

THE ASSOCIATION OF EXPLORATION GEOCHEMISTS



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NEWSLETTER

NO. 18

JUNE 1976

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1976-1978

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The Association of Exploration Geochemists celebrated its sixth birthday by your Council deciding that it was time to formalize the affairs of the Association through incorporation as a non-profit organization, registered in Canada. This step was taken for a variety of legal, financial, and tax reasons. Part of the requirements of incorporation is that the Association has a permanent address; this has been established in Toronto; it is

The Toronto office will be operated by a part-time secretary. This will obviously be of immense benefit to members in dealing more efficiently with the increasingly complex affairs of the Association; regardless of the changing personnel of your executive, the Toronto address is permanent, and all enquiries, orders for special volumes -- and payment of dues -- henceforth should be addressed to the Toronto office.

One of the contentious issues over the past year has been the inevitable increase in the total cost of membership resulting from increased costs in the production of the Journal of Geochemical Exploration (see Newsletter No. 17). While your Council regrets the substantial increase in cost, it is worth emphasizing that membership dues (\$10.00; \$3.00 for students) have not increased. Moreover, the cost of the Journal to members is discounted according to the number of members of the Association; since the present subscription rate to non-members is \$93.60, compared to \$32.50 for members, the current discount is 65 per cent. The number of subscribers to the Journal is reported to exceed 1,250 and the Association now receives royalties on sales. As the membership increases, the

individual members may expect to benefit from an increase in the discount (although, sadly, it could be offset by inflation-caused price increases). Although it is undeniably true that the cost of the Journal is higher than some of the other publications in the broad field of economic geology, it must be remembered that the Association is numerically small and does not have the financial resources to publish a journal itself. The Journal was launched with no financial investment from the Association, and is now a firmly established publication of the highest quality with a wide international distribution.

The \$10.00 membership fee and the modest profits realized on technical meetings are used to distribute this Newsletter free to all members, to provide such invaluable volumes as the Exploration Geochemistry Bibliography free to members (see below for details), and to sponsor other special volumes such as The Applications of Probability Graphs in Mineral Exploration (see below for details).

THE NEWSLETTER

One of the principle difficulties in an organization with members widely spread all over the world is to ensure communication between members; this Newsletter provides an ideal, informal means of achieving this. However, you must send us the material to publish -- when you change employment, details of projects you are working on, information on local meetings of interest. We would like to especially encourage you to send short, informal technical material of the kind you do not wish to publish as a formal journal article -- modifications to an analytical technique, a sampling method you have found useful in your area, geochemical correlations and observations useful in ore-finding, problems you have encountered -- in short, anything of interest to other exploration geochemists. This material will be published in a separate section and should provide a valuable service to all members of the Association.

To encourage you to make the Newsletter even more useful, we hope to introduce a number of regular features:

(1) Current titles of exploration geochemistry papers appearing in other journals will be listed in each Newsletter -- this should be especially useful to members working in areas remote from library facilities. Dr. H.E. Hawkes has generously offered his time to prepare these lists.

(2) Summaries of geochemical exploration activities in various countries (national geological surveys, universities, United Nations, etc). Some agencies and individuals have already been directly solicited for material; we would be delighted to receive offers to undertake these summaries from members in the 53 countries represented in the A.E.G.

Ultimately, the usefulness of the Newsletter depends upon your contributions to it. Let us hear from you.

MEMBERSHIP

Our members have joined the A.E.G. for many different reasons -- ranging from an altruistic wish to help to promote the aims and objectives of the Association as defined in the Constitution, to a desire to share in the advantages that membership offers. It is obvious that the development of exploration geochemistry -- the youngest of the exploration methods -- will benefit from a large and strong membership. It is equally obvious that benefits to the individual members will increase as the membership increases.

The qualifications for membership remain quite rigorous -- a deliberate policy to ensure a high professional standard. While there is no wish to increase the number of members simply for the sake of being able to boast a large membership, there is much scope for growth. Therefore, the next issue of the Newsletter will have a membership form attached; we ask you to suggest to a well-qualified colleague that he consider the advantages of joining the A.E.G. Student members are particularly welcome.

EXPLORATION GEOCHEMISTRY IN THE APPALACHIANS

The first Regional Meeting of the A.E.G., with the general theme "Exploration Geochemistry in the Appalachians" was organized by G.J.S. Govett and was held on the campus of the University of New Brunswick, Fredericton, New Brunswick, Canada on 22-23 April 1976. The meeting has been acclaimed a great success -- a result that owes much to the unremitting work of the organizing committee (and the generous help of wives):

Chairman -- G.J.S. Govett
U.S. Liaison -- F.C. Canney
Mining Industry Liaison -- W.G. Gates
N.B. Dept. of Natural Resources Liaison -- V. Austria
Treasurer -- C.Y. Chork
Technical Services -- B. Erdogan
Field Excursions -- P.W.B. Friske
Pre-registration and Publicity -- S.M. Gandhi
Field Excursion Guidebook -- W.D. Goodfellow
Secretary -- M.H. Govett
Pre-registration -- A. Pwa
Registration -- N.W. Sheppard
Accommodations -- R.E. Uthe
Tourism, Displays, and Field Excursion Guidebook -- J.L. Wahl
Ladies Programme -- Mrs. N. McAllister

For those of you interested in statistics, there were 190 delegates from 14 of the U.S. States, 8 Canadian provinces, and a representative each from the U.K., France, and Sweden. About 50 of the delegates were members of the A.E.G. Sixty-nine application forms for membership were issued.

