THE GEOCHEMICAL NEWS

Quarterly Newsletter of The Geochemical Society

NUMBER 104 ***ISSN 0016-7010*** **JULY 2000**

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

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Goldschmidt 2001

May 20-24, 2001
Roanoke, Virginia, U.S.A.

http://cass.jsc.nasa.gov/meetings/gold2001/gold2001.1st.html

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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), the journal ***Geochimica et Cosmochimica Acta*** (jointly with the Meteoritical Society), and co-publishes the electronic journal G^3 (jointly with the American Geophysical Union); 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 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

Neil C. Sturchio, Editor-in-Chief
The Geochemical News
Argonne National Laboratory
9700 South Cass Ave., ER-203
Argonne, IL 60439-4843 U.S.A.

Phone: 630-252-3986
Fax: 630-252-7415
Email: Sturchio@ANL.gov

From the President

What we do, and don't . . .

The Board of Directors of the Geochemical Society meets annually at the site of the Goldschmidt Conference for one day before the meeting. This year's meeting will be on September 2 in Oxford, England. As I prepare for this upcoming event, it is a good time to think about what this Society does, and also what we don't do that perhaps we should. So to start with the former:

- Under the steady hand of Executive Editor Frank Podosek and his staff, we produce the world's best geochemistry journal in cooperation with Elsevier. GCA's impact factor is far ahead of all other geochemistry journals, and is essentially the same as Earth and Planetary Science Letters. GCA is fully back on schedule, and judging from submissions, it is as popular with authors as ever.

- We co-publish *Reviews in Mineralogy and Geochemistry* (RiM&G), formerly *Reviews in Mineralogy* (RiM). RiM has sold over 200,000 books in the last 25 years through the Mineralogical Society of America (MSA). Now that MSA and the GS have teamed up to produce and sell RiM&G, we can look forward to an ever brighter future. The ultimate goal is to produce books of the highest scientific quality at the lowest possible cost (non-profit) for our membership and other scientists. Currently, this effort is headed up for the GS by Scott Wood and Jodi Rosso.

- We set up and coordinate the world's best geochemistry meetings, the annual Goldschmidt Conferences. The upcoming Oxford Goldschmidt is the 10th annual meeting. Each year, the meeting gains in popularity and diversity, defining geochemistry in an ever-broadening sense.

- We choose the recipients and award the world's most prestigious medals for geochemistry (the Goldschmidt, Treibs, Patterson, and Clarke Medals). Many of the scientists that we have chosen for these awards made their names within our branch of science, but they are known also as important international-class pioneers in many other fields and disciplines.

- We approve, coordinate, and sequence all geochemistry abstract submissions for annual GSA meetings and spring AGU meetings. This large task is handled through our program committee, currently headed by Susan Stipp and Pat Brady.

- From monies earned through financial investments of portions of our endowment, we contribute $10-15K per year to the organizers of the Goldschmidt and occasionally other meetings. The great majority of this money is used to support student attendance.

- We keep you informed through *The Geochemical News*, our quarterly newsletter that you are reading right now. This product has been substantially improved in recent years because of the foresight and hard work of Editor-in-Chief Neil Sturchio.

All of the above activities, and several others for which space does not allow mention, are due to the volunteer effort of more than 60 professional geochemists. Without them, none of this would be possible. But given our situation, is there more that we could do? Certainly. And we will be discussing certain items along these lines at the Oxford Board meeting. We can do a better job at making the Geochemical Society truly international. To this end, we will hopefully approve a plan to hold the 2003 Goldschmidt meeting in Japan. We could award more medals given the increasing number and diversity of geochemists in the world today. To this end, we will be discussing the possibility of awarding medals in the future that are discipline specific. And I could go on and on.

What ideas do you have that we should be considering? What does the GS not do now that you think it should? Let me know! I'm at hochella@vt.edu. I will organize your ideas and discuss them with the Board.

And finally . . .

Before I sign off this quarter, allow me to thank those committee members whose terms have just ended. They are: Laura Crossey and Patricia Dove (Clarke), Dean Presnall and Jonathan Patchett (Nominations), Gerry Wasserburg (Goldschmidt), Larry Edwards (Program), and Malcolm McCulloch and Judith McKenzie (Patterson). I have just sent personal letters to all, but perhaps nothing is better than a public thanks. And why not. These people, in many important ways, have made the Society function and work over the last three years. Thanks!

Mike Hochella
President of The Geochemical Society

Geochemical Society Business

Please address all inquiries and correspondence concerning memberships, subscriptions, address changes, and charitable contributions to:

Business Manager, The Geochemical Society
Washington University
Earth and Planetary Sciences
One Brookings Drive, Box 1169
St. Louis, MO 63130, USA
Tel. 314-935-4131; Fax. 314-935-4121
e-mail: office@gs.wustl.edu

Plans Under Way for Goldschmidt 2001

Planning for Goldschmidt 2001 is already well under way. The meeting will be held in the spectacular Blue Ridge Mountains of Virginia, USA, in the scenic city of Roanoke, from May 20th to the 24th, 2001. Here are some meeting highlights:

- For the first time, sponsorship of the meeting will include the Mineralogical Society of America. MSA promises to bring an exciting new dimension to the meeting that is already established as the world's premier geochemistry conference.

- An Executive Planning Committee is currently assembling cutting-edge, interdisciplinary symposia and theme sessions. There will also be ample space for general contributions in all fields of geochemistry.

- The major venue for the meeting will be the Hotel Roanoke and Conference Center. The Hotel Roanoke, built in 1882, has hosted US Presidents and dignitaries from around the world. Constructed in the late 19th-century grand American tradition, it is on the United States National Registry of Historical Places. It was recently completely restored to recapture its original charm and elegance.

- The adjoining conference center is new and state-of-the-art, yet classic in interior design and appointment. It will provide the best meeting facilities ever utilized by a Goldschmidt Conference. Check out both the Hotel Roanoke and the Conference Center at http://www.doubletreehotels.com/DoubleT/Hotel100/100/100Main.htm

Hotel Roanoke and Conference Center, Roanoke, Virginia

Visit and bookmark the new GS web site
http://gs.wustl.edu

Letters

Dear Editor:

In the last issue of *The Geochemical News* (vol. 103, April 2000), Martin Whitehouse devoted himself to the commendable task of briefing a broader audience on questions related to the oldest record of life on Earth. From his presentation of the carbon isotope story, the uninitiated reader may, however, get the impression that the isotope approach to the Isua record was put on the agenda in the late 90's only whereas, in fact, it had been fully in the focus already 20 years ago on the very pages of *Geochimica et Cosmochimica Acta* (Schidlowski et al., 1979**,** Carbon isotope geochemistry of the 3.7 x 10^9-yr-old Isua sediments, West Greenland: implications for the Archaean carbon and oxygen cycles. *GCA* **43**, 189-199). Moreover, the wider implications had been set out in befitting detail in two major reviews (Schidlowski, 1987, Application of stable carbon isotopes to early biochemical evolution on Earth. *Ann. Rev. Earth Planet. Sci.* **15**, 47-72; Schidlowski, 1988, A 3,800-million-year isotopic record of life from carbon in sedimentary rocks. *Nature* **333**, 313-318, 1988). While the work performed during the current rennaissance of Isua studies certainly has merits in its own right (notably by the application of modern microanalytical techniques), it should be kept on record that the basic concepts had been established more than two decades ago. It might be, therefore, a matter of fairness and intellectual honesty to also refer to the people who baked the cake along with those who put on the icing.

Manfred Schidlowski
Max-Planck-Institut fur Chemie
D-55020 Mainz, Germany

Molecular Modeling Theory and Applications in the Geosciences

Geochemical Society and Mineralogical Society of America

Short Course

Randall T. Cygan and James D. Kubicki, Organizers

May 19 and 20, 2001
(precedes Goldschmidt Conference)
Hotel Roanoke and Conference Center
Roanoke, Virginia, USA

The course will focus on techniques and applications for modeling a wide variety of problems in mineralogy and geochemistry. Those interested in using molecular modeling in research or understanding papers in computational chemistry should attend.

www.sandia.gov/eesector/GScourse.htm

Special Offer: Stumm Issue of GCA Available

The collection is 600 + pages and contains 53 articles as well as the citation for the Goldschmidt Medal and Werner Stumm's acceptance speech. Cost is $40. Orders should be made directly to Peter Henn at Elsevier with the form copied below.

Geochimica et Cosmochimica Acta
Volume 63 Nos 19/20

GEOCHEMISTRY IN AQUEOUS SYSTEMS
(A Special Issue in Honor of Werner Stumm)

Guest Editors: Susan Stipp, Patrick Brady, K. Vala Ragnarsdottir and Laurent Charlet

* Please send me ..... copy/copies of *GCA* Vol. 63, Nos 19/20

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Goldschmidt 2000

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

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

ANNOUNCEMENT

20th International Meeting on Organic Geochemistry
September 10-14, 2001
Nancy Congress Centre, Nancy, France

The meeting will consist of plenary (morning) and parallel (afternoon) sessions and poster sessions dedicated to a variety of subjects.

- Petroleum geochemistry
- Biogeochemistry
- Environmental geochemistry
- New Techniques and developments
- Hot and controversial subjects

Important dates

- Deadline for submission of abstracts
  December 1, 2000
- Distribution of second circular
  May 15, 2001
- Advance registration and hotel reservation
  June 30, 2001
- Conference and submission of manuscripts
  September 10-14, 2001

For information and first circular, please feel free to contact us by mail or e-mail at :

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FRANCE
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The Geochemical Society 2001 Awards

Nominations

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), G. Eglinton (2000)

Nominations for the 2001 V.M. Goldschmidt Award should be submitted before October 15, 2000, to:

Dr. Bernard J. Wood
Dept. Geology
Queen's Rd., Wills Memorial Bldg.
Bristol, BS8 1RJ
UK

Tel: 44-272-287792
Fax: 44-272-253385
Email: b.j.wood
@bristol.ac.uk

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. Eligibility for this award is met if either of the following criteria is satisfied on the first day of the year in which the award is given: (a) the candidate must have received a recognized doctorate or its equivalent within the last six (6) years; or (b) must not have celebrated their thirty fifth (35th) birthday. 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), J. Farquhar (2000)

Nominations for the 2001 F.W. Clarke Award should be submitted before October 15, 2000, to:

Dr. Lisa M. Pratt
Indiana University
1005 E. 10th Street
Bloomington, IN 47405
USA

Tel: 1-812-855-9203
Fax: 1-812-855-7916
Email: prattl
@indiana.edu

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), E.A. Boyle (2000)

Nominations for the 2001 Clair C. Patterson Award should be submitted before October 15, 2000, to:

Dr. Lynn M. Walter
University of Michigan
2534 C.C. Little Bldg.
Ann Arbor, MI 48109
USA

Tel: 1-313-763-4590
Fax: 1-313-763-4690
Email: lmwalter
@umich.edu

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 Peggy H. Ostrom, Dept. Geological Sciences, Michigan State University, 206 Natural Science Building, East Lansing, Michigan, 48824, USA. Phone: 1-517-353-9768; Fax: 1-517-353-8787; Email: ostrom@msu.edu

Call for Nominations for 2001 Joint EAG-GS
Geochemistry Fellows

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.

