Professorships. These were given on criteria that I certainly did not understand at the time. The first I knew about it at all is when I got a letter, which more or less said, "We'd like to offer you a Royal Society Research Professorship. Would you be prepared to accept this if suitable arrangements could be made?" I knew it was really the chance of a lifetime so I went to Cambridge. Those professorships now have a maximum of ten years but were jobs for life in those days. They had to be renewed every five years but you could hold them until retirement, if you wished. I held mine for sixteen years and came to Oxford four years ago. I basically felt that 16 years was long enough. It was time for a change and perhaps to put a bit back in the system and be head of a department some time. Payback time.

Over the last ten years I've done a number of other things. I've been involved in research council committees and have been chairman of a few of them. I was very involved in the European Union science committees. I barely know Brussels at all but I've been to Brussels more than most people would ever want. The last number of years I've been a member of the Council for Science and Technology. None of this has been to the point of having a particularly deleterious effect on the rest of my life. Although I must say that being head of the department is not the best way of doing research. It is not a hard job here in Oxford, but it is a job that never really goes away.

Having been involved in these things, perhaps it is not surprising that the government job has come along. I had three weeks of sheer hell deciding whether to take that job. Of course, most people who take on jobs of this sort don't get back to Labs. They may stay in science in one way or the other, without actually getting back into the lab. So, one has to take such a position with the expectation that one might not come back to it. To the lab, I mean. However, it's a three-year leave-of-absence, formally, and the University will keep my job open for me. Anyway, now that I've made the decision, I am looking very much forward to it. It's a very challenging opportunity.

AS: So what made you decide?

RKO: (Laughs) It just looks like a hell of a lot of fun!

It involves an enormously broad range of science. Many of the things I have been involved with for the government and the research councils have made me aware of a broad range of science, ranging from astronomy through materials science through into the biomedical sciences. I've been much involved in aspects of research council work across that whole range for the last ten years actually and this has been tremendously exciting. I'm ignorant across the whole spectrum, but at least I know that there ís a spectrum. But one's real expertise is very narrow.

I think it's is going to be interesting, having spent all of my adult life in universities and in the academic world, to spend a small amount of time in the real world. Some might say, "Defence, the real world? You must be joking!"

If this had not come along, though, I would have been perfectly happy to stay here. I would have completed my term as head of the department in September 2000 and I would probably have taken a sabbatical then. I would have been perfectly happy pottering along for another decade, doing what I've been doing, would this new opportunity not have arisen.

Coming back to Europe from the States was an eye opener, because in the late 1970's, if you got to know other European earth scientists, it was usually by meeting them in America. There was very little integration in science here in Europe. With the separate funding structures in the various countries, there was very little unified activity at all. Twenty years later, Europe is a very different place. One of the things I really enjoyed was competing with Al Hoffman and Claude Allègre. We were always in a fairly tough scientific competition. But we actually collaborate very closely on geochemistry and earth science in Europe and encourage our post-docs to work in each other's labs.

Unlike Claude's, who's minister of education, science and technology in France, my appointment in the UK is not a political one. Claude would probably call me a typical British pragmatist. I don't have strong political views; I am pragmatic. I like what I like and support what makes sense. I don't have any political party affiliations.

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AS: Have there been any events or periods that were particularly difficult, because you had to solve certain problems, or because of things that turned out entirely differently than you expected?

RKO: In science, my view has always been that if you go into a problem or subject, you should have very good, well thought-out reasons to do so. But, at the same time, you must expect to learn something completely different than what you had in mind originally, which has been really true of my career. Who would have envisaged the application of Nd-isotopes to sediment systems, the evolution of the continental crust and as ocean water mass tracers in the mid 1970's when a number of us started investigating them with regard to meteorite chronology and sources of plume and ridge basalts. And in the 1980's, jointly with Ron Oxburgh we started investigating He-isotope distributions in relationship to heat-flow following the lead of Russian workers such as Igor Tolstikhin. A few years later, together with Chris Ballantine we evolved our work to study the relationship between ground water flow and hydrocarbon accumulation. I think that you have to be ready to understand and discover anything and not just the things you anticipated when you went into it. But I still think that as an intellectual discipline it is extremely important that you have very clear reasons to go into something. That's been a repeated aspect of science, for me.

In personal terms, I have had a very simple straightforward life. I just grew up, got educated, got married, had some kids, moved around the world a bit and here I am. Without too many trials and tribulations on the way. I am one of those unusually fortunate people. I met Rita when we were in Grammar School, at age 11. We were in the same class in school but she was much cleverer than me. She worked as a radiographer until we had children. Now she's teaching disadvantaged children, either visually impaired or with learning difficulties or other special-needs teaching. She was the best mathematician and the best in everything at grammar school. I was relieved when she did not go into earth sciences. (Chuckles) It might have destroyed a wonderful relationship! In effect, she put her career into the children. She didn't work outside the house for about ten years. Yes, in personal terms, my life has been véry straightforward. It's rather unusual, but I have very little interesting to report. With all the travelling and all the places we've lived, I think Rita and I were probably both trying to build a good background for the children too. Looking forward and enjoying the things that are good about a place and not getting too hung up on things that are less than great.

AS: Where do you expect major developments in geochemistry, earth sciences and other sciences, in which subjects? If you would determine where the funding goes, where would it go?

RKO: I've always been much more impressed with supporting smart individuals in science - give them as much freedom as they can to be creative - than the support of hairy-fairy notions and specific missions. This recognises the fact that the best people usually find the best things to do. It is often a bit presumptuous to have a committee decide what are the best things to do and then find the people to do it. You got to have a balance, however. There is a great danger in all western societies that we lose sight of the fact that the best people properly supported are probably going to give you the best outcomes. And these outcomes in science usually have the biggest economic impact or have the biggest effect on the quality of life issues, but are very difficult to guess in advance. They arrive often through serendipity. So I think it is best to strike a balance between directed research, foresight programs directed towards premeditated targets, and the proper support of bright individuals. Because that is where the real creativeness is.

AS: Do you think that the earth sciences need to change? In the sense of justifying their existence to the public? Claude Allègre said a few years ago that the other sciences were not convinced, that what we are doing is worthwhile and therefore also needs to get adequate funding. He said we had to change the way we do things.

RKO: Well, regarding present-day science, the advances that are being made in many areas of biological and biomedical research are really quite incredible. The potential in biological and life sciences is truly enormous. And if one looks at that, and looks at the sorts of proposals that are made in quite a broad part of the earth sciences, one can say that they often look less exciting and less relevant in the societal sense, compared to some of these other areas. It should not surprise us, nor should we protest, that the priority goes to other areas.

Having said that - I mean that was just injecting a sense of reality - I think there are enormous opportunities in earth sciences. The opportunities in the integration of the biological sciences and geological sciences are just immense. There is a big surge and a great deal of potential in cosmochemistry and the planetary sciences, with new missions and new technologies. Progress - if it is going to be made - is usually where conventional parts of the subject overlap with other disciplines. For example, to progress in biogeochemistry, we have got to involve people that really understand biological chemistry. A standard geological or earth sciences education is not going to be sufficient. Difficulties arise where there is a reluctance to move away from traditional parts of the subject and the sort of arguments that are rehearsed in thís country is that intellectually some part of the subject is still rich, and that is absolutely true. I mean, you and I could go and find an outcrop somewhere outside Oxford, pick up a rock nobody gives a damn about and we could spend a very intellectual afternoon, describing it, thinking about it, reasoning about it. It is just not enough for things to be intellectually challenging and to have intellectual vitality or even have intellectually able people involved. It's really got to be more than that. There are so many things we could do in earth sciences, but there is no chance of it all being funded.

