

INTERNATIONAL ASSOCIATION OF GEOCHEMISTRY AND COSMOCHEMISTRY

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IAGC NEWSLETTER - NO. 1, JULY 1971

EO FORWARD

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In these days when it seems that a plethora of scientific organizations exists, one should ask when a new one is proposed, "Is it really needed?" When the Geochemical Society was organized in the 1950's this question was argued at great length. Looking back now with a 15-year perspective it is clear that the Geochemical Society has performed many important services that would probably not have been done by any other earth science society. Few now doubt that the Geochemical Society was needed; it has certainly taken its place alongside other groups associated with the Geological Society of America.

The International Association of Geochemistry and Cosmochemistry (IAGC) is now in the throes of attempting to answer the question of need. Arguments have again arisen, albeit modified to fit the international scene. The Association does not have a 15-year history on which it can be judged, but already it has initiated many activities that would have been difficult or inappropriate for other organizations to undertake.

At the time IAGC was organized, perhaps the strongest single factor influencing the decision to go ahead was the fact that UNESCO was receiving an increasing number of inquiries about geochemical matters, and no international organization concerned with the whole field of geochemistry existed to which the inquiries could be referred. IAGC has attempted to fill this need, for example, by providing information and advice on geochemical matters to such groups as Man and the Biosphere (MAB) and the International Geological Correlation Program (IGCP).

It is too early to be certain that universal agreement exists on the need for an international organization concerned entirely with geochemistry. But no matter how complete the consensus, agreement alone that an organization is needed cannot give it meaning and direction. Nor can the officers and member organizations of the Association give it the vitality and depth of purpose that it must have to be of maximum service. It must have the support and ideas of the individual geochemist to provide it with an adequate vis vitalis.

Hopefully, the IAGC Newsletter will contain sufficient information about activities and plans so that individual members (now about 600) can make appropriate suggestions. Indeed, contributions should not be limited to members; ideas should come from the geochemical community at large, i.e., if

a suitable mechanism can be devised for soliciting them. Members who are particularly interested in the different Working Groups and Commissions of IAGC (see IAGC Newsletter No. 2) may find opportunity to serve with these groups. It is also perfectly in order for anyone to make suggestions to the Editor or to any officer or chairman of a working group to point out things that should be undertaken. Suggestions will always be welcome about the kinds of things that you would like to see included in the IAGC Newsletter, other fields that might be appropriate for studying by a working group, timely topics for international symposia, topics for which reviews or monographs would be timely, areas for which new journals appear to be called for, and geochemical training programs needed by specific developing countries. Please let us have your suggestions.

Earl Ingerson, President IAGC

HISTORICAL BACKGROUND OF IAGC

The truly international scope of geochemistry was emphasized in 1951 when the International Union of Pure and Applied Chemistry (IUPAC) established a Commission on Geochemistry with Dr. P. Niggli as chairman. It became evident that the Commission's goals could be achieved better if a separate international geochemical group were formed or if sections on geochemistry were established within the International Union of Geodesy and Geophysics (IUGG) or the International Geological Congress (IGC). At the 1960 Helsinki assembly of IUGG, therefore, an ad hoc Committee on Geochemical Problems agreed to coordinate geochemical activities within IUGG. About the same time, IUGG, IUPAC, and the newly formed International Union of Geological Sciences (IUGS) agreed to an interunion ad hoc Committee on Geochemistry, Dr. K. Krauskopf acting as chairman.

At its London meeting in 1963 the Commission on Geochemistry expressed the opinion that the primary affiliation of an international geochemical organization should be with the geological union (IUGS-IGC), but recommended to the Executive Committee of IUPAC that a small commission, or committee, be maintained in the chemical union for liaison. An independent organization seemed more desirable because it could affiliate with other appropriate international organizations as well as with IUGS. Dr. E. Ingerson took on the task of polling geochemists on their opinions on forming a new group. Finally, a meeting for the establishment of a new group was held at the 1964 IUGS New Delhi meeting. At that meeting, attending geochemists voted to form an independent group. They also agreed to meet again in Paris in 1965.

The birth of the International Association of Geochemistry and Cosmochemistry can be dated from November 1965 when, at a meeting at UNESCO Headquarters in Paris, the name was officially chosen, preliminary statutes were drafted, and temporary officers and council members were elected, Dr. E. Ingerson being chosen as the first President.

CURRENT OFFICERS AND COUNCIL MEMBERS

Officers

President	E. Ingerson (USA)
Vice-Pres.	L.H. Ahrens (So. Africa)
Vice-Pres.	A.I. Tugarinov (USSR)
Secretary	K. Sugawara (Japan)
Assoc. Sec.	R.M. Perhac (USA)
Treasurer	J.F. Lovering (Australia)
Assoc. Treas.	Z. Pacal (Czech.)