Please take the time to honor your deserving friends and colleagues! It is up to you to ensure that the roll of Fellows is representative of the Geochemical Community!

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. The nomination should include the nominator's name, address, telephone number, and signature.

Nominations should be sent by Nov. 15, 2000 to:

Dr. D.J. Wesolowski, Secretary
Phone: 1-865-574-6903
The Geochemical Society
Fax: 1-865-574-4961
Oak Ridge National Laboratory
Email: wesolowskid@ornl.gov
P.O. Box 2008
Oak Ridge, Tennessee 37831-6110
USA

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, C. Wayne Burnham, William S. Fyfe, Nobumichi Shimizu

2000 Harry Elderfield, Gunter Faure, Fred A. Frey, Gilbert N. Hanson, Frank J. Millero, Francois M. Morel, Minoru Ozima, Douglas Rumble II, Terry M. Seward, G. Alan Zindler

Sulfate Minerals
GSA sessions/MSA short course

Annual GSA meeting
Reno, Nevada, November 13-16, 2000

Theme Session T-37
Sulfate Minerals 1. Hydrothermal Systems
(A tribute to Robert O. Rye)
Theme Session T-38
Sulfate Minerals 2. Low Temperature Environments

Invited speakers for session T-37 are: Bob Rye, Alfred Truedell, Virgil Lueth, and Barney Poole. Topics will include acid-sulfate hydrothermal systems, related mineralization, stable isotopes, radiometric dating, aqueous sulfate in active geothermal systems, and sedimentary-exhalative deposits.

Invited speakers for session T-38 are: Alexandra Navrotsky, I-Ming Chou, Jerry Bigham, and Clare Robinson. Topics will include thermodynamic properties of sulfate minerals, acid mine drainage, geochemical modeling, metal cycling in the environment, stable isotopes, radiometric dating, and paleoclimate studies.

The GSA abstract deadline is July 25 (paper) or August 1 (electronic). For more information see: <http://www.geosociety.org/meetings/2000/t-top4.htm> or contact Charlie Alpers (cnalpers@usgs.gov; tel. 916-278-3134).

A related short course on "SULFATE MINERALS: CRYSTALLOGRAPHY, GEOCHEMISTRY, AND ENVIRONMENTAL SIGNIFICANCE," sponsored by the Mineralogical Society of America and The Geochemical Society, will be held Nov. 11-12, 2000, at the Granlibakken Resort, Tahoe City, CA. Co conveners are Charlie Alpers (cnalpers@usgs.gov), John Jambor (jlj@wimsey.com), and Kirk Nordstrom (dkn@usgs.gov). For more information see: <http://www.minsocam.org/MSA/SC_SO4.html>.

Goldschmidt 2000:
The foremost geochemical conference in 2000

Goldschmidt 2000 is sponsored by both the European Association of Geochemistry, the Geochemical Society and the University of Oxford. The conference will cover all the most important topics in geochemistry, and a list of symposia already planned is given below. The conference will begin with the Ice Breaker Party at 3:00 pm on Sunday September 3rd and will finish at 3:0 pm on Friday September 8th, 2000 in Oxford, UK. The afternoon of Wednesday September 6th will be free for delegates to explore the charms of Oxford or to participate in the excursions that are planned (as detailed below). Further information on this conference will be available at the Goldschmidt 2000 website at

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

Oxford is Britain's oldest University and is the beautiful and historic heart of a diverse and ancient city. From the founding of the first Colleges in the thirteenth century, Oxford established itself as a centre of academic excellence. The conference will be based around the Oxford University Museum and delegates to Goldschmidt 2000 will be accommodated in Christchurch, Keble, St Anne's and St. Hugh's Colleges. Oxford is less than an hour from London's Heathrow Airport, and is extremely well served by motorways and rail. It is set in the beautiful Cotswold countryside, and is within easy reach of the Shakespearian theatres of Stratford-upon-Avon.

Important Dates:

May 1	Deadline for registration at special rates
May 15	Abstract deadline
July 1	Final announcement
September 3-8	Goldschmidt 2000

Registration:

More than 800 potential delegates have already registered their interest in this conference, and we therefore expect that there will be a large number of delegates registering for the meeting. Submitted abstracts will be reviewed by the organising committee, and the acceptance of abstracts and registration will be confirmed in June. The registration form is now available from http://www.campublic.co.uk/science/conference/Gold2000/front.html

Registration Fees:

Every effort has been made to keep registration fees to a minimum, especially those for graduate students. The registration fee for delegates will 150 pounds, that for graduate students only 60 pounds; the abstract fee is 35 pounds. This reduced price registration has been extended right up to the registration deadline of May 15th, as this second circular is being distributed later than it was originally hoped. Payment can be made in pounds sterling, dollars, Euros, French Francs and German Marks. Registration will take place once the payment has been received by Cambridge Publications.

Accommodation:

Forms for requesting accommodation are available from on the Goldschmidt 2000 web site. Delegates will be accommodated in Oxford Colleges or at Oxford Brookes University. Oxford University is unmatched in the UK both for the age of its foundation (twelfth century) and the elegance of its College architecture. The Colleges are all within walking distance of the lecture theatres. The accommodation available in Oxford is limited to about 1000 places, so we recommend that those wishing to attend the meeting complete their registration and accommodation booking and payment as early as they can. Accommodation may be booked in Oxford's Colleges and breakfast will be provided at no additional cost. These delegates may also book evening meals. More economical accommodation is available at Oxford Brookes University, which is linked by a frequent bus service to the city centre. Payment can be made in pounds sterling, dollars, Euros, French Francs and German Marks. The request for accommodation will not be processed until the payment has been received.

The Awards Banquet:

The Awards Banquet will be held in Keble College (http://www.keble.ox.ac.uk/conference/catering.khtml) which boasts one of the finest feasting halls in Oxford. A banquet in Keble College Oxford has been described as a 'once in a lifetime experience', and the organising committee hope that as many delegates as possible will be able to enjoy this occasion. Places for this are limited to 400, and early booking is recommended.

Eating in Oxford:

The limited number of restaurants and pubs in central Oxford may struggle to cope with the influx of 1000 geochemists, and use of College facilities for lunch and evening meals is recommended. Sandwiches will be available at one of the conference locations at lunchtime each day, but a proper cooked luncheon is available at Keble College. Most delegates should plan to use one of these options, as few delegates will be able to find lunch in the city during the time available. Delegates who choose not to book evening meals each night, or those wishing to sample the hospitality at a different College may also book a place at a College Dinner in a different College.

Excursions:

A range of excursions is planned for Goldschmidt 2000. If there is sufficient interest among delegates these will include a visit to Stratford-upon-Avon to see a Shakespeare play (with dinner), a tour of the famous Cotswold villages (with tea) and special guided tours of the geological and mineralogical displays of the Natural History Museum in London.

Transport:

The centre of Oxford was designed for horses and the occasional carriage and is not well suited to cars as parking space is extremely limited. We strongly recommend that delegates plan to come to Oxford by train or by coach as these services are both rapid and frequent. Oxford is less than an hour from London by train, and this service operates every 30 minutes during the day. There are also direct coach services between Oxford and the London Airports.

Special Sessions at Goldschmidt 2000
September 3-8, 2000
Oxford, U. K.

Terrestrial Planets and Meteorites
Alex Halliday & Ed Young

Chemistry and Dynamics of the Earth
Bernie Wood & George Helffrich

Subduction Zone Processes
Chris Hawkesworth, Jon Blundy & Dave Rubie

Rapid Climate Change (Continents/Oceans)
Edouard Bard & Frank McDermott

Biological Geochemistry
Derek Lovely, Rob Raiswell & Matthew Collins

Ocean Circulation: Past and Present
Bill Jenkins & Gideon Henderson

Flow and Reaction of Fluids in Crust
Marion Holness & Terry Seward

Weathering and Erosion: Mechanisms and Rate
Mike Bickle, Niels Hovius & Mike Summerfield

Mineral Surfaces and Reactions
Vala Ragnarsdottir & Andrew Putnis

Mantle Dynamics and Melting
Eric Hauri & Tim Elliott

Life in Extreme Environments
Mike Russell & Everett Shock

Computational Geochemistry
Keith Refson & John Brodholt

Chemistry and Microbiology of Pollution
Adrian Bath & Barbara Sherwood-Lollar

Open Sessions

Surface Chemical Processes in Natural Environments

October 1-6, 2000

MONTE VERITÀ , ASCONA, SWITZERLAND

The goal of the Monte Verità workshop is to bring together leading scientists studying surface reactions in natural environments from different perspectives. Special emphasis will be on modelling and further developments and applications of spectroscopic and microscopic techniques, in particular synchrotron-based methods such as XAFS, XRF, micro-spectroscopies, and AFM. Further topics are macroscopic sorption equilibria and kinetics, and theoretical approaches to understanding surface reactions. For information on the workshop and submission of abstracts see:

http://www.ito.umnw.ethz.ch/SoilChem/mverita/index.html

Confirmed Invited Speakers:

Alain Manceau, Université Joseph Fourier, France; ***Paul Bertsch***, University of Georgia, USA; ***Satish Myneni***, Princeton University, USA, ***William Bleam***, University of Wisconsin, USA; ***Donald Sparks***, University of Delaware, USA; ***Susan Stipp***, University of Copenhagen, Denmark; ***Willem van Riemsdijk***, Agric. Univ. Wageningen, Netherlands; ***Dimitri Sverjensky***, John Hopkins University, USA; ***Michael Bradbury***, Paul Scherrer Institute, Switzerland; ***Gerhard Brümmer***, University Bonn, Germany; ***Kim Hayes***, University of Michigan, USA; ***Stephan Hug***, EAWAG, Switzerland; ***Martin Kaupenjohann***, University Hohenheim, Germany; ***David Kinniburgh***, British Geological Survey, England; ***Jacques Buffle***, University of Geneva, Switzerland; ***Dimitri Kulik***, National Academy of Science, Ukraine; ***Stephan Kraemer***, ETH Zurich, Switzerland; *Kathryn Nagy*, University of Colorado, Boulder, USA; ***Tobias Reich***, Research Center Rossendorf, Germany; ***James Rustad***, Pacific Northwest National Lab, USA; ***Andreas Scheinost***, ETH Zurich, Switzerland.