What earth sciences has to do, is to progress and embrace these new opportunities. Also, to do a better job of communicating its talents, abilities and skills more widely to policy makers than has been the case in the past. I don't think we are good at that, as a subject. If you compare the ability of the astronomy community to communicate its successes to the wider community: that is really quite enormous. I think earth sciences departments are going to have to look at where the boundaries of those subjects are, to make sure that they're not building Chinese walls, but rather seeking new opportunities.

My view is that with regard to the major issues that confront us about our ability to inhabit the planet - the planet we're actively modifying - what earth science has to offer is the physical-chemical basis for understanding the processes that control the environment. That is wonderful, because we're the only ones who can do that. Earth science is populated with people with strong physics and strong chemistry backgrounds and good applied mathematicians. In terms of measurement techniques, the geochemists are probably thé best chemical analysts in the world. So there is a contribution that we can make, in some of the basic physical science of the processes controlling the environment.

Boundaries between subjects are often established for convenience of teaching, funding and administration. These often become too firmly established and great progress often flows when they are breached. It has happened before, of course, this breaking down of walls. Look for instance at molecular biology. A major part of the subject started in the Cavendish Physics Labs in Cambridge, which was part of the crystallography group there. Crystallographers, physicists, started doing structures of organic materials and look where we are, almost fifty years later. What actually happened had an influence across of the whole range of biology.

Earth sciences has also had these sort of revolutions, both intellectual and technical, but I think we are probably failing as a subject, to really get over our own relevance, to policy makers.

A key is to get students to university and encourage them to take courses in the subject. At this university, which is far from standard in terms of the world of university - it's a very unusual place by any standards - we actually have to work very hard to introduce the subject really down to school level. We have open days for schoolteachers, special meetings at Easter time where schoolteachers come. These are schoolteachers of physics and chemistry and we hope they can tell their kids that there other things you can do with your physics, chemistry and math. We work very hard, véry hard, to get students into the subject at this university. Whether we are working harder than other universities, I don't know. There are some universities - far too many - that are taking students into earth sciences without a good mathematics and physical sciences training and these people are not going to be able to push the subject where it needs to go. But the better places everywhere are well aware of this.

AS: *I know you have official links to other European earth science departments. Can you tell me something about those co-operations?*

RKO: We have a European Union Network, which links a number of labs in Europe. The Free University in Amsterdam, the Max Planck Institute in Mainz which is Al Hofmann's, Claude Allègre's lab in Paris, and Aix-en-Provence in France and Oxford. This Network has been tremendously beneficial. We meet every few months with a number of post-docs who are part of this Network. This is very good because the thing with that European network is, that if you're in Holland you can't appoint Dutch people and if you're in England you can't appoint Brits. Twenty years ago, when I came back to Europe, none of this existed. I did not meet Claude Allègre in Europe; I met him at the AGU. In twenty years, a huge change has occurred and this is actually very good. Geochemistry and certainly isotope geochemistry has often had the reputation that it was occupied by a bunch of warring tribes, that it is an area where the rivalries are high and where the levels of aggression and competition also have been high. All those things are true, actually. I think it has been a fairly aggressive area. But one of the great successes in Europe is that three of these aggressive people - Claude, Al and myself - have been able to work really closely together, to do things for the common good of European geochemistry and more broadly, for earth sciences as well. This has required that we place scientific arguments to one side and do these things in a harmonious manner but still maintain a sort of vigour and cut and thrust needed in the research. I think that is actually quite an achievement!

I've also worked with Igor Tolstikhin for eight or nine years. He is funny guy as well and the most outstanding geochemist in Russia. He's the guy who discovered ^{3}He in Kamchatka volcanics. And most of my research career, I've collaborated with Karl Grönvold, who's Icelandic.

About the person

AS: *How do you manage your activities? How do you juggle your parcels of time? I notice that you do not seem the slightest bit stressed and I know quite a few scientists who are.*

RKO: Well, I do work a large number of hours. I work most evenings and I'm not very good at working at home; I tend to come back and work at the office. I go home for dinner, and most often come back to the laboratory in the evenings and work to 10:00 or 11:00 pm. Saturday is my best day for peaceful work. But if you enjoy what you're doing, it's not really work. To me, doing research never feels like work. It is somewhere between a hobby and just having fun. The wonderful thing about sitting down in your office and reading an article is that you can feel quite stimulated. You can feel you've achieved something when you've understood something and got away with some new knowledge. You can go into the lab and make some measurements on something and the euphoria can last for a few days. However, being head of a department is actually work. Stress has never been one of my problems. I can put a lot of effort into something, work very hard at it, if I think I can make a difference. But I never end up beating my head against the wall. There's no point.

But yes, I know that many people feel a strain because we now have three, four, five jobs, where we used to have two jobs, teaching and research, thirty years ago. The accountability is higher. I view juggling my time as a new sort of challenge. I've been very lucky. I almost never ever fail to get a research proposal funded. If you run into trouble with funding, that's a very-high-stress situation.

AS: *Do you have any other favorite books, besides Principles of Geology?*

RKO: To tell you the truth, I don't actually read a lot of books. Teaching here and in Cambridge, I made very little or no use of textbooks at all in teaching. My view is that there is a great deal

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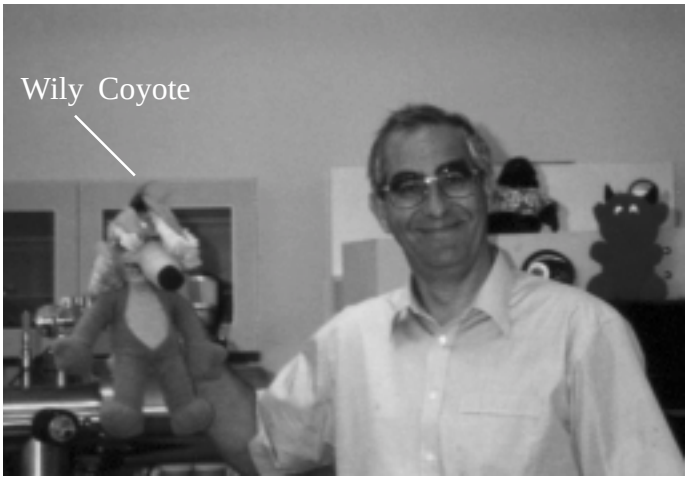
of merit in presenting the subject and encouraging people into the literature at an early stage. I was always discouraged by seeing a course with a particular course text, with the aim of the course that you become familiar with the text. That is probably okay in physical chemistry, where you go through equilibrium thermodynamics, through kinetics and so on but in earth sciences I think it's much less appropriate because the subject moves so fast in so many areas. I make very little use of textbooks and don't recommend geochemistry or geology course texts. But, like everybody else, I do use books as reference books, of course.

Outside of science I read less and less as time goes by. I made a choice. Like many others, I don't have time to read many novels anymore. Reading novels has become a bit of a Christmas occasion. The last novel I read was Steinbeck's *Cannery Row*. This was just because I happened to be in Monterey. In terms of regular reading I read *The Economist* magazine and that is the only newspaper I subscribe to.