Council Members

B. Cambel (Czech.)
A.G.W. Cameron (USA)
M. Fornaseri (Italy)
K.S. Heier (Norway)
M. Roubault (France)
R.C. Sinha (India)
E.A. Vincent (UK)
K.H. Wedepohl (DBR)

MEETINGS ORGANIZED OR CO-SPONSORED BY IAGC

The IUPAC Commission had planned a symposium on Origin and Distribution of the Elements, to be held in conjunction with the Moscow meeting of the Union in 1965. In the meantime, however, the Commission had been disbanded so the symposium could not be held.

The newly formed IAGC picked up the plans and the symposium was eventually held in May 1967, at UNESCO Headquarters in Paris. Nearly 250 scientists from various disciplines attended; 90 papers were presented.

The proceedings Volume (1,173 pages) has been published by Pergamon Press as Monograph No. 30 in their International Series of Monographs in Earth Sciences. By special arrangement with the publisher members of IAGC and affiliated organizations may purchase the volume for \$10.00 U.S. (Retail price, \$48.00). Orders should be sent to Pergamon Press, Inc., Maxwell House, Fair View Park, together with a statement that the requestor is a member of the Association.

In August 1968, the International Atomic Energy Agency organized at its headquarters in Vienna a symposium on Meteorite Research, which was co-sponsored by IAGC and several other organizations. The Proceedings Volume (73 papers; 970 pages) was published by D. Reidel Publishing Company, Dordrecht, Holland. The Publisher has agreed to allow members of IAGC and affiliated organizations a discount of 40% of the list price (\$48.00). Orders from members in North and South America should be sent to Springer-Verlag New York, Inc., 175 Fifth Avenue, New York, N.Y. 10010 U.S.A. Members from other continents should order from: D. Reidel Publishing Company, 419-421 Singel, P.O. Box 17, Dordrecht, Holland. A statement of membership should be included.

The Association itself had organized an important symposium on Geochemical and Geophysical Prospecting for Deep-Seated Ore Deposits, which was to have been held in conjunction with the Prague meetings of IUGS, also in August 1968. No Proceedings Volume has yet appeared, although manuscripts have been collected for 31 of the 40 papers that were scheduled and most of these have already been edited. Hopefully, the Proceedings can appear before the end of 1971. In the meantime, interested individuals can obtain copies of the program from the President's office and abstracts and/or copies of papers in which they may be particularly interested.

In April 1970, the Association co-sponsored a symposium on The Chemistry and Mineralogy of Meteorites with the Mineralogical and Meteoritical Societies. The meeting was held at the British Museum of Natural History, London. No Proceedings Volume is planned, but Mr. P. Wilkinson, Department of Geology, University of Sheffield, S 1 3 JD, England, can supply copies of abstracts of the papers to a limited number of interested individuals.

The IAGC helped to organize and co-sponsor, with the Ukrainian Academy of Sciences and UNESCO, a symposium on the Geology and Genesis of Precambrian Iron-Manganese Formations and Ore Deposits. The symposium was held in Kiev in August 1970, and was followed by an interesting and well conducted field trip to the Krivoy Rog Basin. The Proceedings (about 40 papers) will be published in Russian by the Academy and in English by UNESCO.

An advanced Study Institute on Activation Analysis in Geochemistry and Cosmochemistry was co-sponsored and held at the Netherlands-Norwegian Reactor School, Kjeller, Norway, in September 1970. The Institute was well attended; there were 18 lecturers from seven countries. Published proceedings are available to institutions and interested individuals. Write: Mr. E. Anderson, Reactor School, Institutt for Atomenergi, 2007 Kjeller, Norway.

In co-operation with the Science Council of Japan, the Association organized a major symposium on Hydrogeochemistry and Biogeochemistry, which was held in Tokyo in September 1970. It was co-sponsored by UNESCO and seven other international organizations. Over 400 participants registered from 23 countries. Sixty-one papers on hydrogeochemistry and 55 on biogeochemistry were given. Seven special seminars and joint symposia followed the principal meetings. Most of the manuscripts have been received and edited. The Proceedings Volume should appear in the near future.

FORTHCOMING MEETINGS SPONSORED BY IAGC

The first and second circulars have been issued for the International Geochemical Congress to be held July 20-25, 1971 in Moscow, sponsored jointly by IAGC and Akad. Nauk SSSR. The main theme is the geochemistry of processes in the earth's crust with particular reference to the physico-chemical aspects of geochemical processes. Four sections of the symposium will cover magmatic, hydrothermal, metamorphic, and sedimentary processes. Current plans are to publish as many of the papers as possible in a volume to be ready about the start of the meetings.