John C. Winters

Remembrance of His Life and Contributions

(March 25, 1924 - September 12, 1999)

If you have ever characterized a crude oil by gas chromatography, interpreted biodegradation of a subsurface crude oil, or simulated natural oil generation by hydrous pyrolysis, then you surely can appreciate the pioneering contributions John C. Winters made to the field of organic geochemistry. As supervisor and member of the Amoco Production Company Geochemistry Group (Tulsa, OK) from 1974 to his retirement in 1989, he continually energized Amoco with new ideas and research challenges based on his own research experiences and those of a network of cherished colleagues in a wide array of scientific disciplines. John was a true Aristotelian, with knowledge being based on experiments and observation. Seemingly good ideas had no reality until they were scrutinized and verified through experimentation and the evaluation of data. He always emphasized the importance of research having relevance, rather than just being interesting. If someone came into his office saying they had found something interesting, he would quickly reply with a smile "the world is filled with interesting things, show me something relevant". He always considered energy as a relevant research endeavor, and he was dedicated to unlocking the secrets of petroleum and understanding its origin. Although he emphasized relevancy in research, he also appreciated the importance under-the-bench research had within a successful scientific program. He readily provided researchers with sufficient autonomy, time, and funds to follow leads and set up additional experiments to explore new directions. It was a great learning experience for all who had the pleasure of working under John's leadership.

John was the younger of two boys born to Edith and John Winters in Kansas City, Kansas. As a young boy, John worked at several of his father's service stations and bulk plant operations in Kansas and Missouri. It is here that John may have first become interested in petroleum. He had a variety of interests from hunting to music. He started playing the piano at the age of five and became an accomplished pianist before his teens. At the age of 10, he won the Major Bowes talent competition in Radio City- New York and was considered a prodigy on the piano by many. His passion for science was innate but his brother Charles surely had an influence. Charles was 8 years older and had completed his M.S. and started his Ph.D. dissertation at MIT in chemical engineering at the age of 22. During Charles' years at MIT, John, in his early teens, spent several summers doing lab work on projects for his brother.

He started at Kansas State University at the age of 16, and decided to go into chemistry rather than music. The attack on Pearl Harbor during his sophomore year put his college education on hold for the next four years. John enlisted in the Army Air Force where he successfully completed flight training with his new life-long friend Warren Wilkens. He became a P-47 fighter (a.k.a. Jug) pilot in the 362nd Fighter Group of the 378th and 379th squadrons. John entered combat duty following the Normandy invasion. His fighter squadron was based in Europe, providing air support for the rapid advance of Patton's Third Army. They pulled up stakes and moved to forward airbases regularly. The fighter planes were used hard, often flying several sorties in a day. John crashed south of Frankfurt while on a mission in a P-47 that had sustained damage earlier that day. He remained on active duty despite internal injuries that later required surgery. With

John, the World War II fighter pilot, in the cockpit of a plane.

the surrender of Germany, John was reassigned to the Pacific theater, but was honorably discharged with the ensuing surrender by Japan.

John returned to Kansas City where he underwent surgery to save a kidney that had been badly damaged as a result of his flying. John, who originally started college as one of the younger freshmen was now returning to Kansas State University as one of the older sophomores. He completed his B.S. degree and continued on in chemistry for an M.S. degree under the direction of Dr. A. C. Andrews. His thesis dealt with the structure of compounds containing silicon-nitrogen bonds and was completed in 1950. During these years as a student, John met Wanda Nanninga on a blind date in 1947. They fell in love and two years later they were united in a marriage that would make even the strongest of covalent bonds appear weak. John had planned to go on for his Ph.D., but was offered a research position as a analytical research chemist with Standard Oil of Indiana. At the Whiting Laboratory in Indiana, John worked on laboratory-scale fabrication and operation of improved distillation apparatuses for finer separations of crude-oil components. Some of this work led to larger scale pilot plants, which led to the installation of commercial refinery units in Whiting, Yorktown, and Sugar Creek. In addition to his success as a researcher, John and Wanda had their son Warren in 1952. Warren was an endeared son whose love,

John, the analytical chemist, demonstrating laboratory-scale petroleum distillation unit at Whiting laboratory.

acumen, and devotion were a continuous source of pride and joy in John's life. I believe it was through the raising of Warren that John learned to mentor the unbridled enthusiasm and quest for knowledge of the young.

Dr. E. B. Tucker, who was John's mentor at the Whiting Lab, instilled in John the importance of well-disciplined scientific research, as well as professionalism in one's behavior and dress. John's work in the Analytical Research Division led him to gas chromatography in 1956 as a promising means of separating petroleum constituents. During this research, he became acquainted with one of the pioneers of gas chromatography and, thereafter, a life-long friend, Denis Desty. John collaborated with Ronald Martin and Jack Williams in analyzing crude oils from around the world by gas chromatography, leading to their benchmark paper in 1963. During their chromatographic studies of crude oils, peculiar chromatograms of oil from the Bell Creek field led Jack Williams and John to another benchmark paper in 1969 on subsurface microbial degradation of petroleum. As a result of laboratory experimentation on biodegradation of crude oil, John made another life-long friend, Reino Kallio, who was a microbiologist at the University of Illinois and did the definitive work on omega-oxidation of hydrocarbons.

By 1970, John's leadership in research moved him into a lofty administrative management position where he organized and facilitated the move of laboratories from the Whiting location to a new research complex in Naperville, Illinois. With a successful move and the accompanying nightmarish logistics behind him, John's passion for research enlivened him to transfer to the Organic Geochemistry Group of Amoco Production Co. Research Center in Tulsa. For the next 16 years, the Organic Geochemistry Group flourished under his leadership. In addition to John's pioneering work with Mike Lewan and Jack Williams on simulating natural oil generation through hydrous pyrolysis, he also encouraged pioneering studies on basin modeling and pyrolysis gas-chromatography by Eric Bandurski, biomarker mass spectrometry by Dave Dolcater and Malvin Bjorøy, and kerogen infrared spectroscopy and coal liquefaction by Marwin Kemp. John also conducted research on down-hole heaters for subsurface retorting with Denis Desty and Eric Bandurski. How fortunate the Amoco Organic Geochemistry Group and the scientific community are to have had a member in their company with such vision, spirit, intelligence, and, of course, relevance.

John, the geochemist, in the field collecting Utah oil sample with R. E. Kallio (hard hat).

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In 1984, John suffered a near fatal heart attack, but within 2 months he was back at the lab with the same yearning for knowledge as when he left. He used to say " they're going to have to carry me out of here"! Fortunately, that was not the case. John retired in 1989 but continued to avidly read technical literature nightly and took up precision shooting. John's heart gave out on September 12, 1999 in his Tulsa home. He died in full charge of his brilliant mind and pleasant personality, which endeared him to so many people throughout his life. He is survived by his loving wife Wanda, devoted son Warren and his wife Barbara, endeared granddaughter Leslie, and inspiring brother Charles.

Michael D. Lewan
U. S. Geological Survey, Denver

Geochemistry of Crustal Fluids

Fluids in the Crust and Chemical Fluxes at the Earth's Surface

December 2-7, 2000
Granada, Spain

Chairman: Sigurdur R. Gislason
Vice-Chairman: Jordi Bruno

http://www.esf.org/euresco

Announcement

Earth System Processes

A Global Meeting
Edinburgh, Scotland
June 24–28, 2001
Edinburgh International Conference Center

The Problem

The plate tectonics paradigm developed in the mid-Twentieth Century provides a basic description of the dynamic behavior of the Earth's rigid surface layer. A great breakthrough, it nonetheless constitutes only a starting point for understanding of the Earth System that sustains humankind and all known life. Even in the present period of increased scientific specialization, geologists have come to realize that it is by working closely with scientists in other fields that they can best contribute to this exciting, but demanding task. The interactions among the lithosphere, hydrosphere, atmosphere and biosphere, in particular, require integrated interdisciplinary study and have social and economic implications.

The Geological Society of America (GSA) and the Geological Society, London (GSL), two of the world's oldest and largest organizations of earth scientists, are therefore combining their resources to co-convene a broad, interdisciplinary meeting to discuss the present state of knowledge of Earth System Processes.

The Venue

Teams of specialists with diverse backgrounds are already working together on interdisciplinary research seeking integrated solutions to the complex problems of Earth System science. These teams can be regarded as the modern embodiments of the solitary 'naturalists' of the 18th and 19th Centuries, such as James Hutton, Charles Darwin, James Dwight Dana, and John Wesley Powell. The GSA and GSL believe that it is fitting, therefore, that a meeting on Earth System Processes convened at the start of the 21st Century should take place in Edinburgh, Scotland. It was in that ancient city that James Hutton lived and studied, and Charles Darwin received his earliest education in the natural sciences as a medical student. In addition to oral and poster presentations, the meeting will include visits to localities of note in the history of the earth sciences such as Siccar Point, Salisbury Craigs, and the Moine thrust belt. It will step into the 21st Century with interdisciplinary workshops to be held at state of the art laboratories throughout Scotland and England.

Earth System Processes

Earth System Processes will focus on two themes critical to the understanding of how our planet works. Both themes will involve comparison with other planetary systems in the Solar System and beyond. Both will take into account critical extraterrestrial influences:

Earth System Linkages will explore the relationships between the solid Earth, the hydrosphere, atmosphere, cryosphere, and biosphere.

Earth System Evolution will examine the way in which processes controlling the nature of the planet have changed since the birth of the solar system 4.5 billion years ago.

The meeting will be limited to four parallel sessions and so the number of oral presentations will be strictly limited to some of the topics of most general interest, but there will also be a major emphasis on poster presentations. The detailed shape of the meeting will be determined by the autumn by interaction between the technical Committee and the Geoscience community. **If you are interested in making a contribution, suggesting ideas, or organizing a session, please contact one of the co-chairs or members of the Technical Committee.** The topics attached to each name refer to a broad area of interest, not the titles of specific sessions. They are listed to help you decide who might be the best person to contact with your ideas.