There are lots of books that I've enjoyed. I've been reading Bob Williams, for instance. Bob Williams is a professor emeritus in chemistry here in Oxford and he has written two books, one with a co-author called Da Silva. One is called '*Natural selection of the elements*' and the other is called '*An Introduction to Biological Chemistry*'. These are absolutely fascinating. They deal with how inorganic chemistry interfaces with biological chemistry. The roles of redox elements such as iron and copper in cells, the role of calcium, what the control mechanisms are in passing these elements from an enzyme to a protein and so on. Reading that to me has been just pure relaxation. But it's not on the best-seller list.

AS: *What about hobbies? You used to play rugby as a graduate student in Canada. Do you still play rugby? Or do you play golf now?*

RKO: No! None of that sort of thing. I like walking and I like music, all sorts of music. I listen mostly to classical music. I have no real favourites, but I never tire of Beethoven, Mozart, Vivaldi and Bach. And being English, I have to devote some time to the garden. My biggest hobby, however, is my work and things like theatre and concerts often lose out to it. I do not distinguish between hobby and work, though. As I said, my work really does not feel like work.



I now get official advice from the Ministry of Defence, and they tell you to sit like this.

This is how, I'm told, one must approach The Queen

Massif Central, France, 1984

Krafla, Iceland, 1982

A brief presentation of the Italian Geochemical Society (SoGeI)

Status

The Italian Geochemical Society (Società Geochimica Italiana - SoGeI) was established in Genoa (Italy) on February 26th of the current year. The formal scientific Society is a natural evolution of the former informal group "Gruppo Informale di Geochimica" which operated for about two decades under the sponsorship of the Italian Research Council (CNR). The duties of the Society, as specified in the constitution act, are "the promotion of research and studies and the diffusion of geochemical knowledge". To achieve its duties the Society (hereafter SoGeI):

a) may organize (at least each two years) meetings concerning one or more disciplinary aspects (open to Society members and other interested persons) taking care of the publication of acts;

b) may promote and sponsor scientific sessions, schools and specialization courses;

c) may institute Research and Degree awards and fellowships relevant to the promotion of Geochemistry in Universities, research centers and private and public institutions devoted to environmental control, mining etc.;

d) may promote cultural exchanges with other Geochemical Societies operating outside Italy.

As of now the Society has 82 members, most belonging to Academia and some to private companies. To assess the impact of the SoGeI on the Italian academic world we may recall that the whole geochemistry academic staff comprises 55 individuals (18 full professors, 18 associate professors, and 19 researchers).

Soon SoGeI will open subscriptions to research institutions (enrolled as "soci sostenitori" i.e. supporting members).

SoGeI (and its informal predecessor GIG) has already sponsored seminars and specialized courses. We may quote for instance the "Rome Seminar on Environmental Geochemistry" which was held on May 22-26th 1996 under the sponsorship of the Ministry of Interiors (Department of Civil Protection), and the most recent school "Methods in Geochemistry" held in St. Margherita Ligure on June 1-3rd 1998. Both meetings were attended mostly by Italian geochemists (about 120 and 60 participants, respectively). Lectures were given by international experts, including prominent members of the Geochemical Society.

SoGeI's first official publication is the special volume on the Proceedings of the Rome Seminar, which is available free of charge to members of the Geochemical Society on request. *[Note: It is well worth having! - NCS]*

SoGeI is affiliated with the Italian Federation of Earth Sciences (FIST) which includes: Geological Society of Italy SGI - Italian Society of Mineralogy and Petrology SIMP - Palaeontological Society of Italy SPI - Italian Association of Quaternary AIQUA.

Historical perspective

A brief review of the history of Geochemistry in Italy reveals deep North American roots. The founder of Geochemistry in Italy was a New Yorker. Gian Alberto Blanc was born in 1879 to Alberto Blanc and Natalia Terry. The scientific activity of Blanc began in 1904 with research on the radioactivity of Quaternary sediments (Fornaseri, 1968). In 1905 Blanc, independently and contemporaneously with Otto Hahn, discovered the existence of a new radionuclide (the "radiothorium" of W. Ramsey) and two years later he determined its decay constant. For this reason he was then invited by Marie Curie to her laboratory in Paris where he cooperated on the publication of the "Tables des constantes radioactives (VI Le radium)" (Paris 1909). Back in Italy, Blanc continued his physical-chemical studies on the Quaternary formations of Savoy, Tuscany and Latium and, in 1928, he got the first Chair of Geochemistry at The University of Rome (Fornaseri, 1968). We must now bypass the obscure period of the dictatorship and of the 2nd World War and make a jump of roughly 25 years.

As recently recalled by Harmon Craig in his Acceptance Speech of the 1998 Balzan Prize for Geochemistry, our discipline received a strong impulse and became a self-consistent research field through the combined effort of Giovanni Boato, a physicist at Genoa University and Ezio Tongiorgi, a geologist at Pisa. Boato, after a visit toUrey's laboratory in 1952 (were he made fundamental discoveries concerning hydrogen isotopes) returned to Italy where

"....he and Tongiorgi began a project to build at Genoa three mass spectrometers similar to Urey's machines, one of which went to Pisa, where Tongiorgi had formed a group of young scientists in isotope geochemistry, one went to Professor Fornaseri in Rome for similar studies, and the third remained in Genoa for Boato's research..." (Craig, 1999)

The laboratory of Ezio Tongiorgi in Pisa, together with the Physicalisches Institut of Fritz Houtermans in Bern remained for several years the most advanced european research centers in Isotope Geochemistry.

New research fields joined progressively Isotope Geochemistry: we may quote the Applied Geochemistry research group developed by Franco Tonani in Florence (whose research was mainly devoted to the study of geothermal areas) and the "Instituto di Geochimica dei Fluidi" funded in Palermo by the late Professor Carapezza and dealing primarily with the monitoring of volcanic activity.

All these research centers are still active now but we may complain that, notwithstanding the brilliant premises, Italian Geochemistry underwent a sort of "unnatural decay", in the sense that the energy spent to produce "daughters" was much higher (and the mass of daughters, conversely much reduced) with respect to what expected on the basis of the relativistic relation linking mass and energy.

To appreciate the amount of energy involved in battles against Academia we may recall the personal war conducted by Professor Fornaseri in trying to achieve the status of "compulsory course" for Geochemistry in the Bachelor Degree in Geology. He finally won the war (1986) and new academic positions have opened since to young geochemists.

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Also, Antonio Longinelli and Giorgio Ferrara (the "young scientists" quoted by Craig, 1999) could tell stories about the awkward duty of raising funds from a naturalistic-oriented audience and making laboratories run.

As a net result, the academic consistency of geochemistry within earth sciences is in Italy much reduced with respect to neighboring research fields (i.e. 55 individuals, with respect to 142 individuals in Mineralogy and 137 in Petrology-Petrography). This perhaps could explain why the scientific production of Italian Geochemists is so low with respect to other European countries (21 manuscripts presented to *Geochimica Cosmochimica Acta* in the period 1 October 1996 - 30 June 1999 with respect to 107and 105 manuscripts presented respectively by French and German Geochemists; Turekian, 1999). That this is a problem of numerical consistency and not of quality may be appreciated by the manuscript rejection rate, identical to that of Germany (ibid.).

