Newsletter of the Mineralogical Society of America

The Lattice

Vol. 7, No. 1, February 1991

Members nominate outstanding students in mineralogy for society's undergraduate award

MSA members have again taken advantage of the Society's American Mineralogist Undergraduate (AMU) Award program to recognize 15 outstanding students who have shown an interest and ability in the discipline of mineralogy. Each student was cited by his or her department for outstanding achievement in mineralogy-related courses.

The AMU Awards allow MSA to join with individual professors to formally recognize outstanding students. Each student is presented a certificate at an awards ceremony at his or her university or college. In addition, each recipient receives a complimentary student membership, including the journal, for 1991.

MSA members, who are on the permanent (or tenure-track) faculty and whose department offers one or more courses in crystallography, mineralogy, or petrology, may nominate a student. One student may be nominated per department per year. The department must also be able to present the certificate during a departmental or university award program. MSA encourages but does not require, departments to nominate juniors who will be seniors during the year that they receive the award.

The 1990 Council voted to allow nominations for AMU Awards to be made either by January 1 or July 1 so that students enrolled in Spring as well as Fall mineralogy courses will have a chance for the award. The second deadline for nominating students for 1991 is July 1, 1991. Please mark your calendars now so you can be watching for that exceptional student. To nominate a student, send a letter on departmental letterhead giving the student's full name (for the certificate), departmental address, year in school, interest area, MSA sponsor name, and the date and brief description of the award ceremony at which the certificate will be presented. The letter must be signed by the department chair. Send the letter to the MSA Business Office, 1130 17th Street N.W., Suite 330, Washington, D.C. 20036.

In its seventh year, the AMU Awards have recognized 121 exceptional students in mineralogy programs throughout the U.S. and Canada. Many of these students have maintained a relationship with MSA as current members or participants in its educational short courses.

The Society welcomes these exceptional students to the program's honor roll and wishes to thank the sponsors for enabling MSA to recognize these outstanding individuals.

Stephen A. Brown
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FROM THE PRESIDENT

A number of topics of interest to MSA members have come up since our last newsletter. I was very pleased, although my handwriting suffered, to have signed letters welcoming 132 new members into our Society! Forty of these new members were from countries outside the United States—fourteen from Canada, five from the Netherlands, five from France, four from Sweden, three from Switzerland, two each from Italy, the UK, and Australia, and one each from Spain, Argentina, and Israel. It is certainly gratifying to have so many new members from so many countries joining MSA and truly making it an international organization.

Mike Holdaway and Ann Wylie will represent the MSA at a special conference sponsored by the AGI at its Headquarters in Alexandria, VA on February 22–23, 1991. The subject of the conference is the K–12 (kindergarten through the 12th grade) earth science education program. The AGI has requested that the MSA contribute to this program; Ann and Mike will see if there is a means by which the MSA can accomplish this. Any thoughts on the K-12 initiative from the membership will be most welcome. While attending the GSA meeting last October quite a few MSA members mentioned to me the great difficulty they were having in obtaining grants for scientific research. It appears to me that this is one of the most important issues facing our science today. The K–12 education program may be very useful in promoting an interest by pre-college students in the geosciences, but without good job and research opportunities they may select a non-science major when they enter college. In order for our Society to become more involved with the problem of funding geoscience research the MSA executive committee has appointed an ad hoc committee, tentatively called the "Science Grants Committee", to address this issue. MSA Vice-president Holdaway has generously offered to be chairman of this committee and three activists in finding solutions to our funding drought, Darby Dyar, Linc Hollister, and Paul Ribbe, will join him. Again, if any MSA members have comments or suggestions regarding science funding please bring them to the attention of the committee.

Ernest A. Mancini, President of the Association of American State Geologists (AASG), has brought to the attention of our Society an initiative, which is rapidly moving forward, for a National Cooperative Geologic Mapping Program. The AASG intends to have enabling legislation considered by the 102nd U.S. Congress. To help promote this mapping initiative the Association is soliciting support from the MSA and other geoscience societies. The proposed mapping program is wide ranging in its objectives, which not only include general geologic mapping of the entire United States but also funding for support for teaching geologic mapping field techniques and for corollary studies relating to geochronology, isotopes, geothermometry and geobarometry, paleontology, and geochemistry. The Program will be cooperative between State and Federal agencies and academic institutions. This initiative, if well funded by Congress, I believe would be a boon to our science. I will be polling the Council in order to decide if the MSA should formally support the National Cooperative Geologic Mapping Program and I also solicit comments regarding this initiative from the membership. Further details concerning this program may be obtained from me or from Dr. Mancini. His address is: Geological Survey of Alabama, P.O. Box O, Tuscaloosa, AL, 35486-9780.

An MSA display table was set up at the Tucson mineral show (February 13–17, 1991). Mike Howard of the Arkansas Geological Commission generously offered to organize the display and was assisted by several mineralogists from the U.S. National Museum, Washington D.C. We hope that some of those who attended perhaps the top mineral show in the world will become members of the MSA. Please note the descriptions given elsewhere in this issue of *The Lattice* of the MSA sponsored short course, symposia, and topical sessions to be presented at the Spring AGU-MSA joint meeting. This meeting will be held in Baltimore, MD from May 28 through June 1, 1991. Here there will also be sessions of particular interest to geochemists. We hope that a large number of MSA members will be able to attend this meeting.

I end this letter with sad note—Arnulf Muan, MSA Secretary (1970–71) Vice-president (1974) and President (1975) and distinguished Professor of Geochemistry and Materials Science at the Pennsylvania State University, University Park, PA, died on December 17, 1990. Arnulf will be particularly remembered by the geoscience community for his very important contributions to our understanding of the phase relations within the transition metal oxide systems. We mourn the loss of a great friend of the MSA and a distinguished scientist. He will be greatly missed.

Malcolm Ross

Malcolm Ross

President

1992–93 Fulbright Scholar Awards

The Fulbright Scholar Program for 1992–93 includes some 1,000 grants for research, combined research and lecturing, or university lecturing. Opportunities range from two months to a full academic year; many assignments are flexible to the needs of the grantee. Nearly one-third of Fulbright grants are targeted for research and many lecturing awards offer research opportunities. There are openings in over 100 countries and, in many regions, multicountry research is possible. Virtually all disciplines and subfields participate, including the physical sciences. Scholars in all academic ranks are eligible to apply, from junior faculty to professor emeriti. Applications are also encouraged from professionals outside academe and from independent scholars. The basic eligibility requirements are U.S. citizenship and Ph.D. or comparable experience. The Fulbright Program is funded and administered by the United States Information Agency. Funding is also provided by participating governments and host institutions.

Application materials are available beginning March 1, 1991. The application deadline is June 15; there are other deadlines for special programs. For further information and applications, contact the Council for International Exchange of Scholars, 3007 Tilden Street, N.W., Suite 5M, Box NEWS, Washington, DC 20008-3009. Telephone: (202)686-7877.

Editor's Note

I am pleased to note the inclusion of the article "Suspect Minerals and Human Health: A Commentary" by Malcolm Ross in this issue of The Lattice. Members of MSA are encouraged to submit short technical or semi-technical articles or notes on their research. Informative articles relating to science policy or funding and commentaries on issues of scientific concern are welcome. Material may be sent to me at: U.S. Geological Survey, MS 959, Reston, VA 22092.

Readers are encouraged to submit longer (300 words) articles and announcements on DOS formatted disks (5.25 or 3.5 inch), if possible, in WordPerfect format or as unformatted text or ASCII files. Most word processing programs allow the user to save documents as straight ASCII files. Also, please submit one hard copy of text.