Technical Committee Co-chairs:

Ian Dalziel (University of Texas at Austin)	Ian@utig.ig.utexas.edu	Tectonics and Earth history
Ian Fairchild (Keele University)	i.j.fairchild@keele.ac.uk	Earth surface geochemical processes; climate change

Technical Committee Members:

Richard Alley (Penn State U.)	rba6@psu.edu	Cryosphere and Earth system models
Chris Barnes (U. Victoria)	Crbarnes@uvic.ca	Paleoceanography and paleobiology
Elly Brouwers (USGS, Denver)	brouwers@usgs.gov	Hydrology & catchment systems: interactions &impacts
Julian Dowdeswell (U. Bristol)	j.a.dowdeswell@bristol.ac.uk	Cryosphere and oceans
Mike Edmunds (BGS, Wall'fd)	wme@bgs.ac.uk	Groundwater, hydrogeochemistry and palaeohydrology
Jim Kasting (Penn State U.)	jfk4@psu.edu	Earth and planetary system sciences
Andrew Knoll (Harvard U.)	aknoll@oeb.harvard.edu	Biology and the Earth System through time
David Macdonald (U. Aberdeen)	d.macdonald@abdn.ac.uk	Petroleum geology, sedimentology and tectonics
Richard O'Connell (Harvard)	oconnell@geophysics.harvard.edu	Geodynamics
Kathy Campbell (U. Auckland)	ka.campbell@auckland.ac.nz	Hydrothermal systems
Andrew Watson (UEA)	a.j.watson@uea.ac.uk	Atmosphere and ocean compositions through time
Rob van der Voo (U. Michigan)	Voo@umich.edu	Supercontinents: assemblies, evolution, break-up

Edinburgh representatives

Roger Scrutton (U. Edinburgh)	Roger.Scrutton@glg.ed.ac.uk	Marine geophysics; Edinburgh representative
Andrew McMillan (BGS, Edin.)	A.McMillan@bgs.ac.uk	Field excursions

Meeting sponsors

Geological Society of America, Geological Society of London, British Geological Survey, U.S. Geological Survey, University of Edinburgh, Edinburgh Geological Society

For more information and updates:
www.geosociety.org or *www.geolsoc.org.uk.*

Weeping rivers: Cyanide Spills in Romania

This article reviews the recent environmental problems with which in particular Romania, Hungary and Yugoslavia were confronted earlier this year. A series of disasters that had started with the cyanide spill on January 30, 2000. What happened where and when? How did the people respond? Why is cyanide so toxic? What is the prognosis for the affected area? This review is a necessary appetizer for an article on the geochemistry of cyanide, which will appear in the following issue of The Geochemical News.

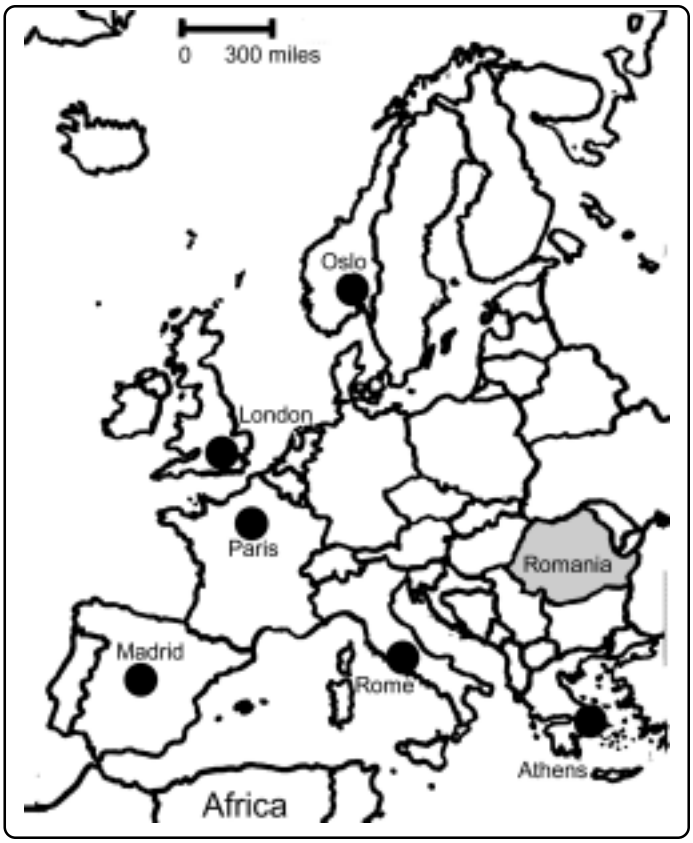

Figure 1. Map of Europe showing the locations of some of its capitals and of Romania. (North is up.)

Baia Mare is a town of 130,000 inhabitants in Maramures (Máramaros) County in Northwest Romania, close to the Ukraine. The name means 'large spa'. There was once a famous artists' and painters' school here. Painters appreciated the little spa in the foothills of the Carpathian Mountains because of the pure azure-blue skies.

Baia Mare has since then become heavily industrialized. The region already had a long history of mining, but the picturesque hills contained ores as well. In the sixties, the Ceaucescu regime lost no time to exploit these natural resources. Maramures County currently has seven active sites, which produce Au, Ag, Pb, Zn and Mn. Wastes are stored in flotation ponds and tailing dams. Metallurgical plants such as lead and copper smelters are also found in the area. Baia Mare is considered the most polluted area in Romania. Doctors say that children here suffer from abnormally high levels of lead in their bodies. Lead poisoning in fact. A WHO report lists mean blood levels of 0.633 mg/L for children living near the Baia Mare lead smelter. It is hardly a surprise to hear that life expectancy appears to be much lower here than in other Romanian cities.

The Aurul S.A. plant, which attained world-wide name recognition in the beginning of this year, is only one of several plants in the area that processes solid wastes from gold and silver extraction. High concentrations of free cyanide are used to extract gold and silver from these wastes. The Aurul plant was designed with a throughput capacity of 2.5 million tons per year. It had only started its operations in May 1999 and was building a containment dam according to the concept of "construction by operation", over a low starter dam. Three tailing dams, adding up to about 23 million tons of material with between 0.30 to 0.60 grams of recoverable gold per ton, were going to be processed and would have yielded approximately 1.6 tons of gold and 9.0 tons of silver annually. The Australian company Esmeralda Exploration Ltd. owns 50% of the shares in the Aurul plant. The Romanian government holds 45% and the remaining 5% are privately owned by foreign investors.

Spill number 1

A worker at the Aurul plant reported an accident at 10 p.m. on January 30, 2000. The temperatures had been above freezing during the day. It had been raining and snowing and there was a snow cover of about 25 inches (60 to 70 cm) in the tailings pond. Prior to that, there had been five weeks of sub-zero temperatures. Part of the dam was flooded and washed away. Thirty minutes later, the local EPA was informed and another half hour later, the plant stopped its operations. About 100,000 cubic meters of water containing free cyanide and cyanide complexes had been released into the environment. Based upon hydrological information combined with plume progress measurements, it has been estimated that this water contained between 50 and 100 tons of cyanide. The following day, the company treated the spillage with sodium hypochlorite. The spillage was finally stopped in the still of the night of February 2.

The Romanian satellite communication system was not working at the time of the spill and Budapest was alerted by fax on January 31, close to 9 o'clock at night. This was early enough for the Hungarian authorities to take measures. The Romanians living close to the spill site should have been alerted sooner, but somehow, ten hours were lost before the local Waters Authority was informed.

The contaminated water first entered the Sasar river near Baia Mare, then the Lapus river. The Lapus river joins the Somes (Szamo or Szamos, in Hungarian), which flows into Hungary. There it joins the Tisza, close to the border with the Ukraine. The pollution plume reached the Tisza on February 4. The cyanide concentration was reported to be 32.5 mg/l, which is about 300 times above acceptable levels. Other reports even mention concentrations as high as 7,800 mg/l. For comparison: the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC,

1992) list a maximum of 0.005 mg/L. The cyanide and heavy metals have had a catastrophic impact on the wildlife in and around the Tisza. "Unbelievably huge quantities of dead fish" were hauled out of the Tisza right after the spill.

Initially, the Esmeralda company and other parties involved came up with other explanations for the demise of the fish. The temperatures, for instance. In Eastern Europe, it gets cold every winter, though, and low temperatures have not killed fish before in the area. "It is like saying that a kangaroo that was hit by a car, was killed by the sun", commented someone. It was not until mid-March when the Australian mining company Esmeralda finally stated that it regretted the accident.

The Tisza is a tributary of the Danube and Hungary's second-largest river (Fig. 2). It joins the Danube in Serbia. The plume took another week to travel to the Danube, where it arrived on February 10. It is said, that the cyanide levels had decreased about an order of magnitude. The plume ended 1200 kilometers farther downstream in the Black Sea, after having traversed the Danube delta wetlands first. No major fish kills were reported from the Danube.

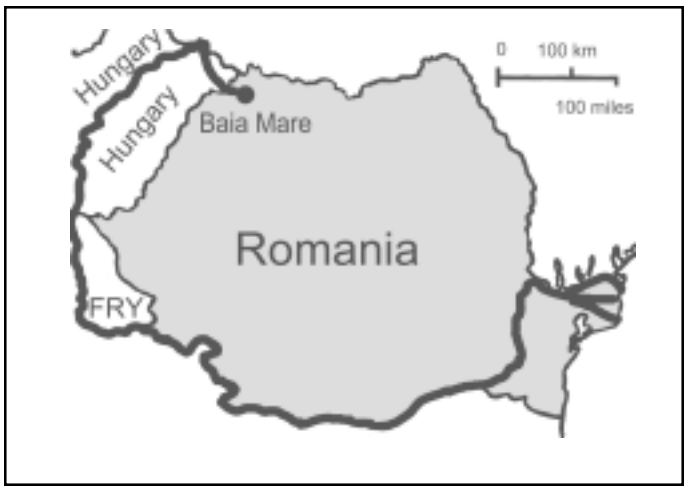

Figure 2. Map of Romania and its surroundings. The bold line is the path taken by the cyanide spill. (North is up.)

Spill number 2

During the week after the big spill, Hungarian officials received reports of new leaks into the Lapus and Sasar (both tributaries of the Tisza). The Hungarian Environment Ministry later confirmed that there had been another spill, but this time less serious.

Spill number 3

On March 10, a dam broke in the Novat reservoir of Borsabánya (Baia Borsa). It was the result of heavy rain and snow melt that caused a containment dam to rupture, according to the Ministry of Waters, Forestry and Environmental Protection in Bucharest. Wastewater, with a pollution level of more than twice the EU standard, flowed through the breakage point at a rate of 40 to 50 liters per second. About 20,000 metric tons of sludge from the state-run Baia Borsa lead and zinc mine were spilled. This mine is located about 380 km northwest of Bucharest and very close the origin of the cyanide spill. This copper, zinc and lead pollution also flowed into Hungary's Tisza.

The Hungarian response

Hungary took the brunt of the disaster. If you look at the figures, you will see that the spill left Romania rapidly, then traversed almost the entire length of Hungary and finally flowed into the Danube, which forms the border of most of Romania.

Due to the very efficient response of the governments and citizens, large parts of nature reserves, such as the Tisza Lake, remained unaffected. Hungary managed to contain the pollution within the Tisza's main bedding, by closing of dams and by similar measures. Lake Tisza is an important part of Hortobágy National Park, which also contains a famous bird sanctuary, enjoyed by bird watchers from all over Europe.

One of the major cities where preparations were made in advance is Szolnok, which draws its drinking water supplies directly from the Tisza river. Drinking water was handed out in plastic bags and the water extraction pumps were shut down and shut off, when the pollution plume reached the town. Consumption of water from wells sunk along the banks of the Tisza was banned in plenty of time and the dangers of drinking water from this source were made very clear.