The future

Beginning in 1993, the Research Committee of the AAPG (American Association of Petroleum Geologists) has performed an annual screening on the Status of Academic Geoscience Departments. For 1998, the screening (Katz, 1998) involved 908 departments, 277 of them in North America and the remaining 631 in the rest of the world. The scope of the screening is to establish the dimensions of the various institutions, the student population, the technical capacities, the post-doctoral employment rate, the funding levels achieved, the main financial agencies and the restrictions to research imposed by local situations. Even if the response level attained by the queries is low (50% for North America and 15% for the remaining part of the world) the results are extremely interesting. Particularly, we may quote the histogram reporting the departmental "top three academic strengths", where Inorganic Geochemistry attains second place, after Environmental Geology, among all the research branches taken into consideration (Figure 1 and Table 1).

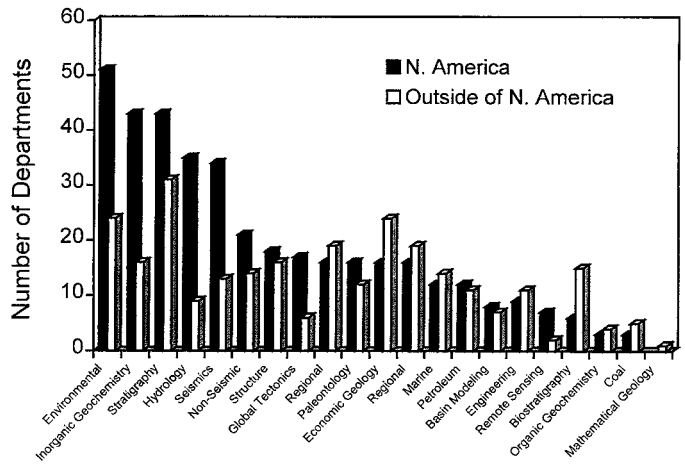

Figure 1: The top three academic strengths in Geology Departments (from Katz, 1998).

It is obvious that the prominent position attained by Geochemistry may be further strengthened if the "environment" (which is a major concern of all industrialized countries) becomes the focus of geochemical research. This is true for all western countries, but is especially valid for Italy, due to its demographic situation and its geography (an overcrowded home garden in the middle of a sea almost closed to oceanic exchanges). Of course Isotope Geochemistry (already present in Italy) offers several tools for environmental investigation, but a quantitative appreciation of phenomena cannot be achieved without a massive introduction of Physical Geochemistry (at present virtually absent from most ground level courses in Italian Universities).

It will be one of the main duties of SoGeI to promote a harmonic growth of Geochemistry in Italy, in all its branches (either theoretical or applied). To achieve this, SoGeI intends to strengthen the links and interactions with The Geochemical Society. Preliminary contacts were established in this sense between the former GIG president and the President and the International Secretary of the Geochemical Society. This policy (which continues under the current SoGeI directorship) is dictated by the consideration that a regional association will never achieve a critical mass sufficient to promote independent advancement of Science. A link has been already opened with GS on our website (gea.geo.uniroma1.it/GIG.html), and at the last GS Board of Directors held in Boston on August 22nd (were I presented the candidature of Italy to host a future Goldschmidt Conference) it was decided, with my great pleasure, to open a link on the GS website toward SoGeI and to host this article in *The Geochemical News*. I hope this is just the beginning of a more vigorous cooperation among the two Societies.

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Life Keeps Getting Better

Gunter Faure
Ohio State University

[The past Executive Editor of Geochimica et Cosmochimica Acta, *Gunter Faure, was convinced by our AE Kenneth Johnson to write a short autobiographical sketch in honor of his long and illustrious service to the geochemical community].*

For those of you who don't know me, I am the guy with the mixed up names combining a German first name with a French surname. Actually, there is a simple explanation for my origins. My ancestors were Huguenots who escaped from France in 1685 and settled in a refugee village in the Principality of Hessia in Germany. About 150 years later, a descendent of my French ancestors moved to Estonia and became a resident of the city of Tartu. Our name is still common in France and is pronounced "for". However, all of the Faures left Estonia in the fall of 1939 to escape the impending occupation of Estonia and the other Baltic states by the Army of the Soviet Union.

For a while it seemed that we were destined to spend our lives as refugees of World War II, living first in Poland, then fleeing to the west in the winter of 1945 on a farm wagon pulled by two of our trusty horses. We arrived in a village near Hanover in the spring of 1945 and were soon liberated by American troops. Later that year, we rented a small farm and thus survived the famine of the post-war years in Germany.

I attended the "Gymnasium" in Stadthagen, founded the school's newspaper, was President of the student body, competed in track and field, and learned a lot of Latin and Greek when I should have been studying science. In June of 1952 we emigrated to Canada and settled in London, Ontario, where I graduated from highschool and subsequently enrolled in the University of Western Ontario as a geology major. While in highschool in London, I had what they call an "epiphany" in the form of a highly emotional decision to become a geologist. The excitement of that moment more than 45 years ago has stayed with me to the present. Looking back, I see that I have exceeded my wildest expectations and I now try to help others to reach their goals.

After graduating from the University of Western Ontario, I was accepted by M.I.T. and came under the influence of Professor Patrick M. Hurley. When I arrived in Pat Hurley's lab in the autumn of 1957, he was using the K-Ar method to date biotite and was developing the Rb-Sr method of dating Rb-rich minerals.

The group of graduate students I associated with at M.I.T. included Stan Hart, Charlie Schnetzler, Jim Powell, Doug Brookins, Tom Krogh, Bob McNutt, George Beall, John Moore, Jim Crocket, John Philpotts, Mike Bottino, Dick Reesman, Hal Krueger, and Phil Whitney, listed in random order. We used to meet in Walton's Cafeteria for afternoon coffee and argued endlessly about the use of Sr and Pb isotopes to find out how the Earth works. I also made friends with Hugh Allsopp and Steve Moorbath who joined our group as post-docs and provided a fresh point of view in our brainstorming sessions.

My excitement about exploring the Earth by measuring the isotope composition of Sr in rocks hightened when Pat Hurley challenged me to study the origin of granite based on measurements of the initial $^{87}Sr/^{86}Sr$ ratios. I worked day and night until I realized that the initial $^{87}Sr/^{86}Sr$ ratios can be used to distinguish mantle-derived igneous rocks from those which contain a component of crustal Sr. This idea has become one of the cornerstones of modern igneous petrogenesis and is known to everybody; but when I presented my dissertation in 1961, I was on cloud nine.

The importance of crustal rocks as potential contaminants of mantle-derived magma motivated my next venture which was to demonstrate that rocks of the continental crust actually are enriched in radiogenic ^{87}Sr. It occurred to me that Sr is released into solution by chemical weathering of rock-forming silicate minerals on the Precambrian shield of Canada and is then concentrated in the shells of mollusks in lakes and rivers of that area. Therefore, my wife and I undertook a month-long camping trip across northern Ontario in the summer of 1961. The shells we collected on that trip clearly demonstrated the expected enrichment in ^{87}Sr and thereby supported the hypothesis that the initial $^{87}Sr/^{86}Sr$ ratios of igneous rocks reveal the extent to which their magmas were contaminated by assimilating crustal rocks.