Marta Flohr

The Lattice is published quarterly (February, May, August, November) by the Mineralogical Society of America. This newsletter is distributed to MSA members as a service. Articles and letters from readers are welcome.

The Mineralogical Society of America is composed of individuals interested in mineralogy, crystallography, and petrology. Founded in 1919, the Society promotes, through education and research, the understanding and application of mineralogy by industry, universities, government and the public.

Membership benefits include: the American Mineralogist, published bi-monthly; 30% discount on volumes in the Reviews in Mineralogy series; The Lattice; Membership Directory; special subscription rates for Mineralogical Abstracts, Physics and Chemistry of Minerals, Journal of Petrology, and Journal of Metamorphic Geology; reduced registration fees at MSA short courses; member rates for the MSA/Geological Society of America annual meeting and member rates at MSA's spring meeting with the American Geophysical Union; participation in a Society that supports the many facets of mineralogy.

Dues for 1991 are $40 for professional members; $20 for students. Membership is on a calendar year basis. Individuals who join after January 1, 1991 will be sent all back issues of the journal for volume 76, 1991.

For additional membership information and an application, and/or to receive a price list of the Society's publications, contact the Business Office.

Institutions may subscribe to the 1991 volume of the American Mineralogist for the annual rate of $175. The subscription price includes any new volumes of the Reviews in Mineralogy series published during the calendar year of the subscription. Payment must be received in full before a subscription will be started.

1991 President: Malcolm Ross, U.S. Geological Survey
Past-President: Peter Robinson, University of Massachusetts
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Secretary: Maryellen Cameron, Miami University of Ohio
Treasurer: James A. Whitney, University of Georgia
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MSA Needs Nominations And Committee Volunteers

As MSA continues to grow, member participation becomes more essential to the continuation and formation of programs that meet member needs. The best way to participate in Society activities is through committees. Please take a minute now to read the brief committee description below and consider getting involved.

Involvement can take several forms: nominate a candidate for office or an award, volunteer to serve on a committee next year, or offer your name or that of a colleague as a possible candidate for office. It is through the involvement of individual members that the Society's programs develop to meet the needs of its members.

Nomination forms and additional information on all Society Committees are available from the MSA Business Office, 1130 17th Street N.W., Suite 330, Washington, D.C. 20036. Telephone: (202) 775-4344. FAX: (202)775-0018. Or, you may communicate with the appropriate committee chair.

Award/Office	Deadline	Committee Chair
Roebling Medal—The highest award given for eminence as represented by outstanding original research in mineralogy. [No form; contact committee chair with name(s).]	**June 1**	R. James Kirkpatrick University of Illinois Geology Department 1301 West Green Street Urbana, Illinois 61801 (217)333-7414
Mineralogical Society of America (MSA) Award—Outstanding contribution prior to 35th birthday with 1991 awardee younger than 37 on January 1, 1990. [No form; contact committee chair with name(s).]	**June 1**	Jo Laird University of New Hampshire Department of Earth Sciences Durham, New Hampshire 03824 (603)862-3140
Crystallography Grant—$3500 for a research proposal in crystallography from a scientist who has not reached the age of 36 as of the date the grant is awarded. (Form required.)	**July 1**	Frank Hawthorne University of Manitoba Department of Geological Sciences Winnipeg, Manitoba Canada R3T 2N2 (204)474-8861
Fellowship—Society recognition of a member's significant scientific contributions. Nomination undertaken by one member with two members acting as co-sponsors. (Forms required.)	**June 1**	Robert A. Wiebe Franklin & Marshall College Department of Geology P.O. Box 3003 Lancaster, Pennsylvania 17604 (717)291-3820
Officers—Any member or fellow of the Society. One year terms for president and vice-president; two-year terms for treasurer and secretary; three-year term for Councillors. [No form; contact committee chair with name(s).]	**June 1**	M. Charles Gilbert University of Oklahoma School of Geology and Geophysics Norman, Oklahoma 73019-0628 (405)325-3253
Committees—Any member or fellow of the Society. Terms usually from one to three years. In addition to above committees, Society has Management, Financial Advisory, Publications, External Awards and Medals, Short Course, Tellers, and Committee on Committees. (No forms; contact committee chair with name(s).]	**May 1**	Michael Holdaway Southern Methodist University Department of Geological Sciences Dallas, Texas 75275 (214)692-2751

WELCOME!

The following new members and students have joined MSA effective January 1, 1991. Welcome! Applications for membership may be obtained from the Business Office, 1130 Seventeenth Street, N.W., Suite 330, Washington, D.C. 20036; (202)775-4344.

Abercrombie, Hugh J., Geological Survey of Canada, 3303 33rd Street, N.W., Calgary, Alberta, Canada T2L 2A7. O:(403)292-7039. H:(403)249-8412.(M-91). Sponsor: MSA.

Anbeek, Chris, Thorbeckesingel 54, Veenendaal, Holland 3904CS. O:31837082416. H:31838541824.(ST-91). Sponsor: MSA.

Anderson, Sharon J., Department of Crop and Soil Science, Michigan State University, East Lansing, MI 48824-1325. O:(517) 336-1258. H:(517)355-7891.(M-91). Sponsor: MSA.

Apps, John A., Lawrence Berkeley Laboratory, Building 50E, 1 Cyclotron Road, Berkeley, CA 94720. O:(415)486-5193. H:(415)284-7447.(M-91). Sponsor: MSA.

Baker, Judith, 5734 S. Ellis Avenue, Chicago, IL 60637. O:(312)702-8137. (M-91)MP. Sponsor: MSA.

Bard, Gary G., 4523 Falcon Courts N., McGuire AFB, NJ 08641. O:(609)724-4128. H:(609)724-9638.(M-91)IP. Sponsor: MSA.

Barker, Lawrence, 129 Smythe Court #201, Virginia Beach, VA 23452. O:(804)444-4495. H:(804)486-6114. (M-91)EG. Sponsor: MSA.

Bhattacharyya, Samir K., Department of Geosciences, University of Arizona, Gould Simpson Building, Tucson, AZ 85721. O:(602)624-6024. H:(602)624-4856.(ST-91) MI. Sponsors: Lawrence M. Anovitz and Eleanour Snow.

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Bloom, Paul R., Department of Soil Science, University of Minnesota, St. Paul, MN 55108. O:(612)625-4711. H:(612) 646-1985.(M-91). Sponsor: MSA.

Borg, Lars E., Department of Geological Sciences, University of Texas, Austin, TX 78713. O:(512)471-1177. H:(512)288-2885. (ST-91). Sponsor: MSA.

Borghi, Alessandro, Dip Scienze Terra, Via Valperga Caluso 37, Torino, Italy 10100. O:(011)6502663. H:(011)4730679.(M-91)MP. Sponsors: Harvey E. Belkin and Fred Hutson.

Brady, Patrick V., EAWAG - Swiss Federal Institute of Technology, Ueberlandstrasse 133, Dubendorf, Switzerland CH-8600. O:(411)823-4074. H:(411)940-7445.(M-91). Sponsor: MSA.

Broecker, Michael, Department of Geology, University of California, Davis, CA 95616. O:(916)752-1861. H:(916)758-8134. (M-91)GE. Sponsors: Raymond E. Beiersdorfer and Howard W. Day.

Brown, Stephen A., 230 Pennell Road #F3, Aston, PA 19014. H:(215)494-1460.(ST-91) MI. Sponsors: Paul H. Ribbe and J. Donald Rimstidt.