While Hungary estimated that more than one thousand tons of fish were killed, Romania reported only a very small amount of dead fish. Yugoslavia on the other hand stated that a large amount of dead fish appeared in the Tisza river. Phyto- and zooplankton were down to zero, when the plume passed. Fish died in the plume or immediately thereafter. As soon as the plume passed, aquatic microbes recovered rapidly.

The Tisza occupies a special place in the hearts of the Hungarians. They call it the 'blond Tisza' just as automatically as others talk about the blue Danube. The Tisza was inspiration for ballads, for a children's counting rhyme, folklore and poems. It nurtured animals, plants and people for thousands of years and was killed in under a week. A carpet of dead fish floated slowly downstream.

When their river died, the people of Hungary threw flowers and wreaths into the water and played Chopin's Funeral March. What else could they do? They had to take fish off the menu, could no longer serve local specialities, such as Szeged fishermen's soup and Upper Tisza fishermen's soup. They could not drink their regular water and many Hungarian fishermen lost their livelihood.

The Hungarians also feared for another kind of Tisza flowers. The larvae of the *tiszavirág* (literally 'Tisza flower'), a species of may-fly unique to the waters of this river, develop underwater to surface spectacularly in huge numbers, forming a living carpet above the river once they reach the adult stage. Their life span is short - one day. This is reflected in the Hungarian language, in which *tiszavirág* can also mean 'ephemeral'. *Tiszavirág életu*, literally 'having the life span of a tiszavirág', means ephemeral or short-lived. There were widespread concerns that the species would become extinct as a result of the tragedy, but those were unfounded.

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Ospreys (*Haliaetus albicilla*) died after eating contaminated fish. The largest otter population in Europe, to be used as a seed group to restore vanishing otter populations elsewhere in Europe, was heavily affected. Otters are important indicators of environmental quality. According to surveys, there were between 1,500 and 2,000 otters living in Hungary and in the Czech Republic prior to the disaster. The whole otter population in Western Europe numbers only about 700 to 800. One of the only seven eagles that had survived the years of intensive agriculture in the region was found dead. *Cygnus color* (a species of swan), *Phalacrocorax carbo sinensis* (cormorant), coots and seagulls, foxes and deer appeared to have suffered less damage. Tourism was affected as well but not too badly, overall.

Hungarian top musicians gave a charity concert on May 3 in aid of the regeneration of the Tisza river after the drastic effects of cyanide pollution. The money raised was used to replenish fish stocks.

The emotions ran high in Hungary, but the Hungarians remained relatively calm. Unknown persons place bodies of fish that had died as a result of cyanide poisoning in front of the Romanian Consulate in Szeged. Someone else expressed his or her frustration by throwing a jar of pickled herrings through the window of the Romanian Embassy in Budapest.

The response elsewhere

The US gave USD 25,000, to both Hungary and Romania, while the Dutch, British and Japanese governments donated USD 20,000, 16,000 and 10,000 respectively. The US also quickly established pollution-monitoring stations on the Szamos, Hernád and Berettyó rivers.

Margot Wallström, the Environment Commissioner of the EU, had only entered office last December and at the occasion, she declared that she had two priorities: public health and water quality. She had not been kidding. As soon as she received official notification of the accident, she traveled to Hungary and Romania and offered immediate EU assistance. Hungary and Romania are currently not part of the EU, but both countries want to join.

On February 18, the United Nations Environment Programme's Executive Director announced that a team of experts would be sent to the area to carry out a scientific assessment survey. This UNEP/OCHA mission lasted from February 23 to March 6, 2000 and included sixteen experts from seven countries (Austria, Czech Republic, Finland, Germany, Norway, Sweden and Switzerland). It had three mobile labs at its disposition. (OCHA = Office for the Co-ordination of Humanitarian Affairs.)

Dutch scientists, for instance from RIZA and HKV Consultants, also came to the rescue. HKV has been a partner in the development of the Accident Emergency Warning System (AEWS) for the Danube countries for many years. The system includes standard coded forms in the local languages, satellite communication between the various nations as well as models to predict the course of a disaster. AEWS includes all countries along the Danube and its tributaries. The only gaps occur in the country formerly known as Yugoslavia, due to local wars. AEWS worked well during the recent disasters. Hanneke Vreugdenhil is a physicist who works for HKV Consultants. Her role in AEWS is technical and 'social' support. She teaches people in the various countries how to use the equipment, introduces them to each other, gets them to communicate across borders and tests the system.

In Belgium, the Association of Hungarian Students at the University of Louvain organized a demonstration, aided by the international organization of Friends of the Earth and the World Wildlife Fund (WWF). On March 2, about 60 people gathered on Luxembourg Square near the European Parliament, for a march to the Australian embassy. Speeches were given by Hungarian students and by Patricia Lorenz on behalf of Friends of the Earth Europe. A petition was handed over to the Embassy's First Secretary. The mood was rather cheerful, not somber or angry.

In the United States, around 50 people flocked together outside the Romanian Embassy in Washington on 1 and 2 April. Most of the demonstrators were Hungarian and their aim was to raise awareness. As it turned out, many of the passers-by did not know about the environmental disaster in Central Europe, but were quickly brought up-to-date by the demonstrators.

Nature's cleansing

Eastern Europe had scarcely taken stock of the disasters, when record-breaking massive flooding occurred in mid-April. Although the state of emergency needed to be declared in Hungary, Romania and parts of Serbia, the flooding may have been a blessing in disguise. Flooding revitalizes river ecosystems. It flushes nutrient-rich silt into rivers and onto flood plains. In the case of the Tisza and Danube, the flooding had the additional benefit of helping to dilute the cyanide and heavy metals.

Most of the naturally meandering stream and river systems in Central Europe have been straightened in the past. In the 18th and 19th century, formerly broad wetland areas have been drained, for agricultural purposes. The removal of river loops and folds has cut the length of many rivers by over a third or even half, intensifying the flow of water accordingly. This partly explains the flooding.

The Tisza is no exception, but still has more natural features and habitats, such as oxbows, beaches, wetlands and floodplain forests, than most other European river systems. This is due to its location in the most underdeveloped part of Hungary and proved highly advantageous. The Tisza floods are almost traditional. Every spring the snow in the Carpathian mountains melts and then the river steps outside its boundaries.

The shallow water now covering the flood plains was an ideal breeding ground for fish. Fish, plankton and other organisms still untouched in the tributaries, in small lakes and swamps as well as in Lake Tisza were washed into the Tisza. And the river stopped crying. The state of emergency around the Tisza river was lifted about three weeks after it was declared.

On May 9, hydrobiologists resettled around 100,000 fish into the Tisza, about 30 km north of the Yugoslav border. Until then, there had been a ban on reintroducing fish into the Tisza and Szamos, because the fish were not yet expected to survive. Species like carp and catfish have survived. The fish species that

was decimated in the biggest numbers was not indigenous to the river and will not be restocked.

Undoubtedly, many claims and lawsuits from individuals and communities along the Tisza still need to run their course. It is questionable if the Aurul mining company can afford to pay for the damages. Romania however has accepted responsibility for the disasters. This is in marked contrast to what the Romanian response would have been, had this all happened ten years ago. Back then, in the days of Ceaucescu, the Hungarian government was helpless when it was confronted with pollution originating from across the border.

Cyanide spills have happened before and will happen again. In 1995, 3 million cubic meters of cyanide-containing waste waters spilled into Guyana's largest river, the Essequibo. On 20 May 1998, 1800 kg of sodium cyanide, from a truck heading for the Kumtor mine, entered the Barskaun River in Kyrgyzstan. On March 21, 2000, a one-ton crate of sodium cyanide pellets was dropped from a helicopter sling during stormy weather. The transport was on its way to the Tolukuma Mine in Papua New Guinea. The incident happened approximately 85 kilometers to the north of Port Moresby over rugged terrain. The Tolukuma Mine itself is located another 15 kilometers farther north and is owned and operated by an Australian company called Dome Resources N.L.

One of the conclusions in the Final Report of the UNEP/OCHA Assessment Mission was that the recent accidents in Baia Mare and Baia Borsa '*dramatically increased public awareness of the environmental and safety hazards of the mining industry. The Baia Mare accident showed that the level of public knowledge and understanding of risks inherent in mining and related industrial processes is very low. It also showed that there is insufficient communication between the various levels of authorities and between the authorities, the NGOs and the public concerning emergency preparedness, emergency response and damage prevention options and possibilities.*'

It is very difficult to say if heavy metals were dispersed in other forms than as soluble cyanide complexes, since the amount of solids and the grain size distribution in the spilled material has never been determined. Long-term health effects are not expected, with the exception of the Baia Mare area where the heavy metal concentrations were already too high before the spill. Only time will tell if and when the rivers will start smiling again.

One of the recommendations in the Final Report is that further research be carried out with respect to "in particular, the formation and stability of heavy metal cyanide complexes in the aquatic system". Now, while we should not all start submitting new proposals like crazy, there is a task for us here.

The cyanide issue is complicated by more than just its chemistry, though. Not only does cyanide crop up in detective stories and movies, cyanide research also touches on delicate issues, such as the use of HCN gas during the Holocaust and in the enforcement of the death penalty in the United States. Nevertheless, we will take a closer look at cyanide itself in the following issue of the GN. Why is cyanide used by the mining industry? What are the alternatives? How is its concentration determined? What is its fate in the environment?

Angelina W. M. G. Souren

Cyanide

The term cyanide is used for a group of substances, such as HCN, KCN and NaCN.

Hydrogen cyanide is a colorless gas or liquid with a faint, bitter almond odor. The odor threshold for hydrogen cyanide is 0.58 ppm, but about 10% of the population is unable to smell this odor, due to a genetic trait. Sodium cyanide and potassium cyanide are both colorless solids with a slight odor of bitter almonds (in damp air).

Cyanide is extremely toxic and HCN gas easily forms explosive mixtures with air. One of the reasons why cyanide is so toxic is because it binds iron. It ruins hemoglobin and myoglobin. It binds tightly to all cytochromes and thereby also blocks oxidative phosphorylation (ATP synthesis).

Cyanide is about one thousand times more toxic for fish than for humans. Doses of 0.03 mg/L can be fatal and 0.2 mg/L kills most fish species. This sensitivity makes fish excellent markers for the presence of cyanide. Factors involved in the cyanide toxicity for fish are dissolved oxygen concentration, temperature, pH, salinity and what else is dissolved and how much. A twelve degree C decrease in t increases the toxicity three-fold. The survival time of fish poisoned by cyanide is shorter in seawater.

Sources and use of cyanide

While the mining industry is of particular interest to geochemists, cyanide is also used in other industries. Particularly during the production of nylon and acrylics, in electroplating and as an insecticide for fumigating enclosed spaces.

Iron cyanide is added to road salt as an anti-caking agent.

Car exhausts are an important source of cyanide in the air, as is tobacco smoke

Cyanide is also reported as a means to collect fish (instead of blasting reefs with dynamite of using nets).