The study of Sr in lakes and rivers of northern Ontario led to questions about the $^{87}Sr/^{86}Sr$ ratio of seawater and the possible variation of this ratio in different parts of the ocean. The answer to these questions came in a couple of studies I carried out at M.I.T. during the summers of 1962 and 1963. The data I obtained from the Atlantic Ocean and from the Hudson Bay demonstrated that the $^{87}Sr/^{86}Sr$ ratio of present-day seawater is constant even at the mouths of major rivers draining Precambrian gneisses. The reason is that the concentration of Sr in seawater is much higher than that of river water and, in addition, Sr has a long residence time in the oceans thereby allowing the circulation of the water to homogenize the isotope composition of Sr (but not Nd, as it turned out later).

In 1962 I became an Assistant Professor in the Department of Geology and Mineralogy of the Ohio State University.

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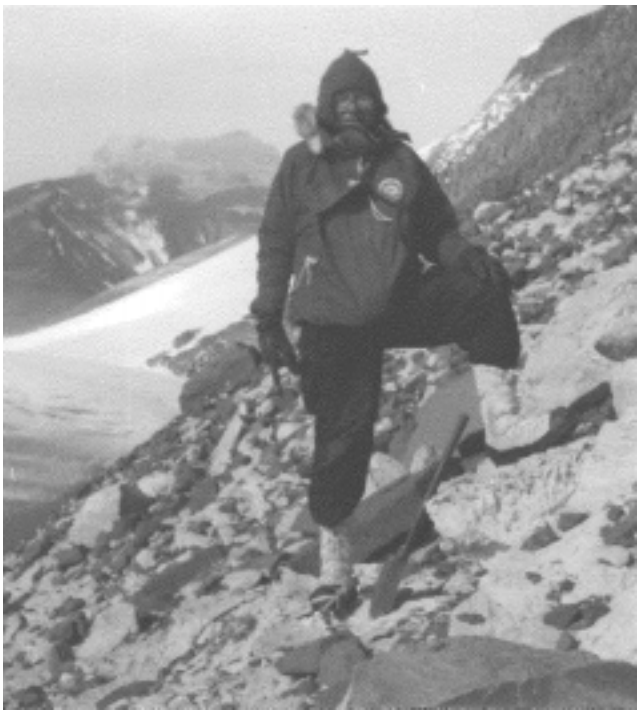
I came to Ohio State with the mission to demonstrate how the isotope compositions of different elements can be used to solve geological problems. Therefore, I started teaching a course on the principles of isotope geology and built myself a mass spectrometer out of assorted components provided by Len Herzog (President of Nuclide Corporation), my predecessor at M.I.T.. I also attracted a large number of graduate students with whom I have continued to explore the world. Some outstanding individuals who trusted me to guide their research include Sam Chaudhuri, Lois Jones, Mike Fenton, Rene Eastin, John Gunner, Ed Tremba, Larry Owen, Phil Boger, Julie Palais, Terri Mensing, John Curtis, Erik Hagen, and Ralph Haefner.

Working with smart and highly motivated graduate students has kept me on my toes and has pushed me into subject areas that did not exist when I was a student. The insights I have gained have enriched the courses I am teaching. In addition, I have learned to explain complicated issues to students by starting at the beginning and by proceeding systematically until a state of understanding is achieved. This skill has helped me to write textbooks on the principles of isotope geology and geochemistry that appear to be popular with students. Several more books are in the works in which I hope to explain what I have learned about the use of isotopes to understand the petrogenesis of igneous rocks and the growth of the continental crust, about the planets and satellites of our Solar System, and about geochemistry of the Transantarctic Mountains.

The Byrd Polar Research Center at Ohio State University (and the Office of Polar Programs of the National Science Foundation) provided me with the opportunity to study a wide range of phenomena in Antarctica. These have included the ages of the crystalline basement rocks underlying the Transantarctic Mountains, the geochemistry of soil salts and of the saline lakes of southern Victoria Land, the provenance of the glacial deposits on the summit plateaus, the formation of supraglacial moraines on the East Antarctic ice sheet and the accumulation of meteorites on its surface, the ablation rates and oxygen-isotope profiles of exposed ice of the polar plateau, and the exposure ages of quartz sandstones of the Beacon Supergroup by means of cosmogenic ^{10}Be and ^{26}Al in collaboration with Dr. K. Nishiizumi.

Although all of these research projects have been productive, the most significant contributions my students and I have made in Antarctica are the demonstration by Richard Hill in 1969 that the silica concentrations and initial ^{87}Sr/^{86}Sr ratios of the Jurassic basalt flows in the Transantarctic Mountains are positively correlated. The correlation of chemical and isotopic parameters indicates that the basalt magmas may have assimilated wallrocks while they differentiated in crustal magma chambers. Twenty years later, Dr. Janet Hergt attributed these kinds of correlations in the Jurassic dolerites of Antarctica to magma formation from mixed source rocks, including a component of previously subducted terrigenous sediment. In addition, John Bowman observed in 1971 that the concentrations and initial isotope ratios of Sr of sequentially-erupted lava flows in the Transantarctic Mountains vary systematically up-section and hence as a function of time. Such stratigraphic changes in chemical and isotopic compositions of lava flows imply that the magma had become stratified and was being erupted from the top of the chamber (most contaminated and/or differentiated) downward. These results have been widely cited in the literature because the phenomena we described have been observed in many other volcanic provinces and are now recognized as important aspects of the petrogenesis of igneous rocks.



In addition to the opportunity for interesting research and for the training of my graduate students, Antarctica has allowed me to return to my roots as a field geologist. I derive a great deal of personal satisfaction from being, among other things, an Antarctic field geologist. I have thoroughly enjoyed the solitude of camping in a Scott tent on the polar plateau and the challenge of trying to figure out what amazing things had happened at the many sites we studied. In addition, I have enjoyed the company of other Antarctic field geologists, too numerous to mention here, who are attracted to Antarctica for the same reasons that appeal to me.

At a very different level, I am also interested in the effective communication of geological thought and have pursued this interest as an editor of scientific journals. After a turn as Associate Editor of the *GSA Bulletin*, I was invited by Elsevier Science Publishers of Amsterdam to edit a new journal on isotope geology. To get the ball rolling, I met Henk van der Rijst of Elsevier in September of 1981 in the Faculty Club of the Hebrew University in Jerusalem. We had a very productive meeting at which we invented the title of the new journal *(Isotope Geoscience)*, selected a group of Associated Editors most of whom are still working for the journal, and formulated the mission statement. The first issue of our journal was published in 1983 and, in the next few years, the journal prospered in a modest sort of way. It was later added to the back of Chemical Geology and continues to publish seminal papers on the principles and methodologies of isotope geoscience under the leadership of its present editor Dr. Peter Deines.

My tenure as Editor-in-Chief of *Isotope Geoscience* ended in December of 1988 when I became the Executive Editor of *Geochimica Et Cosmochimica Acta* . My predecessor, Dr. Denis Shaw, had guided GCA for eighteen years during which it became the most prestigious journal of geochemistry and meteoritics. I continued most of the practices of my illustrious predecessor, but will not elaborate further at this time because my account of that period was published in issue 91 (1996) of *The Geochemical News*.

I left GCA at the end of 1996 to assume the Presidency of the International Association of Geochemistry and Cosmochemistry (IAGC). The Association sponsors the journal *Applied Geochemistry* which is growing rapidly and is becoming the premiere journal for high-quality papers in environmental geochemistry. The IAGC has eight Working Groups which organize international meetings that attract hundreds of participants. In addition, the IAGC sponsors the International Ingerson Lectures in alternate years. Our last speaker was Denis Shaw who spoke on August 12, 1998, at the 17th General Meeting of the International Mineralogical Association in Toronto. Our next International Ingerson Lecturer will be Dr. Umberto Cordani who will speak during the 31st International Geological Congress (IGC) in August of 2000 in Rio de Janeiro. During this meeting, I will have the pleasure of transferring the office of the President of the IAGC to Dr. Eric Galimov, Director of the Vernadsky Institute of Geochemistry in Moscow and an Associate Editor of *Isotope Geoscience*.