At the time of the Montreal meetings of IUGS in August 1972, there will be (in addition to the regular sessions of Section 10 - Geochemistry) two special symposia organized by IAGC and co-sponsored by UNESCO. One on Cosmochemistry (Prof. A.G.W. Cameron, convener, Yeshiva Univ., New York) will be held at the Smithsonian Astrophysical Observatory, Cambridge, Mass., the week before the Montreal meeting, i.e., August 14-19. The second on Atmospheric Carbon Dioxide (Prof. Hans Suess, convener, Scripps Institute, La Jolla, California) will be held in Montreal during the meetings of IUGS. Inquiries should be directed to the conveners.

OTHER MEETINGS

The Council of IAGC has voted to co-sponsor, with the Geochemical Society of India, a meeting on Recent Researches and Applications of Geochemistry in Patna in January 1972. Requests for circulars and information regarding papers should be direct to Dr. A.K. Prasad, Dept. of Geology, Patna Univ., Patna-5, Bihar, India.

Under discussion is the organization of a symposium on Geochemical and Metallogenic Provinces to be held at Leoben, Austria in November 1972. The Council has voted to co-sponsor this meeting with the Austrian government. Plans are to have 15 invited papers and to limit attendance from abroad to approximately 50 persons. Persons particularly interested and who are, or have been, active in the general area should request information for Prof. Dr. W.E. Petrascheck, Institut fur Geologie, Montanistischen Hochschule, A-8700 Leoben/Stiermark, Austria.

Prof. J.H. Grossi-Sad, Belo Horizonte, has suggested that it would be appropriate to hold a symposium on the Geochemistry of Carbonatites in the Minas Gerais-Goiias-Mato Grosso-Sao Paulo corner of southwestern Brazil where 25-30 complexes of alkalic igneous rocks occur, many of which are associated with carbonatites. The Council of IAGC and the carbonatite experts of the Vernadsky Institute (USSR) have expressed interest in organizing such a symposium, but no specific invitation has yet been received.

IAGC EMBLEM

IAGC is seeking a design for an emblem for use on the Newsletter. We would welcome any designs any members wish to submit. Drawings should be sent to the Newsletter Editor, Dr. K.M. Perhac, Dept. of Geology, Univ. of Tennessee, Knoxville, Tenn., U.S.A.

BOOK REVIEWS

MINERALOGICAL APPLICATIONS OF CRYSTAL FIELD THEORY by Roger G. Burns (1970), Cambridge Univ. Press, \$13.50. Review by: Dr. E.H. Poindexter, Inst. for Exploratory Research, U.S. Army Electronics Command, Fort Monmouth, New Jersey, U.S.A.

We who received our mineralogical education before 1960 have become uneasily aware of advancing technology in recent publications. New theoretical and experimental tools from chemistry and physics are bringing a fresh and critical view to many old problems. Professor Burns' book presents the state-of-the art in applying a particularly powerful method - crystal field theory - to a wide selection of mineralogical topics.

Crystal field theory is a substantial elaboration of the more familiar hard-sphere, point-charge electrostatic or ionic bonding model. Its key conceptual advance lies in considering the detailed spatial distribution of the outer electrons of certain species of atoms composing a crystal. The diverse shapes and symmetries of certain electron orbitals, and their specific reaction to the complicated electrostatic field arising from neighboring ions, determine much of the physics and chemistry of the host materials.

The book begins with a qualitative treatment of quantum mechanics of atomic structure, electron orbital symmetries, and the basics of crystal field theory. Burns confines his book to the first group of transition elements having exposed d orbitals: Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu. The role and behavior of these atoms in octahedral, tetrahedral, and cubic environments is described in language meaningful to the non-physicist. He proceeds into Chapter 3, treating the energy states and optical spectra of the transition atoms in various sites and circumstances. All observational aspects of spectra are explained, including color, polarization, intensity, and linewidth.

One chapter interprets the optical spectra of orthosilicates, amphiboles, pyroxenes, and a few other silicate classes. Another chapter discusses crystal chemistry of common silicates and selected other minerals. Interatomic distances, transition metal site preferences, cation ordering, and enrichments are generally well explained by crystal field theory.

The crystal field explanation of thermodynamics and solid-liquid fractionation introduces the geochemistry of trace elements and their distribution in the earth's crust. This chapter vanquishes Goldschmidt's rules and supplants them with the multi-parametered crystal field arguments. Sedimentary and metamorphic processes are also explained, although in the latter it seems that crystal field theory is being a bit oversold. A final crystal field chapter interprets physical and chemical properties of the mantle.

The book is not without its flaws, albeit small ones. The language in some sections involving mathematics or atomic physics suggests that the author is not completely at home in these disciplines, and physics-minded students will probably seek other specialized texts in these areas. The last chapter (molecular orbitals) is obscure and misleading. Finally the book could appropriately include a discussion of relevant aspects of electron spin resonance spectroscopy which offers a highly diagnostic probe of transition metals in crystalline sites. These are, however, but minor carpings. I found the book completely fascinating. I venture that it will be much appreciated by many crystal and solid state physicists and chemists -- and it is a must for every mineralogist and geochemist.