Bruton, Carol J., Lawrence Livermore National Laboratory, P.O. Box 808, Mail Stop L-219, Livermore, CA 94550. O:(415)423-1936. H:(415)443-6175.(M-91). Sponsor: MSA.

Buchholtz tenBrink, Marilyn, R., L202 Earth Science Department, Lawrence Livermore National Laboratory, Livermore, CA 94550. O:(415)423-7662. H:(415) 578-1220.(M-91). Sponsor: MSA.

Burch, Timothy, E., Yale University, Kline Geology Laboratory, P.O. Box 6666, New Haven, CT 06511. O:(203)432-3126. H:(203)389-2646.(ST-91). Sponsor: MSA.

Burns, Peter C., Geology Department, University of Manitoba, Winnipeg, Canada. O:(204)474-8869. H:(204)255-8270.(ST-91) CC. Sponsors: Frank Hawthorne and Marti Raudsepp.

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D'Arcy, Kimberley A., Department of Geology, University of Florida, Gainesville, FL 32607. O:(904)392-2231. H:(904) 371-8338.(ST-91)GE. Sponsor: MSA.

Daines, Martha J., Department of Geology and Geophysics, University of Minnesota, Minneapolis, MN 55455. O:(612)626-0572. H:(612)222-7037.(M-91). Sponsor: MSA.

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Duffield, Wendell A., U.S. Geological Survey, 2255 North Gemini Drive, Flagstaff, AZ 86001. O:(602)527-7205. H:(602) 774-0404.(M-91). Sponsor: MSA.

Eary, L. E., Pacific Northwest Laboratory, P.O. Box 999, MS K6-81, Richland, WA 99352. O:(509)376-8623. H:(509)627-5470. (M-91). Sponsor: MSA.

Edwards, Benjamin R., 2411 Land Street #32G, Laramie, WY 82070. O:(307) 766-2914. H:(307)766-4557.(ST-91)IP. Sponsors: Ron Frost and Don Lindsley.

Ela, Wendell P., Environmental Engineering Program, Civil Engineering Department, Stanford University, Stanford, CA 94305. O:(415)723-0315. H:(415)856-4863.(ST-91). Sponsor: MSA.

Eide, Elizabeth, Department of Geology, Stanford University, Stanford, CA 94305. O:(415)723-1010.(ST-91)MP. Sponsors: J.G. Liou and S.R. Bohlen.

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Feiss, P. Geoffrey, Department of Geology, University of North Carolina, Mitchell Hall, CB#3315, Chapel Hill, NC 27599-3315. O:(919)962-0693. H:(919)967-7265.(M-91). Sponsor: MSA.

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Fish, William, Department of Environmental Science & Engineering, Oregon Graduate Institute, 19600 N.W., Von Neumann Drive, Beaverton, OR 97006-1999. O:(503)690-1099. H:(503)239-5494.(M-91). Sponsor: MSA.

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Garcia-Casco, Antonio, Dpto Mineralogia-Petro., Facultad de Ciencias, Granada, Spain 18002. O:(34) 58 243355.(M-91)PE. Sponsors: Manuel Rodriguez-Gallego and Daniel Martin Ramos.

Gatz, Donald F., Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820. O:(217)333-2512. H:(217)367-0670.(M-91). Sponsor: MSA.

Giblin, Angela M., Division Exploration Geoscience, CSIRO, P.O. Box 136, North Ryde Australia 2113. O:(02)8878736. H:(02)6531273.(M-91). Sponsor: MSA.

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Gullett, Cheryl, 30 Carillon Court, Columbia, SC 29204. O:(803)777-2411. (ST-91)SP. Sponsor: MSA.

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Heins, William A., Department of Earth & Space Science, UCLA, Los Angeles, CA 90024. O:(213)206-1178. H:(213)3974569. (ST-91). Sponsor: MSA.

Hellmann, Roland, L.G.I.T., BP 53X, 38041 Grenoble, France. O:61556241. H:61530977.(M-91). Sponsor: MSA.

Herbert, Bruce E., Savannah River Ecology Laboratory, Drawer E, Aiken, SC 29801. O:(803)725-2472. H:(803)642-9324.(ST-91). Sponsor: MSA.

Hesse, R., Department of Geological Science, McGill University, 3450 University Street, Montreal, Quebec, Canada H3A 2A7. O:(514)398-4895. H:(514)845-1758.(M-91). Sponsor: MSA.

Hill, Brittain E., Department of Geology, Oregon State University, Wilkinson Hall 102, Corvallis, OR 97331-5506. O:(503)737-1201. H:(503)757-1809.(ST-91). Sponsor: MSA.

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Hu, Chen, Department of Earth & Planetary Sciences, The Johns Hopkins University, Baltimore, MD 21218. O:(301) 338-8362. H:(301)243-8596.(ST-91). Sponsor: David Veblen.

Hunter, Margaret A., Department of Environmental Science & Engineering, Rice University, P.O. Box 1892, Houston, TX 77251. O:(713)527-8101x2615. H:(713) 630-9137.(ST-91). Sponsor: MSA.

Ilton, Eugene S., Department of Mineral Sciences, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024. O:(212)769-5385. H:(914)738-7523.(M-91). Sponsor: MSA.

Intasopa, Suporn, Department of Geology, University of New Brunswick, Fredericton, NB, Canada E3B 5A3. O:(506)453-4804. H:(506)457-2576.(ST-91). Sponsor: MSA.

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Jenne, Everett A., Pacific Northwest Laboratory, MS:K3-61, P.O. Box 999, Richland, WA 99352. O:(509)375-6869. H:(509)735-6648.(M-91). Sponsor: MSA.

Johnson, Lois A., Rutgers University, Ceramics Department, Piscataway, NJ 08855. O:(908)932-5613. H:(908)245-7636. (M-91)CC. Sponsors: Jeremy S. Delaney and Ronald A. McCauley.

Johnsson, Patricia A., Applied Earth Sciences Department, Stanford University, Stanford, CA 94305. O:(415)723-0580. H:(415)326-6659.(ST-91). Sponsor: MSA.

Jones, John H., NASA, Johnson Space Center, SN2, Houston, TX 77058. O:(713)483-5319. H:(713)474-5345.(M-91). Sponsor: MSA.

Kamineni, Choudari, Atomic Energy of Canada Limited, Pinawa, Manitoba, Canada R0E 1L0. O:(204)753-2311. H:(204) 753-2789.(M-91). Sponsor: MSA.

Karlsson, Haraldur R., NASA, Johnson Space Center, SN2, Houston, TX 77058. O:(713)483-5402.(M-91)GE. Sponsors: Lindsay P. Keller and John M. DeHart.

Kilinc, Attila, I., Department of Geology, University of Cincinnati, Cincinnati, OH 45221. O:(513)556-3732. H:(513)489-8259. (M-91). Sponsor: MSA.

Kim, Yeongkyoo, Department of Geology, University of Illinois, 245 NHB, 1301 West Green Street, Urbana, IL 61801. O:(217)333-6527. H:(217)332-2271. (ST-91)MI. Sponsors: Xiandong Cong and R. James Kirkpatrick.

Klug, Caroline, Department of Geological and Geophysical Sciences, Princeton University, Guyot Hall, Princeton, NJ 08544. O:(609)258-5011. H:(609)683-0498. (ST-91). Sponsor: MSA.

Knauss, Kevin G., L-202 Earth Sciences Department, Lawrence Livermore National Laboratory, Livermore, CA 94550. O:(415)422-1372. H:(415)443-8782.(M-91). Sponsor: MSA.