The current research activities of my students are focussed on the sorption of ions by colloidal ferric hydroxide precipitates that form when streams contaminated by acid mine waters (or by acid rock waters) are neutralized as a result of mixing with the water of uncontaminated tributaries. The increase of the pH causes potentially toxic cations to be removed from solution and allows the resulting metal-rich sediment to accumulate in lakes and reservoirs. The presence of metal-rich sediment in most reservoirs in the world is a fact of environmental geochemistry that may haunt us in the future when it becomes necessary to dredge these reservoirs, or in case the water in the reservoirs is acidified accidentally or by natural processes.

I have no idea what life has in store for me in the future. Although I do not lack for things to do, I hope to become more intimately involved with the exploration of the Solar System because in the thousands of centuries yet to come, humans will live and evolve on Mars and on some of the other terrestrial bodies of the Solar System.

List of Selected Books and Papers

Faure, G. and P.M. Hurley, 1963. The isotopic composition of strontium in oceanic and continental basalts: application to the origin of igneous rocks. J. Petrol., 4:31-50.

Faure, G., P.M. Hurley, and H.W. Fairbairn, 1963. An estimate of the isotopic composition of strontium in rocks of the Precambrian shield of North America. J. Geophys, Res., 68:2323-2329.

Faure, G., P.M. Hurley, and J.L. Powell, 1965. The isotopic composition of strontium in surface water from the North Atlantic Ocean. Geochim. Cosmochim. Acta, 29:209-220.

Jones, L.M. and G. Faure, 1967. Origin of the salts in Lake Vanda, Wright Valley, southern Victoria Land, Antarctica. Earth Planet. Sci. Letters, 2:101-106.

Faure, G., J.H. Crocket, and P.M. Hurley, 1967. Some aspects of the geochemistry of strontium and calcium in the Hudson Bay and the Great Lakes. Geochim. Cosmochim. Acta, 31:451-461.

Faure, G., and J.L. Powell, 1972. Strontium Isotope Geology. Springer-Verlag, Heidelberg, 118 p.

Faure, G., J.R. Bowman, D.H. Elliot, and L.M. Jones, 1974. Strontium isotope composition and petrogenesis of the Kirkpatrick Basalt, Queen Alexandra Range, Antarctica. Contrib.. Mineral. Petrol., 48:153-169.

Jones, L.M. and G. Faure, 1978. A study of strontium isotopes in lakes and surficial deposits of the ice-free valleys, southern Victoria Land, Antarctica. Chem. Geol., 22:107-120.

Faure, G., J.R. Bowman, and D.H. Elliot, 1979. The initial $^{87}Sr/^{86}Sr$ ratios of the Kirwan Volcanics of Dronning Maud Land: comparison with the Kirkpatrick Basalt, Transantarctic Mountains. Chem. Geol., 26:77-90.

Taylor, K.S. and G. Faure, 1980. Rb-Sr dating of detrital feldspar: a new method to study till. J. Geol., 89:97-107.

Mensing, T.M. and G. Faure, 1983. Identification and age of neoformed Paleozoic feldspar (adularia) in a Precambrian core from Scioto County, Ohio. Contrib. Mineral. Petrol., 82:327-333.

Mensing, T.M., G. Faure, L.M. Jones, J.R. Bowman and J. Hoefs, 1984. Petrogenesis of the Kirkpatrick Basalt, Solo Nunatak, northern Victoria Land, Antarctica, based on isotopic compositions of strontium, oxygen, and sulfur. Contrib.. Mineral. Petrol., 87:101-108.

Faure, G., 1986. Principles of Isotope Geology, second edition. Wiley and Sons, New York, 589 p.

Hergt, J.M., B.W. Chappell, G. Faure, and T.M. Mensing, 1989. The geochemistry of Jurassic dolerites from Portal Peak, Antarctica. Contrib.. Mineral. Petrol., 102:298-305.

Mensing, T.M. and G. Faure, 1996. Cretaceous alteration of Jurassic volcanic rocks, Pain Mesa, northern Victoria Land. Chem. Geol., 129:153-161.

Faure, G., 1998. Principles and Applications of Geochemistry, second edition. Prentice Hall, NJ, 600 p.

ASTROBIOLOGY:

A New Science for the Next Millennium

After Stanley Miller and Harold Urey's famous experiment in 1953 demonstrating the ease with which organic materials can be made nonbiologically, many people thought that solving the mysteries of life's origins was a simple matter of time. To be certain, advancements have been made in unraveling some of life's secrets, and new paradigms are emerging as we search for life's beginnings. But now, 46 years later, as we prepare to celebrate the calendar turning to the new millennium, we are seemingly not very much closer to discovering how life began on Earth. There are also new concerns about the balance of ecosystems on the planet and how life in all its forms adapts to changes in the Earth environment. Finally, as we welcome the year 2000, man's activities in space perhaps point to a future in which life will venture far beyond its only known home, Earth.

Recently, the National Aeronautics and Space Administration (NASA) demonstrated its commitment to pursue such research by formalizing the study of the emergence and evolution of life into a new program - Astrobiology. Astrobiology is defined by the agency as the "study of the origin, evolution, distribution and destiny of life in the universe." NASA began the program to attempt to answer such age-old questions as: How did life begin? Is there life elsewhere in the universe? Will life from Earth spread to other parts of the solar system or beyond?

In 1998, eleven institutions were chosen to make up the fledgling NASA Astrobiology Institute, designed to be a 'virtual institute' in which the participants use advanced telecommunications and electronic networking to interact and collaborate. NASA Ames Research Center in Moffett Field, CA was chosen to house the program and its administration and coordinate its activities. The Institute's founding members include universities (Harvard University, University of Colorado, Pennsylvania State University, University of California at Los Angeles, Arizona State University), research institutions (the Carnegie Institution of Washington, the Marine Biological Laboratory, the Scripps Research Institute) and government laboratories (NASA Ames Research Center, NASA Johnson Space Center, Jet Propulsion Laboratory). The Institute is intended to be interdisciplinary, encouraging collaboration between planetary scientists, geologists, biologists, astrophysicists, physicists, paleontologists and chemists. Based on the proposals each of the institutions submitted, the Institute members will conduct a broad range of research on topics including: the formation of organic compounds important to the origins of life in a variety of environments; the formation and characteristics of habitable planets; the emergence of self-replicating systems; how the Earth and life have influenced each other over time; the evolution of multicellular organisms and the evolution of complex systems in simple animals; organisms in extreme environments such as hydrothermal systems; and the identification and development of biomarkers to determine terrestrial and extraterrestrial biosignatures.