Cyanide in food

Cyanide also occurs in plants that contain large quantities of cyanogenetic glycosides. Cyanogenetic glycosides are sugar complexes in which the cyanide molecule is chemically tied up. Damage to the plant cells may ultimately lead to the release of cyanide from the glycoside complex. Examples of plants and plant parts that contain cyanogenetic glycosides: sorghum species, white clover, arrow grass, cashews, corn, flax, lima beans, leaves and pits of Prunus species (cherries, apricots, peaches) and apple seeds. Certain bacteria, fungi, and algae produce cyanide. Cyanide is also a part of the commercial form of vitamin B12. A word of warning: it is not advisable to consume huge amounts of cassava.

Positive notes on cyanide

Cyanide along with cyanate, thyocyanate and cyanamide can serve as a nitrogen source to certain microorganisms.

Cyanide is thought to be one of the precursors of life on Earth. Adenine can be created from cyanide plus it can help turn amino acids into polypeptides.

Because cyanide, just like azide, is a non-specific enzyme inhibitor, scientists use it in enzyme studies. For example of wood-degrading fungal enzymes, where NMR spectroscopy results of active enzyme and inhibited enzyme can be compared.

Mineral Surface Reactivity

Meeting Report

The picturesque bay of San Feliu de Guixols, Spain.

AndrewPutnis (Muenster) and Roland Hellmann (Grenoble)

Along the sunny Costa Brava in San Feliu de Guixols, Spain, 76 scientists gathered from May 27 – June 1, 2000, for a European Research Conference (EURESCO) titled *Mineral Surface Reactivity — The Interaction of Mineral Surfaces with Organic and Inorganic Species in Aqueous Solution: Experiment and Theory*. The group included experimentalists and theorists mainly from Europe, as well as participants from the USA, Israel, Turkey, Russia, Australia, Iceland, and Japan. The conference, organized by Andrew Putnis (Muenster) and Martin Dove (Cambridge), was a tremendous success. Several partipicants were overheard to remark that it was among the best conferences they had ever attended.

It delivered what the title advertised. Presentations reflected the diversity of approaches being taken currently to elucidate mineral-fluid interface processes at the molecular scale. Featured prominently were experimental studies involving in situ scanning force microscopy and synchrotron radiation (by EXAFS, X-ray reflectivity, and X-ray standing waves), as well as optical methods, NMR, and the usual gamut of electron spectroscopic techniques applied in vacuo. Detailed spectroscopic and transmission electron microscopic observations of natural occurrences also were presented. Theoretical studies included both quantum mechanical and atomistic simulation techniques.

Extracurricular activities were particularly enjoyable at this conference (with one exception -- the break-in and robbery of several hotel rooms that affected one of the conference participants). There was a group excursion to the Dali Museum. Swimming, biking, and walking provided pleasant means by which to burn off calories from the plentiful meals. And many took advantage of the unique shopping opportunities in San Feliu de Guixols.

This conference provided extensive evidence that major progress toward achieving a fundamental understanding of mineral surface reactivity is clearly being made. We look forward to Part II of the series, tentatively scheduled for 2002.

Neil C. Sturchio

Martin Dove (Cambridge) and Steve Parker (Bath)

Alain Manceau (Grenoble), Kathryn Nagy (Colorado), and Paul Fenter (Argonne)

Call for Proposals

European Facility for High-Pressure Research
Bayerisches Geoinstitut, Bayreuth (Germany), 2000-2003

The Bayerisches Geoinstitut (Bayreuth, Germany) is funded by the European Union Access to Research Infrastructures Programme for the period 1 May 2000 to 30 April 2003. This support follows on from six years of HCM and TMR Large-Scale-Facility funding which ends on 30 April 2000.

The aim of the Access to Research Infrastructures programme is to fund visiting scientists (users), from institutions in EU countries and Associated States, who wish to use the experimental and analytical facilities of the Bayerisches Geoinstitut. With this funding, visiting scientists are accepted generally for periods of between 2 weeks and 3 months. The funding covers travel expenses, accomodation and living expenses incurred during the stay in Bayreuth, and all experimental costs.

The Geoinstitut staff provide full support for the users in terms of training and assisting with experiments.

The available facilities include a wide range of high-pressure apparatus, analytical equipment and apparatus for characterising the physical and chemical properties of materials. In the past, most users have taken advantage of the high-pressure facilities (in particular the multi-anvil laboratory) which are unique in Europe, but others have also used the extensive X-ray diffraction and spectroscopic facilities.

A full list of available equipment as well as information about typical research projects can be found on the Bayerisches Geoinstitut home page (http://www.bgi.uni-bayreuth.de/).

This opportunity is open to earth scientists, material scientists, physicists and chemists from institutes in EU Member States and Associated States (with the exception of Germany). Proposals from potential users should be submitted for evaluation by one of the following deadlines: 31 March 2000, 31 August 2000, 28 February 2001, 31 August 2001, 28 February 2002, 31 August 2002.

An application form can be found on the Bayerisches Geoinstitut home page. Selection of proposals will be based on scientific merit. Priority will be given to new user groups that would normally not have access to the facilities of the Bayerisches Geoinstitut. Proposals are reviewed by a Users Selection Panel that meets twice a year.

Accommodation for visiting scientists is arranged either in the University Guest House or in local hotels. Travel and subsistence expenses are paid to users (as cash) when they arrive at the Geoinstitut.

Proposals and requests for further information should be sent to: Prof. D.C. Rubie (Dave.Rubie@uni-bayreuth.de). All necessary information is available on the facility web site:

http://www.bgi.uni-bayreuth.de/job_offers/elsfhp1.php3

Call for proposals

EU Geochemical Facility

Applications are invited for access to the EU Geochemical Facility at Bristol University, supported by the European Commission Access to Research Infrastructures action of the IHP Programme. The aim of the Facility is to provide access to modern analytical equipment for research groups who do not otherwise have free use of such equipment in their own country.

The Geochemical Facility contains a number of modern analytical instruments for geochemical studies. These include electron probe microanalysis, ICP-MS, laser ablation ICP-MS, XRF, ICP-AES,XRD Mössbauer (Fe3+/Fe2+), Fourier Transform Infra-Red spectrometry (CO2 & H2O), LECO (bulk C & S), Nuclear Magnetic Resonance and Scanning Electron Microscopy with qualitative EDS. Analysis of surfaces can be performed using Auger Electron, Secondary Ion Mass and X-Ray Photoelectron Spectrometers. Four well-equipped experimental geochemistry laboratories allow Users to carry out investigations that simulate a wide variety of geological conditions.

Access is restricted to research teams from institutions in EU countries (except UK) plus Bulgaria, the Czech Republic, the Republic of Cyprus, Estonia, Hungary, Iceland, Israel, Latvia, Liechtenstein, Lithuania, Norway, Poland, Romania, Slovakia and Slovenia.

The Facility will pay all reasonable travel and subsistence expenses.

Visits are usually expected to last between 1 week and 1 month. Only research teams who are entitled to disseminate, or arrange to disseminate, the knowledge they have generated during the project are eligible to benefit from access to the Facility. Priority will be given to research teams who have not previously used the infrastructure and who do not normally have access to such facilities. Selection of projects will be on the basis of scientific merit taking into account the interests of the Community.

The next deadlines for applications are 15th September and 15th December 2000.

Application forms can be downloaded from: http://eugf.gly.bris.ac.uk or are available from the address below.

For further information see http://eugf.gly.bris.ac.uk or contact one of the following:

john.dalton@bris.ac.uk
stuart.kearns@bris.ac.uk
b.j.wood@bris.ac.uk

Prof. Bernard J. Wood
Department of Earth Sciences
University of Bristol
Wills Memorial Building
Queen's Road
Bristol BS8 1RJ, U.K.

Tel: +44 117 954 5422
Fax: +44 117 925 3385

Martian Chronology: Workshop Report

Peter T. Doran
University of Illinois at Chicago
Earth and Environmental Sciences (MC 186)
845 W. Taylor St., Chicago, IL 60607-7059
pdoran@uic.edu

Introduction: The absolute chronology of Martian rocks and events is based mainly on crater statistics and remains highly uncertain. Martian chronology will be critical to building a time scale comparable to Earth's to address questions about the early evolution of the planets and their ecosystems. In order to address issues and strategies specific to Martian chronology, a workshop was held at the University of Illinois at Chicago, 4-7 June 2000, with invited participants from the planetary, geochronology, geochemistry, and astrobiology communities. The workshop focused on identifying: a) key scientific questions of Martian chronology; b) chronological techniques applicable to Mars; c) unique processes on Mars that could be exploited to obtain rates, fluxes, ages; and d) sampling issues for these techniques. This is an overview of the workshop findings and recommendations.

Table 1. Martian epochs and their model ages [1].

Epoch	Maximum age (Ga)
Early Noachian	4.6
Middle Noachian	~4.5 to 3.92
Late Noachian	~4.3 to 3.85
Early Hesperian	3.8 to 2.5
Late Hesperian	3.7 to 1.3
Early Amazonian	3.55 to 0.6
Middle Amazonian	1.8 to 0.25
Late Amazonian	0.5 to 0.1

Scientific Questions (chronologic targets).

Calibrating the long-term Mars cratering rate. To calibrate the Martian cratering rate and improve chronology based on crater statistics, the most critical date to acquire is Hesperian to middle Amazonian. Additional Noachian and late Amazonian dates should be acquired to check for changes in the cratering rate over time. Desirable units for dating are igneous rocks having pristine cratering records (i.e., unbrecciated). By dating the largest impacts on the planet (e.g., Hellas), absolute global time horizons may be established.

Major volcanic events. Volcanic flows are probably the best types of deposits to constrain the impact cratering rate. It is important to establish the ages of volcanic features and address questions regarding the timing and long-term trends in global volcanic activity which may be related to the fluvial events discussed below. Chronologic and related isotopic information on the oldest volcanic rocks may provide insight into early planet-wide processes, such as core formation, crust-mantle differentiation, and the possibility of plate tectonics, early in Martian history.

Ancient and recent fluvial activity. While most hydrologic activity on Mars is thought to be ancient (pre-Amazonian), high-resolution MOC images suggest recent fluvial activity on the surface of Mars (<10^7 a BP) as well [2]. Hypotheses invoking changes in Mars obliquity [3] and internal processes [4] have been put forth to explain how liquid water might be generated on the surface during the present epoch. Discrimination between these possible origins will require both *in situ* confirmation of their true nature and accurate dating of their occurrence. Data on the history of surface water on Mars would help constrain the environmental conditions during the Noachian, which in turn would help constrain models for prebiotic chemistry, protobiology, the possible origin and evolution of life, and the potential transfer of life between Mars and Earth.

Polar layered terrain. As the planet's principal cold traps, the Martian polar regions have accumulated extensive mantles of ice and dust that cover ~10^6 km^2 and are as much as 4 km thick [5]. The scarcity of superimposed craters on their surface suggests that these deposits are relatively young (<10^8 a). Their layering allows for a temporal calibration of global events (e.g., volcanic eruptions, dust storms, large impacts, etc.) that can be used as chronological markers elsewhere.