Knipe, Stephen W., Department of Geology, Southampton University, Southampton, England S09 5NH. O:(0703)592737. H:(0703)770554.(ST-91). Sponsor: MSA.

Kozak, Sam, Geology Department, Washington and Lee University, Lexington, VA 24450. O:(703)463-8867. H:(703) 463-5037.(M-91). Sponsor: MSA.

Kriegman, Michelle R., Department of Civil Engineering, Stanford University, Stanford, CA 94305-4020. O:(415)723-0315. H:(415)327-8715.(ST-91). Sponsor: MSA.

Kuentz, David, Department of Earth Sciences, University of California, Santa Cruz, CA 95064. O:(408)459-4924.(ST-91). Sponsor: MSA.

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IN MEMORIAM

We regret to announce the passing of the following MSA members. The Society extends its condolences to the families and friends of these scientists.

Ahrens, Louis H.,
Life Fellow, 1951

Muan, Arnulf,
Fellow, 1961

Parnau, Jack,
Life Member, 1948

Registration Form

Contact Metamorphism Short Course
October 17–20, 1991

Return this registration form, completed, to the MSA Business Office, 1130 17th Street N.W., Suite 330, Washington, D.C. 20036. FAX: (202)775-0018. Payment must accompany this form. Registration is limited to 125 individuals on a first-come, first-served basis.

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CONTACT METAMORPHISM
Mineralogical Society of America Short Course

October 17–20, 1991
Pala Mesa Resort
San Diego, CA

This course, convened by Derrill M. Kerrick of the Pennsylvania State University, will utilize theoretical, experimental and field information to elucidate the processes and controls of contact metamorphism. Speakers will review current knowledge and will explore avenues for future research. Particular emphasis is given to a multidisciplinary analysis of contact metamorphism (igneous & metamorphic petrology, geochemistry, thermal modeling, structural geology).

Speakers and specific topics include:

Derrill Kerrick & Mark Barton: Overview

George Bergantz & Mark Barton: Intrusives

David Pattison & Robert Tracy: Contact Metamorphism of Pelites: Phase Equilibria, Thermobarometry and Fluids

Robert Tracy, Ronald Frost & David Pattison: Contact Metamorphism of Calcareous Rocks, Metabasites and Other Non-Pelitic Rocks: Phase Equilibria, Thermobarometry and Fluids

Theodore Labotka: Physical and Chemical Properties of Fluids and Mass Transport in Contact Metamorphic Aureoles

John Ferry & Mark Barton: Mineralogical and Geochemical Effects of Fluid-Rock Interaction during Contact Metamorphism

Peter Nabelek: Stable Isotope Monitors of Contact Metamorphism

Kevin Furlong, James Bowers & Brooks Hanson: Thermal Modeling

Ray Joesten, Tony Lasaga & Derrill Kerrick: Kinetics of Contact Metamorphic Processes

Scott Paterson & Ron Vernon: Aureole Tectonics

Mark Barton, Derrill Kerrick & Brooks Hanson: Aureole Systematics

The course will take place on Thursday, October 17 through noon on Sunday, October 20. This is just prior to the MSA/GSA Annual Meeting. The short course will be held at the Pala Mesa Resort in Fallbrook, California, approximately 50 miles from the San Diego airport. The course will begin with a welcoming reception on Thursday evening and continue until noon on Sunday. Transportation will be provided from the San Diego airport at two separate times to be determined at a later date. Buses will return participants to the main GSA hotels in San Diego at approximately 2:00 on Sunday. In addition, registration fees include Volume 26 of the *Reviews in Mineralogy* series, lodging Thursday, Friday and Saturday nights and all meals beginning with the reception and light buffet dinner on Thursday through lunch on Sunday.

The resort is located on Interstate 15 between Los Angeles and San Diego. In nearby Fallbrook visitors are welcomed by an unpretentious old West charm and quaint antique shops amid modern shopping centers and theme restaurants. Among the recreational facilities that the Pala Mesa has to offer are: lighted tennis courts, whirlpool spa, swimming pools, and an 18-hole championship golf course. Seaworld, the San Diego Zoo and Wild Animal Park, Mount Palomar Observatory, and many local wineries are but a leisurely drive from the resort. So that participants can take advantage of these facilities and the surrounding area, and to promote an informal atmosphere, the convenor has decided on a schedule of talks during the morning on Friday, Saturday and Sunday and talks during the evening on Friday and Saturday. This allows participants to have their afternoons free to enjoy the resort and visit with friends and colleagues.

MSA is organizing a scholarship program to defray costs of graduate students who are attending this course and who are pursuing thesis research on contact metamorphism. Details will be given in the May, 1991 *Lattice*.

Mineralogical Abstracts

Are you aware that MSA is co-owner of *Mineralogical Abstracts* and that as a consequence MSA members are able to subscribe personally to *MA* at a much reduced rate? For several years this rate has been held at $25 but was increased for 1991 to $30 (this price compares with the full price to subscribers of $230).

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SUSPECT MINERALS AND HUMAN HEALTH: A COMMENTARY

Malcolm Ross
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The mining and metals industry in the United States is undergoing a rapid decline; not only is this causing serious employment problems and an ever increasing dependency on other nations for mineral commodities, but is also affecting the vitality of the earth sciences. If this decline continues fewer and fewer geoscientists will be needed to find and develop domestic mineral resources.

As a consequence of the wave of environment and health consciousness that began in the 1970's and continues unabated to this day, several common minerals have become suspect as agents of cancer and other diseases. Mine dumps are assumed to be a hazard to human health and many have been placed on the Environmental Protection Agency's (EPA) Superfund list for future cleanup. Better environmental controls were certainly needed in many of our basic mining, smelting, steel, and chemical industries and much progress has been made in the last ten years in reducing industrial emissions. It is clear, however, that some of the newly instituted and excessively restrictive regulatory controls are a consequence of an extreme over reaction to perceived health risks that are in fact insignificant or nonexistent.

The very stringent Federal regulations promulgated in the United States are based on a health policy that appears to require a near risk-free living environment. The prevailing cancer dogma in the United States espouses the "no threshold" theory of cancer induction. It is said repeatedly by influential health specialists that since no one knows the minimum amount of a carcinogen required to initiate the growth of a tumor it must be assumed that any amount of a carcinogen is unsafe. Thus, the public is led to believe that exposure to just one molecule of a chemical carcinogen can cause cancer. In regard to exposure to asbestos and other mineral dusts, this paradigm becomes "one mineral fiber can kill". Unless we decide that living on a carcinogenic planet is unacceptable and move elsewhere, we must recognize that the products and emissions presently produced by U.S. industry, some of which contain substances that are carcinogenic to animals when administered in large quantities, are responsible for very little human cancer. This is proven by massive amounts of human epidemiological data. It also should be recognized that naturally occurring carcinogens (as defined by animal experiments) are ubiquitous in foods we eat; man ingests at least 10,000 times more of mother nature's carcinogens than of man-made carcinogens.

Ore and gangue minerals that are presently classified as human carcinogens include: chrysotile, amosite (grunerite asbestos), crocidolite (riebeckite asbestos), anthophyllite, tremolite, and actinolite asbestos, minerals containing arsenic, cadmium, chromium, nickel, and beryllium, radioactive minerals, quartz, tridymite, cristobalite, and hematite. The presence of these suspect mineral carcinogens in the mining, milling and smelting environments places these industries in a very vulnerable position with regard to their survival if very restrictive regulatory controls are instituted.