Broadly, astrobiology focuses on the interactions between biology and geology. It is rapidly emerging into a highly quantitative field due to experimental and theoretical advances in geochemistry and progress in understanding geochemical processes that support life. As geochemists, we are beginning to recognize that organisms catalyze chemical reactions in order to live. The existence of microorganisms that thrive at temperatures in excess of 80°C in the absence of light, feeding on the geochemical energy available in seafloor hydrothermal systems, is a remarkable example of this idea. The discovery of oases of life around seafloor hydrothermal vents in the late 1970s has led many to believe that hydrothermal systems are the most likely places for the emergence of life. Hydrothermal circulation through the Earth's crust has been a constant process nearly since the time the Earth formed. Furthermore, organisms that thrive at high temperatures in these environments are genetically the most primitive of all known on Earth. Biogeochemical energetic calculations show that organisms living in these environments have an easy life, living off of the geochemical energy provided by the planet as it tries to cool off. These geochemical processes drive the very processes life requires.

Since all life, at least as far as is known, requires liquid water, the study of life and its origins is intimately linked with aqueous geochemical processes. The discovery of liquid water extant or in the past on other planetary surfaces (or by inference, below the surface) has given new hope that life may exist or have existed on Mars and Europa. Carbonaceous chondrite meteorites also show evidence of extinct hydrothermal processes, and show complex organic chemistry. Thus they are snapshots of the chemical evolutionary processes perhaps analogous to those on the early Earth which led to the emergence of life. The role of geochemists in the search for life elsewhere in the solar system is to identify locations where the proper geochemical reactions can take place.

For those interested in the geochemical perspective on origin of life research, a symposium on Geochemistry and the Origin of Life will be held during the 219th American Chemical Society National Meeting, March 26-30, 2000 in San Francisco.

Other geologically based disciplines are also well represented in the concept of astrobiology. For example, the search for evidence of life on other planets, especially Mars, makes extensive use of the tenets of paleontology. One of the keys to this approach is knowing what to look for and what it means when it is found. The announcement in 1996 of possible fossil microbes in the ALH84001 Martian meteorite galvanized public support for the search for life beyond Earth. While the jury is still out on the definitiveness of these claims, NASA hopes that the publicity the controversy has generated will translate into an astrobiology program that will continue for many years to come. The agency budgeted $9 million in 1999 and $20 million in the year 2000 for the astrobiology program, expecting that the program will encourage innovative and interdisciplinary research, and perhaps some answers to the age-old questions.

For further information on the Astrobiology Program, see NASA's Astrobiology Web Site at http://astrobiology.arc.nasa.gov. Look for a more detailed discussion of geochemical perspectives in astrobiology in the next issue of the Geochemical News.

Mitch Schulte
NASA Ames Research Center
Moffett Field, California, U.S.A.

Meetings Calendar

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

Nov. 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, CA., U.S.A. 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 14-17, 2000: II Latin American Sedimentological Congress and VIII Argentinian Meeting of Sedimentology, Mar del Plata, Argentina. Web Site: http://cig.museo.unlp.edu.ar/congreso/

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

April 24-28, 2000: Morphology and dynamics of crystal surfaces in complex molecular systems (Symposium M), Materials Research Society, San Francisco, CA. Abstract Deadline Nov. 1, 1999 (online). Contact: J. DeYoreo, L-487, Department of Chemistry and Materials Science, Lawrence Livermore National Laboratory, P.O. Box 808, Livermore, CA 94551; Phone: (925) 423-4240; FAX: (925) 423-9242; E-mail: deyoreo1@llnl.gov. Web Site: http://www.mrs.org/

April 24 -29, 2000: 5th International Symposium on Environmental Geochemistry, University of Cape Town, South Africa. Pre- and post-conference technical tours available. Abstract deadline 30th September 1999. Registration and other details on the web site: http://www.uct.ac.za/depts/geolsci/menviro/main.html

May 7-11, 2000: Salt Symposium, The Netherlands Congress Centre, The Hague,The Netherlands. Contact: Secretariat Organizing Committee 8th World Salt Symposium, P.O. Box 25, NL-7550 GC Hengelo (Overijssel), The Netherlands; Phone: +31 74 244 3908; Fax: +31 74 244 272; E-mail:Salt.2000@inter.NL.net. Web Site: http://www.salt2000.nl/

May 8-11, 2000: 2nd International Conference on Applications of Stable Isotope Techniques to Ecological Studies, Braunschweig, Germany. Dr. Anette Giesemann, Institute of Agroecology, Federal Agricultural Research Centre, Bundesallee 50, D-38116 Braunschweig Tel.:++49 531/596-217; FAX: ++49 531/596-366; e-mail: anette.giesemann@fal.de; http://www.pe.shuttle.de/slater/anette

May 15, 2000: Geology and ore deposits 2000: the great basin and beyond - AGeological Society of Nevada Symposium, Reno/Sparks, Nevada, USA. Co-sponsored by: Nevada Bureau of Mines and Geology, U.S. Geological Survey, Society of Economic Geologists and The Association of Exploration Geochemists. Deadline abstract drafts: October, 1999. Contact: GSN Symposium Editor, P.O. Box 12021, Reno, NV 89510-2021, USA. Tel: +1 775 323-3500; Fax: +1 775 323-3599; E-mail: gsnsymp@unr.edu; Web Site: http://www.gsnv.org/symp2000.htm

May 15-20, 2000: 2nd EMU School and Symposium on Environmental Mineralogy, Eötvös University, Budapest, Hungary. Contact: EMU Secretariat, Department of Mineralogy, Eötvös University Múzeum krt. 4/A, H-1088 Budapest, Hungary: Fax: +36 1 266 4992; E-mail: emu@ulixes.geobio.elte.hu. Web Site: http://ulixes.geobio.elte.hu/emu.htm

May 21-24, 2000: Biogenic Iron Minerals, Kastély and Park Hotels, Tihany, Lake Balaton (Hungary). Contact: Mihalý Pósfai, e-mail posfaim@almos.vein.hu: Web Site: http://www.vein.hu/conference/bim/

May 24-28, 2000: Meteorite Impacts in Precambrian Shields, Lappajarvi, Finland. Abstract deadline: March 15, 2000. Contacts: Dr. Lauri J. Pesonen; Geological Survey of Finland; P.O. Box 96, FIN-02151 Espoo, Finland; Phone: +358-205 50 2269/+358-40-5015533; Fax: +358-205 50 12; Email: Lauri.Pesonen@gsf.fi; and Dr. Martti Lehtinen; Geological Museum; P.O.Box 11, FIN 00014; University of Helsinki, Finland; Phone: +358-9-19123424; Fax: +358-9-19123466; Email: Martti.Lehtinen@helsinki.fi; Web Site: http://psri.open.ac.uk/esf

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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/

June 26-30, 2000: Mineralogical Museums in the 21st Century – International Symposium on the History of Mineralogy, Mineralogical Museums, gemology, Crystal Chemistry, and Classification of Minerals, St. Petersburg, Russia. Contact: Galina F. Anastasenko, Vladimir G. Krivovichev, Faculty of Geology, St. Petersburg University, Universitetskaya Emb. 7/9, St. Petersburg 199034, Russia. Tel: +7 812 328 9481: E-mail: dept@mineral.geol.pu.ru.