Chronology Techniques Applicable to Mars.

Nuclear techniques. Radiogenic dating by the K-Ar system (including ^{40}Ar-^{39}Ar) will be applicable to the >10^5 a window for dating volcanic lava flows or widespread ash deposits (e.g., in the polar layered terrain). An application of radiogenic dating to the history of water on Mars is the use of the K-Ar or Rb-Sr methods to date evaporite deposits, especially K-rich salts, and possibly co-existing carbonates. Radioactive parent-daughter dating schemes will be directly applicable (K-Ar, Rb-Sr, Sm-Nd, U-Th-Pb, Lu-Hf, Re-Os, and short-lived systems, e.g., Hf-W, Mn-Cr, I-Xe, Pu-Xe, ^{146}Sm-^{142}Nd). If there is recent (<10^6 a) activity on Mars, U-Th decay series methods can be used to determine the: a) ages of young lava flows or pyroclastic deposits; b) ages of waterlain spring deposits, evaporites, and hydrothermal deposits/alterations; and c) atmospheric residence times of aeolian particulates.

Cosmogenic techniques. The production rates for cosmogenic nuclides on Mars will allow for exposure dating of samples within the 10^7 a range. Events and processes that may be datable using cosmogenic nuclides include: a) erosion (i.e., by floods, landslides, glaciation); b) deposition age of previously deeply buried material (erosion and deposition by glacial processes, floods, etc); c) faulting (tectonic scarps); and d) volcanic or impact events. The history of aeolian dust may also be measurable, allowing trapped dust in the polar layered deposits to be dated. The use of secondary neutron capture effects (e.g., in Gd, Sm) would permit studies of cosmic ray irradiation to the 10^9 a scale.

Mars-specific chronometers.

Stable isotopes of nitrogen. The unique isotopic composition of nitrogen in the Martian atmosphere may permit a Mars-specific "chronometer" for tracing the time-evolution of the atmosphere and of lithic phases with trapped atmospheric gases. Theoretical models predict a nearly linear increase of δ^{15}N from near zero to the present-day value of ~620‰ [6, 7]. The time rate of change of δ^{15}N could be calibrated by measuring δ^{15}N in nitrogen extracted from secondary phases of rocks (e.g., impact glass) with ages measured by standard radiometric techniques. Subsequent measurement of δ^{15}N in a nitrate, for example, would de-

termine the time of nitrate deposition. The secular variation in the isotopic compositions of other atmospheric gases (O, C, H, Ar) also could be used to determine independent estimates of the deposition time.

Gas Fluxes. The goal of flux investigations is to establish the rates of volatile transfer from the Martian crust to the atmosphere, most likely by molecular diffusion. Data on volatile species, such as He, Rn, CO_2 and H_2O, can then be used as a prospecting tool to define areas of recent hydrologic processes (deep saline ground water or trapped hydrothermal fluids).

Platinum Group Elements (PGE). Measuring the abundance of PGE in Martian soils would provide a measure of the accumulated influx of micrometeorites to the Martian surface. The initial component of Martian PGE should have been partitioned into the core at its formation. The lack of crustal recycling on Mars would allow the accumulation of PGE on the Martian surface over long periods. The effects can address surface (regolith) gardening by meteorite impacts.

Recommendations. The workshop focused on key science questions and solutions. General recommendations on sampling were made:

Context and background. For useful chronometric information, it is essential to know the geological (stratigraphic) context of the samples. Knowing the chemistry of the samples is also critical for most applications. In addition, there are certain baselines that need to be known, such as the present composition of the atmosphere (and trace species of interest) and the chemical and physical characteristics of current dust.

Multiple techniques. For any chronometric determination, an age on a single sample determined by a single technique is unlikely to be useful. For full confidence in the results, it is preferable to measure ages by multiple techniques on multiple samples. If a single technique is to be used (e.g., in situ), it must be shown to give consistent results on multiple samples.

Technique development. Most of the techniques described require further development for use on Mars. For in situ sampling, funds must be committed early enough to allow for design, miniaturization and thorough testing and calibration. For a sample return mission, questions of environmental requirements for the samples and planetary protection must be considered.

Acknowledgements. This abstract is based on the input of the participants: P. Beauchamp, L. Borg, C. Budney, G. Cardell, F. Carsey, T. Cerling, J. Christensen, S. Clifford, J. Cutts, A. Davis, P. Doran, S. Forman, S. Guggenheim, J. Kargel, D. Kossakovski, K. Lepper, G. McDonald, C. Mckay, S. McKeever, R. Morris, K. Nizhiizumi, L. Nyquist, D. Papanastassiou, F. Podosek, R. Poreda, J. Rice, B. Stewart, T. Swindle, M. Taylor, K. Tanaka, M. Wadhwa. The workshop was supported by the Mars Program Office, JPL (Contract #1215592).

References: [1] modified from Tanaka K.L. (1986) *JGR* **91**, E139. [2] Malin M.C. and Edgett K. S. (2000) *Science* **288**, 2330-2335. [3] Parthare A. V. and Paige D. A. (1998) *First Inter. Conf. Mars Polar Science Exploration*, p. 31, LPI, Houston. [4] Baker V. R. et al. (1991) *Nature* **352**, 589-594. [5] Clifford S. M. et al. (2000) *Icarus* **144**, 210-242. [6] Pepin, R. O. (1994) Icarus **111**, 289-304. [7] Jakosky B.M. et al. (1994) Icarus **111**, 271-288.

Bibliographic Search

In recent years, many of the databases for scientific bibliographic search became available over the Internet. Database producers and third parties have developed sleek, web browser-based search interfaces. Until recently, a literature search meant going to the library to sign out Georef CD ROMs. Before that, some of us were brave enough to actually go through the printed copies of Chemical Abstracts or Science Citation Index with reading glasses.

Librarians hear very little input from researchers when it comes to the licensing of web-based interfaces. Most researchers are unfamiliar with the electronic bibliographic databases. Consequently, many of us use whatever licensed by the librarians who may not be aware of the needs of geochemists. Or worse, you may be unaware of the vast resources available at your institution while looking for the answers the hard way.

Following is a small list of Web-accessible literature databases that contain geochemical literatures. If you are interested, ask your librarian. The chances are that you have access to many of these already. Please note that parties not listed below may also offer web-based interfaces to these and other databases.

Electronic Database **Producer** **Total # of Records**	**Contains GCA?** **Available Through**
Applied Science and Technology Abstracts H. W. Wilson Company 1,000,000 +	No OCLC First Search Wilson Web
Chemical Abstracts Chemical Abstracts Service (American Chemical Society) 15,000,000 +	Yes SciFinder STN
Environmental Sciences & Pollution Management Cambridge Scientific Abstracts (CSA) 1,100,000 +	Yes CSA OCLC First Search
General Science Abstracts H. W. Wilson 615,000 +	No OCLC First Search Wilson Web
GEOBASE Elsevier Science 812,000 +	Yes OCLC First Search
GeoRef American Geological Institute 2,100,000 +	Yes CSA, STN OCLC First Search
Marine, Oceanographic & Freshwater Resources National Information Services Corporation 979,000 +	Yes NISC BiblioLine
Science Citation Index Expanded Institute for Scientific Information *5,700 + journals, back to 1945	Yes ISI Web of Science
Water Resources Abstracts Cambridge Scientific Abstracts 34,000 +	Yes CSA NISC BiblioLine

Yoko Furukawa

Summit 2000

Geological Society of America Annual Meeting and Exposition

November 9-18, 2000
Reno, Nevada, U.S.A.

Technical Sessions Sponsored (or Co-sponsored) by The Geochemical Society:

T2 Frontiers in Gas Hydrate Research
T5 Reaching Beyond Earth: Presentations of Innovative Plans and Demonstrations of Novel Technologies for the New Age of Planetary Exploration
T7 Weathering Processes: The Message in Martian Meteorites
T12 Superplume Events in Earth History: Causes and Effects
T16 Deep Structure of Archean Cratons
T23 The Antler Foreland Basin System
T25 Rates of Magmatic and Host Rock Processes in Arcs
T26 Paleomagnetic Applications to Geologic Problems
T29 Xenolith-Based Studies of the Physical & Chemical Evolution of the Deep North American Lithosphere
T34 Gold Deposits of the Great Basin
T37 Sulfate Minerals I. Hydrothermal Systems (A Tribute to Robert O. Rye)
T38 Sulfate Minerals II. Low-Temperature Environments
T39 Mineralogy of the Mixed-Layer Clays & Applications for Understanding Earth Processes & History
T44 Granite Revisited: Anomalies, Problems, and Novel Approaches
T46 Advances in Quaternary Geochronometry
T51 Reshaping Glacial Geomorphology: New Age Controls on Late Pleistocene Alpine Glaciation
T77 OGD Symposium: Sources, Synthesis, Transformations, and Sinks of Organic Matter on Earliest Earth
T82 Surface Water-Groundwater Connections
T84 Closed-Basin Lakes: Hydrogeology, Geochemistry, Water Management, and Environmental Impacts
T86 Physical Modeling for Process Understanding & Model Validation in Subsurface Flow and Transport
T87 25 Years of Groundwater Modeling-A Special Session in Honor of Professor Mary Anderson
T95 Mining Impacts on Hydrologic Systems
T96 Coupled Hydrologic & Geochemical Processes in Mining Wastes & Other Heterogeneous Media
T97 Environmental Isotopes in Hydrogeology
T98 Solute Cycling in Groundwater and Surface Water
T99 Rare Earth Elements in Groundwater Flow Systems
T104 Redox Manipulation for Groundwater Remediation
T108 Geomicrobiology: Microbial Communities and Geochemistry
T109 Long-Term Changes in Seawater Chemistry: Causes and Responses
T110 Paleosols, Soils, and the Composition of Ancient Atmospheres
T111 Secondary Mineralization in the Unsaturated Zone at Yucca Mountain, Nevada
T112 Reactive Transport Modeling: Theory and Applications
T113 Sources, Transport, Fate, & Toxicology of Trace Metals in the Environment: A Tribute to Ron Fuge
T114 Colloidal Chemistry of Natural Waters
T124 The Employment of Geological Techniques for Archaeological Provenance Studies
T128 Geological Sequestration of Carbon Dioxide Released from Burning of Fossil Fuels
T131 Water Quality in the Arid West: Controls on Inorganic Anthropogenic By-Products
T132 Ecological-Geochemical Aspects of Problems in Technogenic ContaminatedAreas
T133 Impact of Mercury on the Global Environment