Some actions that have taken place over the last 15 years, perpetrated allegedly to protect human health, which greatly affect the vitality of the U.S. mining and metals industries and the U.S. economy are:

(1) In 1986 the Occupational Safety and Health Administration (OSHA) proposed a rule that defines all tremolite, actinolite, and anthophyllite as asbestos if the particles have a length-to-width ratio of 3:1 or greater. This "Federal fiber" definition would thus define all tremolite, actinolite, and anthophyllite as "asbestos" whether or not these minerals have an asbestiform habit. Some have even proposed that other amphiboles, for example hornblende, be included within this definition. If the proposed OSHA rule regarding "Federal fibers" is upheld by the courts many mining operations will be affected for these amphiboles are common and are found in many types of rocks. Examples of activities that might be impacted by restrictive Federal asbestos regulations are the mining of talc, vermiculite, copper, and the quarrying of various rock aggregates. It is now becoming very difficult to open new vermiculite and talc mines due to the perception that mine ores and gangue may contain "asbestos".

(2) The County Council of Prince George's County, Maryland, passed a law in 1986 prohibiting the use of crushed stone that contains more than 100 parts per million "asbestos" as defined by OSHA. This law has since been invalidated by a higher court on a technicality. If this law had remained in effect the only rock that might be able to pass the "Federal fiber" test would be limestone from west central Maryland, a rock that is unsuitable for many construction purposes.

(3) A dike surrounding part of the city of San Jose, California is composed of serpentinite rock containing small amounts of chrysotile asbestos. The EPA considers this rock toxic and has placed the dike on the Superfund list for remedial action. Serpentinite, a very common type of rock, is exposed in many areas in the United States and is commonly used as construction stone and aggregate. Indeed, if serpentinite rock is considered toxic many hundreds of square miles of land area might be placed off-limits for any kind of development.

(4) The U.S. District Court for Minnesota in 1975 declared that the taconite mined by Reserve Mining Company contained amosite asbestos. The Company was ordered to build a special landfill at the cost of $300,000,000 to dispose of the waste rock. The taconite mined by Reserve contains magnetite, carbonates, quartz, and various other silicates including non-asbestiform cummingtonite and actinolite amphibole. The rock does not contain asbestos!

(5) In 1987 tremolite asbestos was discovered at a construction site located within a prime real estate area of Fairfax County, Virginia. Small pockets of this type of asbestos are found throughout a four

square mile area that is underlain by a highly altered ophiolitic mélange. The asbestos occurs where the tremolite schist, the dominant rock type in the mélange, is sheared or folded. Workers employed at major construction projects located within this "suspect terrane" are now required to wear white suits and air filters. Signs have been posted in front of private homes announcing: DANGER TREMOLITE and/or ACTINOLITE—CANCER and LUNG DISEASE HAZARD—AUTHORIZED PERSONNEL ONLY. Rock samples sent to commercial laboratories are reported to contain up to 80 percent "asbestos" (the labs are recording the non-asbestiform as well as the asbestiform tremolite particles as "asbestos"). One wonders whether it is only a matter of time before fear, generated by the posted warning signs, etc., will require the County to forbid any new development in this area.

(6) A British-based company is now exporting crushed stone from the west coast of Scotland to U.S. ports; the first ships unloaded the stone in New Orleans and loaded coke for the return voyage. Lone Star Stone is now shipping granite aggregate from Nova Scotia, Canada to U.S. ports and Vulcan Minerals will soon be shipping aggregate from Yucatan, Mexico to U.S. Gulf Coast ports. As environmental concerns force stone quarries farther and farther from large urban centers the cost of trucking the aggregate will exceed the transatlantic or transgulf shipping costs. One wonders how a nation can survive economically if it has to import crushed stone.

(7) In 1975 the EPA promulgated zinc standards for mine and mill water effluent of 0.5 milligrams per liter (0.5 ppm) and 0.2 mg (0.2 ppm), respectively, for the central U.S. zinc mining districts. Since the zinc in the ground water in these districts averages 1.53 mg per liter, the mine operators would have to remove zinc from the influent water in order to comply with EPA standards. As this was uneconomic to say the least, the mines were closed. In these same districts farm animals are given zinc supplements in their feed. Adequate zinc in animal diets promotes wound healing, sexual development, bone growth, DNA synthesis, glucose utilization; it prevents various types of skin lesions, retarded growth, loss of hair, emaciation, and loss of appetite. Low zinc intake also causes similar effects in humans. In order to maintain minimum daily human requirements for zinc (15 to 25 mg) one would have to drink 75 to 125 liters of EPA regulated effluent mill water each day. Now most of the zinc mines and smelters are closed, mine stopes and tunnels are flooded, and there is a serious problem with acid drainage. If the mines had been left open and pumped there would be little acid drainage and the huge costs of cleaning up the mine sites would be avoided.

(8) The International Agency for Research on Cancer (IARC) has designated quartz a carcinogen—a decision based on recent experiments in which cancer tumors were produced in rats when exposed to quartz dusts. The rules of the OSHA Communication Standard were automatically invoked by this IARC action. Part of this action requires that any U.S. product that contains more than 0.1 percent "free silica" (meaning quartz, tridymite, cristobalite, and possibly opal) must display hazardous warning signs. For example, truck drivers hauling crushed stone to construction sites in Delaware were recently cited by OSHA for not displaying signs warning of the presence of carcinogenic quartz in the stone.

The "no threshold" dogma for cancer induction that has been repeatedly foisted on the American public is generating a national crisis of such proportions that our economy could be very adversely affected. The economic consequences are particularly apparent with regard to the asbestos abatement fiasco in schools. It is clear that most of the many billions of dollars spent on asbestos removal was entirely unnecessary and in fact was counterproductive. Many asbestos abatement workers now have been exposed to high levels of asbestos dust through employment in the many very dirty, poorly supervised asbestos abatement jobs.

The "case histories" mentioned above invoke the following questions: Will this Nation repeat the asbestos abatement fiasco in other areas of economic activity? Will many mines, mills, and smelters be closed because of these suspect mineral carcinogens? Will many mines dumps have to be buried? Will large areas underlain by "suspect rocks" be placed off limits for human activity? Will many corporations go bankrupt because of the enormous and mostly unnecessary abatement costs? Will the United States grow evermore dependent on foreign sources for its mineral commodities, further endangering the national security? One would hope that the answers to these questions is an emphatic NO! There is good scientific evidence to show that the concept of "zero threshold" for cancer causation is not valid and that controls can be placed on mine and mill emissions that will protect the workers and those casually exposed in the non-occupational setting while still insuring that mineral commodities can be produced so as to compete economically in the international market.

In conclusion, I believe it is imperative that our national health policy be reevaluated so as to recognize that monies spent to reduce or eliminate exposure to a perceived health hazard be proportional to the risk associated with that hazard. The health risk of exposure to asbestos in the schoolroom is trivial, the risk of smoking is enormous; yet we are spending billions to mitigate the former, little to mitigate the latter.

From the *American Mineralogist* Editorial Office . . .

The editorial office has been a busy place these past few months, mostly as a result of the exceptional pace at which papers were submitted to *American Mineralogist*. This is having an effect on both the size of the journal and the number of people in the editorial office.

You will be seeing issues that are much larger than usual in 1991 for two reasons. First, we are going to be publishing a special issue—now planned for May–June—in honor of Jim Thompson of Harvard University, with John Brady and Charlie Burnham serving as the Associate Editors for the entire issue. Second, in the last year there has been an increase in submissions of approximately 25% above those of past years.

As pleased as we are with such success, it has meant that we have had to make additions to the office staff. Joyce Sherman, the Assistant Editor and Barbara Blomfield, the part-time Editorial Secretary, have been joined by Mary Hoban, who is helping with the exceptionally large number of papers to appear in the next few issues.