July 1-6, 2000: Isotope Workshop V, Krakow, Poland. European Society for Isotope Research. Contact: Dr. P. Wachniew, University of Mining and Metallurgy, Michiewicza 30, 30-059 Krakow, Poland. Tel. +48-12-617-29-66; Fax. +48-12-634-00-10; E-mail: VIW@ftj.agh.edu.pl; Web site: http://www.ftj.agh.edu.pl/~viw

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 10-14, 2000: Symposium on the Role of Erosion and Sediment Transport in Nutrient and Contaminant Transfer, University of Waterloo — Waterloo, Ontario, Canada. International Association of Hydrological Sciences. Web Site: http://www.fes.uwaterloo.ca/Research/IAHS2000/

July 11-12, 2000: 1st International Professional Geology Conference,Universidad de Alicante, Spain. Web Site: http://www.ua.es/sri/1IPGC.htm

July 12-14, 2000: GEOFLUIDS III ´2000. Third international conference on fluid evolution, migration and interaction in sedimentary basins and orogenic belts, Barcelona, Spain. Abstract deadline: November 15, 1999. Contact: Geofluids III, Institut de Ciències de la Terra, C/ Lluis Solé I Sabarís s/n, 08028, Barcelona, Spain. Tel: +34 93 409 5410; Fax: +34 93 411 0012: E-mail: geofluids@natura.geo.ub.es; Web Site: http://www.ub.es/geoquimi/geofluids.htm

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 17-19, 2000: The Extreme of the Extremes - International Symposium on Extraordinary Floods, Grand Hótel Reykjavík, Iceland. Convened by The Hydrological Service - National Energy Authority in co-operation with The International Association of Hydrological Sciences (IAHS). Web Site: http://www.os.is/vatnam/extremes2000/

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

July 25-28, 2000: Joint Sixth International Symposium on Hydrothermal Reactions (ISHR) & Fourth International Conference on Solvo-Thermal Reactions (ICSTR), Kochi, Japan. Abstract deadline: Feb. 20, 2000. Contact: K. YANAGISAWA, Joint ISHR & ICSTR, Res. Lab. Hydrothermal Chem., Faculty of Science, Kochi University, Kochi 780-8520, Japan. FAX:+81-88-844-8362 TEL:+81-88-844-8352; e-mail:shr@cc.kochi-u.ac.jp

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

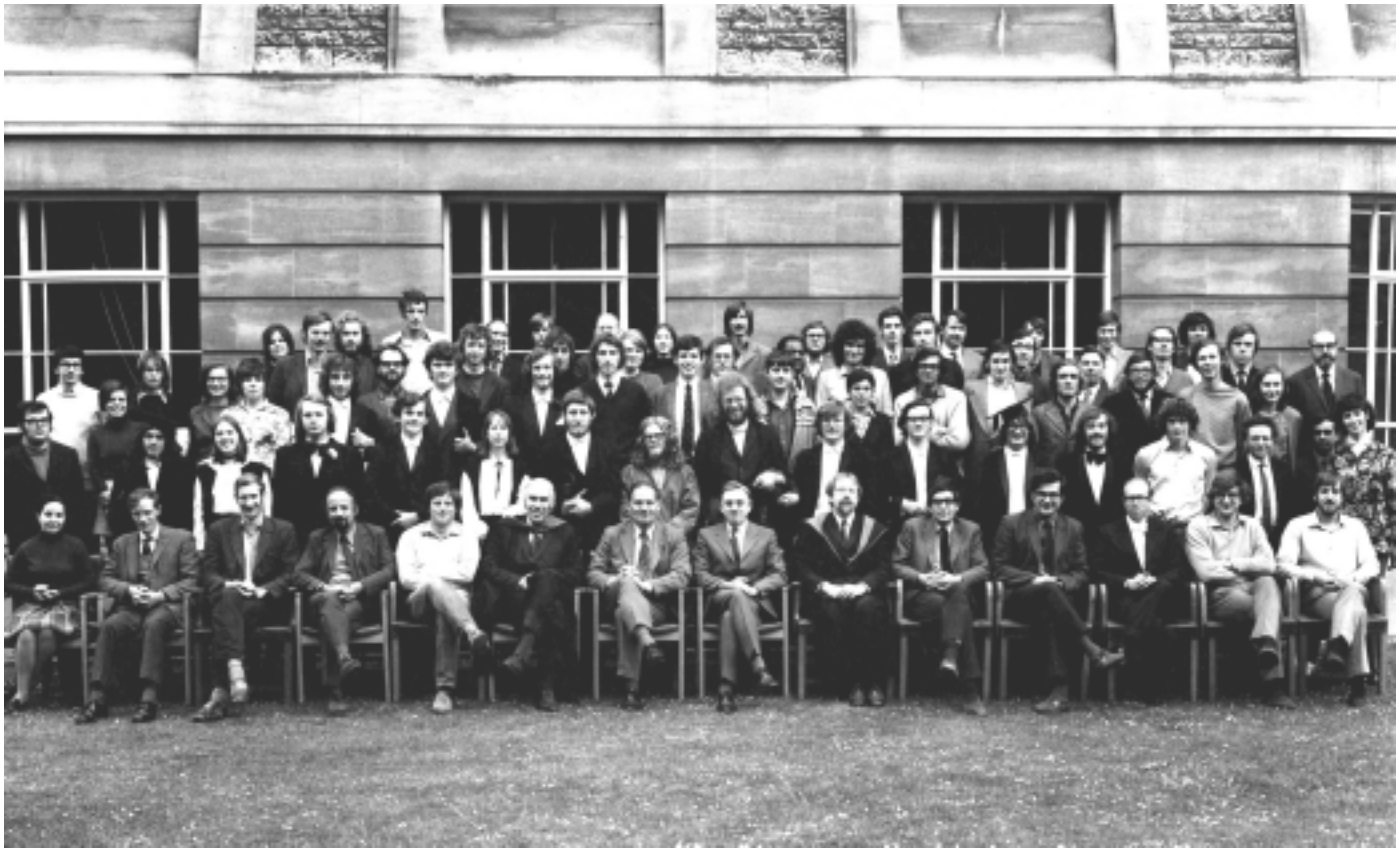
May 20-24, 2001: Goldschmidt 2001, Roanoke, VA, USA. Contacts: Mike Hochella (hochella@vt.edu) and Bob Bodnar (bubbles@vt.edu), Department of Geological Sciences, Virginia Tech, Blacksburg, VA 24061-0420.

June 10-15, 2001: 10th Water-Rock Interaction Symposium, Tanka Village Congress Centre, Villasimius, Sardinia, Italy. Organized by the University of Cagliari in cooperation with the Working Group on Water-Rock Interaction of the International Association of Geochemistry and Cosmochemistry. Contact: WRI-10 Scientific Committee Secretariat (Prof. L. Fanfani, secretary general), Department of Earth Sciences, University of Cagliari, Via Trentino 51, I-09127 Cagliari, Italy; Phone.: +39 070 6757724; Fax: +39 070 282236; E-mail: wri10@unica.it. Web Site: http://www.unica.it/wri10/

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

Sept. 9-13, 2002: Mineralogy for the new millenium (IMA 2002), 18th General Meeting of the International Mineralogical Association, Edinburgh, United Kingdom. Contact: Mr K. Murphy, Executive Secretary, Mineralogical Society of Great Britain and Ireland, 41 Queen's Gate, London SW7 5HR, United Kingdom: Phone: +44 171 584 7516; E-mail: IMA@minersoc.demon.co.uk.



Department of Earth Sciences, Oxford University, 1972. First row, first and second from the right are Pankhurst and McKenzie, fourth and fifth are Oxburgh and O'Nions. Behind them in the third row is Paul Taylor. Stephen Moorbath is fourth from the left on the first row and Hawkesworth is the light-shirted person at the back, behind Moorbath.

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