GeoSoilEnviroCARS

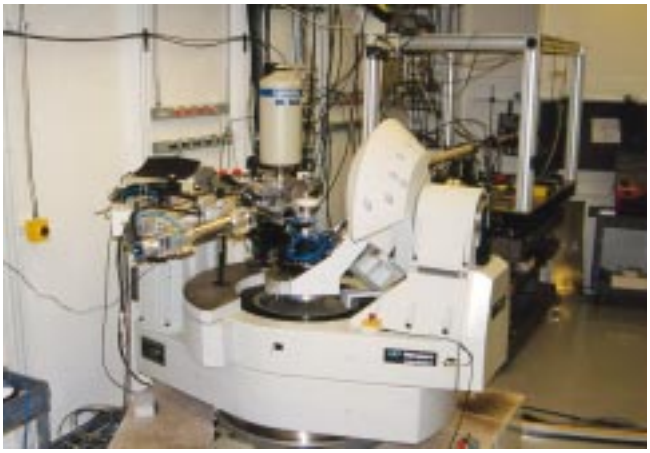
The University of Chicago

Argonne National Laboratory • Advanced Photon Source

GeoSoilEnviroCARS is a synchrotron-based, earth science research facility under development at the Advanced Photon Source, Argonne, IL. A variety of techniques will be made available to the general scientific community for state-of-the-art research on earth materials. These include but are not limited to:

- high pressure research with the laser-heated diamond anvil cell and multi-anvil press
- x-ray absorption fine structure spectroscopy
- x-ray fluorescence microprobe
- microtomography
- microcrystallography
- powder diffraction
- surface diffraction

APS Aerial View



Diffractometer (foreground) and x-ray fluorescence microprobe (background) in experimental station 13-ID-C on the undulator beamline at GeoSoilEnviroCARS

Although construction and commissioning activities are still in progress, we are initiating our user program in a limited fashion for three techniques that are currently operational: microprobe/microspectroscopy, microtomography and energy dispersive diamond anvil cell with laser heating. To apply for beamtime, visit our web site (http://cars.uchicago.edu, follow the GSECARS link) and complete the online application form. If you have any questions, particularly with regard to experimental feasibility, please contact Steve Sutton (sutton@cars.uchicago.edu) or Mark Rivers (rivers@cars.uchicago.edu)

GeoSoilEnviroCARS online at http://cars.uchicago.edu

Continued on page 25

Meetings Calendar

Aug. 6 - 12, 2000: 11th International Peat Congress - Sustaining Our Peatlands, International Peat Society, Québec, Canada. Web site: http://www.cqvb.qc.ca/wetland2000/english/frame_home_ips.html

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

August 13-16, 2000: 7th Canadian Continuous-Flow Isotope Ratio Mass Spectrometry Workshop, Montreal (Quebec), Canada. For information and registration: www.cf-irms.uottawa.ca

Aug. 25-31, 2000: 19th European Crystallographic Mtg. (ECM-19), Nancy, France. Web site: http://www.lcm3b.u-nancy.fr/ecm19/

Aug. 29-Sept. 1, 2000: Scuola di Geochimica dei Fluidi, Arezzo, Italy. Contact: Giulio Ottonello, giulio@ugo.dipteris.unige.it

August 30-Sept. 3, 2000: GEOANALYSIS 2000, 4th International Conference on the Analysis of Geological andEnvironmental Materials. Pont à Mousson, Lorraine, France. http://crpg.crpg.cnrs-nancy.fr/NEWS/Geoanalysis-2000/

Sept. 2-8, 2000: GIS/EM4 - 4th International Conference on Integrating Geographic Information Systems (GIS) and Environmental Modeling, Banff, Alberta, Canada. Web site: http://www.colorado.edu/Research/cires/banff/content.html

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/

Sept. 11-15, 2000: 7th International Mine Water Association Congress - Mine Water And The Environment - Environmental impacts of mining and mines closure, Katowice - Ustron, Poland. Contact: Dr. Andrzej J. Witkowski, Dr Andrzej Kowalczyk, Secretariat of the 7th IMWA Congress, University of Silesia, Bedzinska Ul. 60, PL-41-200 Sosnowiec, Poland . Tel: +48 32 291-6888: Fax: +48 32 291-5865: E-mail: awitkows@us.edu.pl; kowalcz@ultra.cto.us.edu.pl. Web site: http://www.geo.tu-freiberg.de/~cwolke/IMWA/Cong2000.htm

Sept. 17-22, 2000: 8th International Symposium on Biological and Environmental Reference Materials (BERM-8), Bethesda, Maryland, USA. Web site: http://www.nist.gov/berm-8.

Sept.17-26, 2000: KARST'2000 - International Symposium & Field Seminar on Present State and Future Trends of Karst Studies, Marmaris - Turkey. Contact: Secretariat of Karst'2000, International Research & Application
Center for Karst Water Resources (UKAM), Hacettepe University, 06532 Beytepe, Ankara, Turkey. Tel: +90 312 235 2543 ;Fax: +90 312 299 2136; Email: karst@hun.edu.tr Web sites: http://www.karst.hun.edu.tr/ and
http://www.karst.hacettepe.edu.tr/

Sept. 18-21, 2000: European Workshop on Clay Mineralogy, Jena, Germany. Contact: Prof. Dr. Reinhard Gaupp, Institut für Geowissenschaften, Burgweg 11, D-07749 Jena. Tel: +49 3641 948 620; Fax: +49 3641 948 622; E-mail gaupp@geo.uni-jena.de; Web site: http://www.unijena.de/chemie/geowiss/kurse/kurse.html#clay

Oct. 6-9, 2000: International Symposium Mineral Diversity - Research and Preservation, Sofia, Bulgaria. Contact: Earth and Man National Museum, Bulgaria, Sofia 1421, bul. Cherni vruh 4; Tel: +359 2 65 66 39; Fax: (+359 2) 66 14 55; E mindiv@museum.web.bg Web Sites: http://mineraldiversity.web.bg ; http://museum.web.bg ; http://web.bg/nmzh/mineraldiversity/symposia/Symposiumen.htm

Oct. 18-20, 2000: EURO ENVIRONMENT 2000 on Industry and Environmental Performance, Aalborg, Denmark. Visions, strategies and actions towards sustainable industries. Contact: Aalborg Congress and Culture Centre, Europa Plads, PO Box 149, DK-9100 Aalborg, Denmark. E-mail: else_herfort@akkc.dk; Web site: http://www.akkc.dk/uk/euro/envire/

Nov. 2-4, 2000: Advances on Micas - Problems, Methods, Applications in Geodynamics, Rome, Italy. Accademia Nazionale dei Lincei and Università degli Studi Roma Tre. Abstract deadline: September 1, 2000. Contact: Daniela Volpato, Accademia Nazionale dei Lincei, Via della Lungara 10, I-00165 Roma RM; Tel: +39-06-6868223; Fax: +39-06-6893616; E-mail: segreteria@accademia.lincei.it Web Site: http://www.unimo.it/micas2000/

Nov. 11-12, 2000: MSA Short Course on Sulfate Minerals: Geochemistry,Crystallography, and Environmental Significance.
Granlibakken Resort, Tahoe City, California. Co-conveners: Charlie Alpers (cnalpers@usgs.gov), John Jambor (jlj@wimsey.com), and D.Kirk Nordstrom (dkn@usgs.gov). Registration: MSA Business Office, 1015 Eighteenth St NW
Ste 601, Washington, D.C. 20036-5274, USA. Tel: 202-775-4344; Fax: 202-775-0018; E-mail: business@minsocam.org; Web site: http://www.minsocam.org/MSA/SC_SO4.html

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. 3-7, 2000: Geochemistry of Crustal Fluids, Granada, Spain. Organizers: S. R. Gislason and J. Bruno;
Web site: http://www.esf.org/euresco/00/lc00106a.htm

Dec. 13-15, 2000: 1st French Meeting on Environmental Chemistry/ 1st French Meeting on Stable Isotopes, Nancy, France. Contact: Eric.Lichtfouse@ensaia.inpl-nancy.fr; tel/fax (33) 3 83 59 58 99; http://www.ensaia.inpl-nancy.fr/colloque/

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

April 8-12, 2001: Biennial Meeting of the European Union of Geosciences (EUG-11) , Strasbourg, France. Web site: http://eost.u-strasbg.fr/EUG/EUG11.html

April 19-23, 2001: Third IAEA Symposium on Isotope Techniques in the Study of Environmental Change, Vienna, Austria. Contact: Pradeep K. Aggarwal, Isotope Hydrology Section, International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, A 1400, Vienna, Austria; Ph. +43-1-2600-21735; Fax +43-1-26007; e-mail: p.aggarwal@iaea.org; www.iaea.org/worldatom/Meetings/Planned/2001/

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.

May 23-June 3, 2001: Strength From Weakness: Structural Consequences of Weak Interactions in Molecules, Supermolecules, and Crystals, Erice, Italy. http://www.geomin.unibo.it/orgv/erice/strength.htm

June 10-15, 2001: 10th Water-Rock Interaction Symposium, Tanka Village Congress Centre, Villasimius, Sardinia, Italy. 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/

June 25-29, 2001: 4th International Symposium on Applied Isotope Geochemistry (AIG-4), Asilomar Conference Center, Pacific Grove, California, U.S.A. Contact: Tom Bullen, tdbullen@usgs.gov

July 24-27, 2000: International Symposium on Isotopomers (ISI 2001), Yokohama, Japan. Web site: http://nylab.chemenv.titech.ac.jp/ISI2001/isi2001.html

Aug. 19-24, 2001: Gordon Conference on Inorganic Geochemistry, Proctor Academy, New Hampshire. The theme will be the formation, modification and preservation of ore deposits, with a focus on geochemical processes related to tectonic, climatic, and surficial factors. Attendance will be limited; subsidies for students are anticipated. Convened by Jean Cline, Jeff Hedenquist and John Thompson. Contact Jeff Hedenquist, gordongeochem@aol.com

Aug. 25-31, 2001: 20th European Crystallographic Meeting (ECM-20): Crystallography in Natural Sciences and Technology, Kraków, Poland.The Jagiellonian University. In collaboration with Stanislaw Staszic University of Mining and Metallurgy. Contact: ECM20, Conference Secretariat, Faculty of Chemistry, Jagiellonian University, Ul. Ingardena 3, 30-060 Kraków, Poland. E-mail: ECM2001@chemia.uj.edu.pl Web site: http://www.ch.uj.edu.pl/ECM2001.htm

Aug. 26-29, 2001: 6th Biennial SGA Meeting -- Mineral Deposits at the Beginning of the 21st Century, Krakow, Poland. Contact: 6th Biennial SGA Meeting, Dr. Wojciech Mayer, University of Mining and Metallurgy, Faculty of Geology, Geophysics & Environmental Protection, av. Mickiewicza 30, 30-059 Kraków, Poland; Phone: +48-12-6172385; Fax:+48-12-6332936, E-mail: wmayer@geol.agh.edu.pl Web site: http://galaxy.uci.agh.edu.pl/~sga/

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.

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