One aspect of the increase in number of papers is that recent issues of *American Mineralogist* have been published somewhat late. This is a temporary situation, however. With the increase in staff we should not only be able to handle the increased number of papers, but also make up the lost time. We plan that by the end of this year you will be receiving *'American Mineralogist'* right on schedule.

Because we are geared up to handle greater volume, you should not be concerned about the possibility of lengthened publication times. In fact, we expect that publication time will decrease over this year. So please keep the papers coming! And please keep in mind that the "Letters" section gives rapid publication for especially timely papers. We will be looking forward to seeing your submissions.

Steve Bohlen, Editor

Don Peacor, Editor

Vicki Lawrence, Managing Editor

Call for Papers

MSA will jointly sponsor with Mineral Physics and VGP two special sessions, which are described below, at the Spring 1991 joint AGU/MSA Meeting in Baltimore. If you wish to submit a paper to either of these sessions, please refer to the Call for Papers in the October 31, 1990 or January 15, 1991 issue of EOS for the standard AGU abstract format. Deadline for the receipt of abstracts by AGU is March 7, 1991. Please remember that this is a hard deadline. Indicate on the abstract that it is intended for inclusion in the applicable special session.

I. M01 Oxide Minerals: Status of Unusual Properties and Applications

This special session on oxide minerals of invited and contributed papers will complement the "Reviews in Mineralogy—Oxide short course" sponsored by MSA and scheduled to precede the AGU/MSA meeting.

Long recognized as the source of rock magnetism, the oxide mineral group has been widely employed as a petrogenetic indicator. Innovative research along a broad front in the past few years has resulted in many insights and unusual applications that are of increasing mineralogical, geological, and geophysical interest.

Some of the topics to be considered in this special session are: (1) Wüstite and oxygen in the Earth's core and the role of oxide and oxide structures in the D" layer, the 400–670 km transition zone, and in mantle flumes (plumes and hot, wet spots); (2) Spinel, perovskite, and hibonite in primitive inclusions in meteorites; (3) Oxide minerals in planets and satellites; (4) Retrieval of oxygen and titanium from lunar ilmenite; (5) Exotic spinels and other oxides at the K-T and other extinction boundaries; (6) HRTEM of Fe, Ti, and Mn oxides; (7) Radiometric dating of spinel, rutile, perovskite, and zirconolite; (8) Hydroxyl radicals in nominally anhydrous oxides; (9) Organically precipitated oxides in the range of bacteria to mammals and from limestone to petroleum; (10) Evaluation of residual titanites in partitioning of LIL and HFSE in alkali magmatism; (11) Evaluation of techniques for the redox determination of titanomaghemite in ocean floor basalts and in spinel and ilmenite from the upper mantle; (12) Spinels in the classification of ophiolites and podiform chromites, ilmenite, and magnetite-type granites and related ore deposits, and the role of oxides in PGE horizons.

Please also send one copy of your abstract to the organizer, Prof. S.E. Haggerty, Dept. of Geology, University of Massachusetts, Amherst, MA 01003. Telephone: (413)545-0938; FAX: (413)545-1200.

MINERALOGICAL SOCIETY OF AMERICA

MSA SHORT COURSE ON FE-TI OXIDES: THEIR PETROLOGIC AND MAGNETIC SIGNIFICANCE

May 24–27, 1991
BWI Marriot
Baltimore, MD

Co-conveners: B. Ronald Frost, Donald H. Lindsley, and Subir Banerjee

A short course to explore the crystal chemistry, magnetic properties, and phase relations of oxide minerals and their influence on petrology and the magnetic properties of rocks. This short course is designed to address the following:

The mineralogical controls of rock magnetism.
The role of oxides as petrologic indicators.
The interrelation between the thermodynamic and magnetic properties of oxide minerals.
The range of oxygen fugacities at which common crustal and mantle rocks crystallize.

Speakers:

Glenn Waychunas:	Crystal chemistry of oxides
Donald Lindsley:	Phase equilibria of oxides
Subir Banerjee:	Magnetic properties of Fe-Ti oxides
Mark Ghiorso:	Thermodynamic solution models for oxide minerals
Bernard Wood:	Interrelation between macroscopic and microscopic measurement of thermodynamic properties
Steve Haggerty:	Oxide textures in all their noble glory
Ben Burton:	Interplay between chemical and magnetic ordering
Richard Sack:	Chromite as a petrogenetic indicator
Steve Haggerty, Bernard Wood:	Oxides and oxygen fugacity in the mantle
Don Lindsley, Ron Frost:	Fe-Ti oxides in magmatic systems
Peter Wasilewski:	Magnetic properties of common rock types
Ron Frost:	Magnetic petrology: The stability of Fe-Ti oxides in crustal rocks
Robert Karlin:	The magnetic properties of sedimentary rocks

This two and one-half day course will be held just prior to the 1991 Spring AGU Meeting. The course will be held at the BWI Marriott, conveniently located just minutes from the Baltimore-Washington International Airport. The course will begin with a welcoming reception on Friday evening, May 24th. Sessions begin Saturday morning and continue until 1:30 on Monday. The registration fee includes the short course program and accompanying volume of the *Reviews in Mineralogy* series, lunch on Saturday, Sunday and Monday, daily coffee breaks, and the welcoming reception on Friday. Individual participants are responsible for making their own sleeping room arrangements. The BWI Marriott is offering special rates to participants of the short course—$75/night for single and $80/night for double. Be sure to identify yourself as a short course participant when making your reservation. Enrollment is limited to 125 on a first come, first served basis, so register early! See registration form in this newsletter.

II. M02 Hydrogen in Minerals: Crystallography, Mineralogy, and Thermodynamics

There has been much recent research interest in the incorporation of hydrogen in minerals. The stability of hydrous minerals in the mantle may control the generation of melts. The incorporation of H in nominally anhydrous phases has been shown to affect conductivity. The purpose of the special session is to bring together practitioners of various experimental and theoretical methods used to detect, locate, model, and predict the mechanisms and effects of the incorporation of H in hydrous and nominally anhydrous minerals to present results and stimulate further collaborative studies.

Topics of interest will include: (1) Neutron, X-ray and electron diffraction methods; (2) IR, Raman, and NMR spectroscopic methods; (3) Computer modeling of crystal structures and prediction of H locations in minerals; (4) detection and location of H in nominally anhydrous minerals; (5) Location of H in hydroxyl-bearing minerals; (6) H in high-pressure

continued on page 16

CMS Workshop Lectures Volumes Available

Two new publications are now available from the Clay Minerals Society.

'Quantitative Mineral Analysis of Clays', Volume 1 CMS Workshop Lectures and edited by D.R. Pevear and F.A. Mumpton, provides a guide to the methodologies of quantitative clay mineral analysis. Chapters include: 'Principles and Techniques of Quantitative Analysis of Clay minerals by X-ray Powder Diffraction', by R.C. Reynolds, Jr.; 'A Computer Program for Semiquantitative Mineral Analysis by X-ray Powder Diffraction', by J.W. Hosterman and F.T. Dulong; 'A Computer Technique for X-ray Diffraction Curve Fitting/Peak Decomposition', by R.C. Jones; 'Quantitative Mineral Analysis by X-ray Transmission and X-ray Diffraction', by B.L. Davis and L.R. Johnson; Quantitative Determination of Clays and Other Minerals in Rocks', by Maynard Slaughter; A Combined X-ray Powder Diffraction and Chemical Method for Quantitative Mineral Analysis of Geological Samples', by C.S. Calvert, D.A. Palkowsky, and D.R. Pevear; and 'Appendix: Computer-Generated Templates to Convert 20 to Interplanar Spacings', by L.J. Poppe and J.E. Dodd. (Paperback, 171 pages)

'Electron-Optical Methods in Clay Science', Volume 2, CMS Workshop Lectures and edited by I.D.R. Mackinnon and F.A. Mumpton, provides a basis for the use of electron-optical methods in the analysis of clays. Chapters include: 'Introduction', by I.D.R. Mackinnon; 'Transmission Electron Microscopy: Scattering Processes, Conventional Microscopy, and High Resolution Imaging,' by D.R. Veblen; 'Electron Diffraction of Clay Minerals', by Necip Gven; 'Selected Applications of Analytical Electron Microscopy in Clay Mineralogy, by C.R. Hughes, C.D. Curtis, J.A. Whitman, Sun Heping, C.K. Whittle, and B.J. Ireland; 'Low-Temperature Analyses in the Analytical Electron Microscope', by I.D.R. Mackinnon; 'Application of the Electron Microprobe and Image Analysis in the Study of Clays', by R.E. Ferrell, Jr. and P.K. Carpenter; and Case Studies on 'Transmission Electron Microscopy of Phyllosilicate Minerals from Low-Grade Chloritoid-bearing Rocks, North Wales', by A.J. Brearley and 'Chemical Composition and Variation of Authigenic Illite, Rotliegende Sandstone (Permian), Southern North Sea' by E.A. Warren. (Paperback, 159 pages)

Both volumes may be ordered from The Clay Minerals Society, P.O. Box 12210, Boulder, CO 80303. The costs are $14.00 plus $2.00 postage and $18.00 plus $2.00 postage for Vol. 1 and Vol. 2, respectively. (U.S. funds only)

MEETING CALENDAR 1991

April/May

30	Mineralogical Society of Great Britain's Spring Meeting organized jointly with the Geochemistry Group on "Extraterrestrial Geochem istry". Details: Dr. R. Hutchison, The Natural History Museum, Cromwell Road, London SW7 5BD. Telephone: 071-938-8866. FAX: 071-938-9268.
29–04	1991 Spring Meeting of the Materials Research Society in Anaheim, CA. Details: Materials Research Society, 9800 McKnight Road, Pittsburgh, PA 15237. Telephone: (412)367-3003. FAX: (412)367-4373.
06–1	6th Annual Meeting of the Society for the Preservation of Natural History Collections in Ottawa, Ontario. Details: G.R. Fitzgerald, Canadian Museum of Nature, Earth Sciences (Paleobiology), P.O. Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4.
27–29	Geological Association of Canada—Mineralogical Association of Canada Annual Meeting held jointly with the Society of Economic Geologists in Toronto, Canada. Details: J.J. Fawcett, Dept. of Geology, Earth Sciences Center, University of Toronto, 22 Russell St., Toronto, Ontario M5S 3B1, Canada. Telephone: (416)978-3027.

May/June

24–27	MSA Short Course on Fe-Ti Oxides: Their Petrologic and Magnetic Significance in Baltimore, MD. Details: MSA Business Office.
28–01	AGU/MSA Spring Meeting in Baltimore, MD. Details: MSA Business Office.
07–09	"Geology of White River Valley, Grant Range, Eastern Railroad Valley, and Western Egan Range, White Pine County, Nevada", Nevada Petroleum Society Field Trip. Contact: Earl W. Abbott or Neal Brecheisen, NPS, P.O. Box 11526, Reno, Nevada 89510. Telephone: (702)827-2324.

July

21–26	Annual Meeting of the American Crystallographic Association in Toledo, Ohio. Transactions Symposium: "The Structural Chemistry of Silicates". Details: Margaret C. Etter, Dept. of Chemistry, University of Minnesota, 78 Kolthoff Hall, Minneapolis, MN 55455. Telephone: (612)624-5217.

September

02–04	International Conference on Applied Mineralogy in Johannesburg, South Africa. Details: The Conference Coordinators, C.133, P.O. Box 395, 0001 Pretoria, South Africa. Tel.: +27 12 841-3188/4513.
16–21	15th International Meeting on Organic Geochemistry in Manchester, United Kingdom. Details: Dr. D.A.C. Manning, Dept. of Geol., The University, Manchester, M13 9PL. FAX: (44) 61 275 3947.

October

05–10	28th Annual Meeting of the Clay Minerals Society, to be held at the NASA Gilruth Center and the nearby Nassau Bay Hilton (located about 20 miles south of Houston, TX.) Details: David Pevear (general chair for the meeting) (713)965-4452; Joe Dixon (program chair) (409)845-8323.
06–18	Preventative Conservation for Geological Collections in Kingston, Ontario. The course is designed for those who have the responsibility for the maintenance of mineralogical, paleontological or petrological collections. Details: Director, Art Conservation Dept., Queen's University, Kingston, Ontario K7L 3N5 Canada.
17–20	MSA Short Course on Contact Metamorphism in San Diego, CA. Details: MSA Business Office.
21–24	GSA/MSA Annual Meeting in San Diego, CA. Details: GSA, Meetings Dept., P.O. Box 9140, Boulder, CO 80301. Telephone: (303)447-2020; FAX: (303)447-1133.

Registration Form

FE-TI OXIDES: THEIR PETROLOGIC AND MAGNETIC SIGNIFICANCE

May 24–27, 1991 Baltimore, Maryland

Return this registration form, completed, to the MSA Business Office, 1130 Seventeenth Street, N.W., Suite 330, Washington, D.C. 20036. FAX: (202)775-0018. Payment must accompany this form. Registration is limited to 125 individuals on a first-come, first-served basis.

Please type or print.

Name _____
(first) (middle initial) (last)

Address _____

_____
(city) (state) (zip/postal code) (province) (country)

Telephone numbers _____ (____) _____ (____) _____
(office) (home)

Please check appropriate registration category.

	Member	Non-Member
Professional:	☐ $245	☐ $265*
Student:	☐ $100	☐ $120*

*includes MSA dues for 1991.

Please check method of payment:

___ Enclosed is a check or money order in the amount of $ _____.
___ Please charge my ___ Visa ___ Mastercard ____ Diner's Club ____ American Express card in the amount of $ _____.

(Your credit card will be charged when the registration form is received. Should a refund be required, a credit will be applied to your charge card.)

_____
(card number)

_____
(name on card—please print)

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(exp. date)

_____
(signature)

Please list any special meal requirements.

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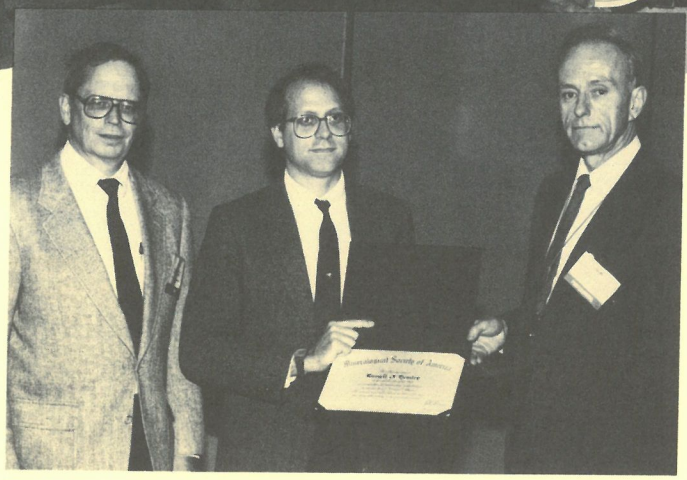
At the Annual Awards Luncheon, Past President Peter Robinson (left) awards the Roebling Medal to Sturges Bailey (center). Citationist Eugene Cameron (right), noted Bailey's extensive research on the crystal structure and crystal chemistry of phyllosilicate minerals.

Malcolm Ross, current president (center), receives the Distinguished Public Service Medal from Past President Peter Robinson (left). Ross was cited by Donald Lindsley for his contributions to the understanding of the health effects of mineral dust, particularly the asbestos minerals.



Russ Hemley (center), receives the Mineralogical Society of America award from Past President Peter Robinson. Charles Prewitt (left) introduced Hemley and noted his studies of the high pressure properties of a variety of earth and planetary materials.

WELCOME!

The following new members and students have joined MSA effective January 1, 1990. Welcome! Applications for membership may be obtained from the Business Office, 1130 Seventeeth Street, N.W., Suite 330, Washington, D.C. 20036; (202)775-4344.

Adams, Larry, Southdown, Inc., P.O. Box 937, Victorville, CA 92393. O:(619)245-1681/228. H:(619)244-1718. (M-90)MI. Sponsor: MSA.

Aizawa, Jun, Hakozaki 5-4-12-406, Higashi-ku, Fukuoka 812, Japan. O:(092)871-6631/6282. H:(092)631-1428. (M-90)SP. Sponsor: MSA.

Bartelmehs, Kurt L., 1900 Carroll Drive, Blacksburg, VA 24060. O:(703)231-3358. H: (703)552-1178. (St-90)CC. Sponsors: P.H. Ribbe and Robert T. Downs.

Boardman, Shelby J., Department of Geology, Carleton College, Northfield, MN 55057. O:(507)663-4402. H:(507)645-6357. M-90)IP. Sponsors: William A. Crawford and Maria L. Crawford.

Brown, Michael, Department of Geology, University of Maryland, College Park, MD 20742. O:(301)405-4080. H:(301)345-6538. (M-90)MP. Sponsors: Steven Bohlen and Philip A. Candela.

Burr, Jonathan L., Department of Geology and Geography, University of Massachusetts, Amherst, MA 01003. O:(413)545-0745. H:(413)549-4867. (ST-90)MP. Sponsors: Michael L. Williams and Stephen E. Haggerty.

Comerford, Michael C., Mendenhall Laboratory, 125 S. Oval Mall, The Ohio State University, Columbus, OH 43210. O:(614)292-0641. (ST-90)MI. Sponsor: MSA.

Dixon, Jacqueline E., Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA 91125. O:(818) 356-6588. H:(818)352-5376. (ST-90)IP. Sponsors: John Beckett and George R. Rossman.

Drennan, Gillian R., 33 Johan Meyer Street, Linmeyer, Johannesburg, South Africa 2197. O:(011)716-2641. (ST-90)MI. Sponsors: Alastair B. Moyes and Rudolf H. Boer.

Eaton, Harvill C., Office of Research, Louisiana State University, Baton Rouge, LA 70803. O:(504)388-5833. H:(504)769-3873. (M-90)CC. Sponsor: MSA.

Farmany, Farid, 37 Pirozist Tabarsi Avenue, Krayyam Alley, Tehran, Iran 17354. (ST-90)MI. Sponsor: MSA.

Furst, Bruce W., P.O. Box 1039, Cedar Crest, NM 87008. O:(505)281-4423. (M-90)IP. Sponsor: MSA.

Hayward, C.L., Department of Geological Sciences, University College London, London, England WCIE 6BT. O:(01 387) 7050/2433. H: (01 546) 4215. (ST-90)MI. Sponsors: N.L. Ross and R.J. Angel.

Hemmings, Raymond T., Matex Consultants Inc., 100 Matheson Blvd. E, Suite 201, Mississauga Ontario, Canada L4Z 2G7. O:(416)890-0804. H:(416)823-3978. (M-90)GE. Sponsors: Doug Goldsack and Greg McCarthy.

Hermes, O. Don, Geology Department, University of Rhode Island, Kingston, RI 02881. O:(401)792-2192. H:(401)789-3227. M-90)IP. Sponsor: MSA.

Kirby, Stephen, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, CA 94025. O:(415)329-4847. H:(415)367-0987. (M-90)MI. Sponsor: MSA.

Lear, Kerry G., 2045 B. Jack Street, Fairbanks, AK 99709. O:(907)456-0006. (ST-90)GE. Sponsors: Sam Swanson and Daniel B. Hawkins.

Legeros, John, Dental Materials Department, New York University, 345 E 24th Street, New York, NY 10010. O:(212)998-9970. (M-90)MI. Sponsor: Toshiro Sakae.

Lemanski, Chester, Jr., 309 Massachusetts Road, Browns Mills, NJ 08015. O:(201)532-4931. H:(609)893-7366. (M-90)MI. Sponsors: James J. Chenard and Steven C. Misior.

MSA Symposium

MSA is planning a Symposium on contact metamorphism at the Geological Society of America annual meeting in San Diego, October 21–24, 1991. This session will be convened by Maria Luisa Crawford and Robert J. Tracy. The topic is chosen to compliment the MSA short course on contact metamorphism that is being organized by Derrill Kerrick. The session is planned to emphasize any and all physical and chemical effects on country rocks due to heat and fluids introduced into the crusts by magmas. To be included in the symposium you will need to submit an abstract, following standard GSA format, to M. L. Crawford, Bryn Mawr College, Dept. of Geology, Bryn Mawr, PA 19010 *no later than* June 15, 1991. This deadline is prior to the standard GSA deadline, and it will be strictly enforced.

Call for Papers

continued from page 12

minerals; (7) Thermodynamic treatment of H in minerals; and (8) the effects of H on physical and electrical properties of minerals.

The session on hydrogen in minerals will consist of invited and contributed papers. If you are submitting an abstract, please also send a copy to one of the organizers: Prof. J.R. Smyth, Dept. of Geological Sciences, University of Colorado, Boulder, CO 80309, Telephone: (303)492-5521; FAX: (303)492-2606; BITNET: JOESMYTH@COLORADO; or Prof. C.T. Prewitt, Carnegie Institution of Washington, Washington, DC 20008, Telephone: (202)966-0331.

Other sessions

Other sessions to be held at the Spring AGU/MSA joint meeting that may be of interest to MSA members include: session V01—Advances in High Resolution Isotope Geochemistry (joint with MSA and Geochemical Society); session V02—Dynamics and Petrology of Sill Solidification; and session V03—Granites as Probes to the Lower Crust.

1992–93 Advanced Research Fellowships in India

The Indo-U.S. Subcommission on Education and Culture is offering twelve long-term (6–10 months) and nine short-term (2–3 months) awards for 1992–93 research in India. These grants will be available in all academic disciplines, except clinical medicine. Applicants must be U.S. citizens and hold the Ph.D. or comparable professional qualifications. The fellowship program seeks to open new channels of communication between academic and professional groups in the United States and India and to encourage a wider range of research activity between the two countries than now exists. Scholars and professionals with limited or no prior experience in India are especially encouraged to apply. The program is sponsored by the Indo-U.S. Subcommission on Education and Culture and is funded by the United States Information Agency, the National Science Foundation, the Smithsonian Institution, and the Government of India.

Application deadline is June 15, 1991. Application forms and information are available from the Council for International Exchange of Scholars, Attn.: Indo-American Fellowship Program, 3007 Tilden Street, N.W., Suite 5M, Washington, DC 20008-3009. Telephone: (202)687-4017.

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