The meeting was opened by Dr. D.G. Brewer, Acting Dean of Science at the University of New Brunswick, who introduced the Hon. R.C. Boudreau, Minister of Natural Resources for the Province of New Brunswick. Mr. Boudreau reviewed the status of the mining industry in the province, and commented on the prospects for future developments. The main thrust of his address was that his government has continued the long-established policy in New Brunswick of encouraging mineral exploration and mining activity.

The keynote address -- "New Brunswick: Where It All Began" -- was given by Dr. H.E. Hawkes. It was a light-hearted, amusing, yet thoughtful historical review of his involvement with the early development of exploration geochemistry, leading up to the surveys he led in New Brunswick in 1953-1955. Coloured slides of the field "laboratory", of J.S. Webb eating beans by the roadside, and of the field camp were of special interest. Herb's "philosophical" remarks were especially well received; some of these were "Always be on the brink of finding an orebody", "Don't be too successful; otherwise you'll do yourself out of a job", and "It's good to be one jump ahead of everybody, but never be two jumps ahead".

Fifteen technical papers were given in seven technical sessions. Three papers dealt with prospecting for uranium in drainage and groundwater. The use of heavy minerals, manganese-iron concretions, organic sediments, and the effect of manganese and iron on trace elements were discussed in four papers on stream sediment surveys. Five papers concentrated largely on soil geochemistry, two on rock geochemistry, and one on biogeochemistry. A matter of considerable interest was the contrast in the problems of application of geochemical exploration techniques between the sparsely settled Canadian part of the Appalachian region which has relatively few problems of contamination, and the much more densely settled and contaminated southern U.S. segment of the Appalachians. Similarly, the differing climatic regimes along the belt were forcibly brought out by the differences in the geochemical responses reported. Since the papers all will be published in a special 200-page issue of the Journal of Geochemical Exploration (November 1976), they will not be reviewed here.

The mood of the meeting was considerably enhanced by the generous hospitality of the University of New Brunswick which gave a reception on the evening of 21 April, and the New Brunswick Department of Natural Resources which gave a reception and a magnificent dinner of salmon and fiddleheads on the evening of 22 April. A ladies programme, led by Mrs. Norma McAllister, gave delegates' wives a chance to see something of Fredericton and the nearby "Mactaquac Country".

A major attraction of the meeting was the field excursions to the base metal mines of Heath Steele, Brunswick Mining and Smelting, and Anaconda Caribou in the Bathurst District; the antimony mine of Consolidated Durham at Lake George; and the multi-metal deposit of Brunswick Tin Mines at Mt. Pleasant (this was one of the deposits found by Herb Hawkes' team in the geochemical stream survey in the mid-1950's and was

revisited by Herb and John Riddell, one of the team, during the excursions). These excursions were made possible by the wholehearted support of the mining companies who opened their properties and by the mine, provincial, university, and exploration company geologists who cheerfully led the tour groups. The interest in the field excursions was so great that even although they were run twice (20-21 April and 23-24 April) many who wished to go had to be refused for lack of space.

Extra copies of the forthcoming November 1976 issue of the Journal of Geochemical Exploration, containing the technical papers and H.E. Hawkes' address, may be ordered from the A.E.G. office in Toronto at a cost of \$25.00. A limited number of copies of the 109-page Field Excursion Guidebook, Selected Mineral Deposits of New Brunswick -- which contains illustrative stream sediment, soil, and rock geochemical data as well as descriptions of the deposits -- are also obtainable from the A.E.G. office at a cost of \$2.50 while supplies last.

URANIUM GEOCHEMISTRY WORKSHOP

Introduction

An A.E.G.-sponsored Workshop, the general theme of which was exploration for uranium deposits with particular reference to geochemical techniques, was held at the Colorado School of Mines, November 12-14, 1975. The Workshop Committee was chaired by Professor H. Bloom; other committee members were P.K. Theobald and R.F. Horsnail.

Welcoming remarks were expressed by J.G. Welles, Vice President for External Affairs, Colorado School of Mines; concluding remarks, on behalf of the A.E.G., were given by H.E. Hawkes.

Summary

The Workshop was attended by over 60 people and is generally considered to have been a success. The majority of the participants were senior geologists employed by the exploration departments of major mining companies active in the western United States; a sizeable contingent from Canada was also present.

The response that this Workshop met with is clearly indicative of a wide and intense interest in all aspects of uranium exploration. It appears probable that geochemistry will play an increasing role both in the search for new uranium resources, and in understanding the mechanisms of formation of uranium deposits.

Attendance at the Workshop was deliberately restricted in order to preserve an atmosphere conducive to widespread participation and free-ranging discussion. One full day was devoted to discussions of case histories contributed by attendees. A further, and powerful, stimulus to free discussion was provided by two cocktail parties.

The Workshop Committee wish to express sincere appreciation to all who contributed to the success of this event by giving generously both of their time and expertise. It is hoped that all who attended the Workshop felt that the experience was worthwhile.

The Program

The first two days of the Workshop were devoted to technical sessions, each of which was led by an invited speaker and followed by a general discussion. A list of these speakers, their affiliations, and the topics on which they spoke follows:

<u>Author</u>	<u>Affiliation</u>	<u>Title</u>
V. Ruzicka	Geological Survey of Canada	Geology and Genesis of Primary and Secondary Uranium Deposits
J.S. Stuckless	Branch of Uranium & Thorium Resources, U.S. Geological Survey	Granites as a Source of Uranium
J.S. Leventhal	Branch of Uranium & Thorium Resources, U.S. Geological Survey	Organic Geochemistry of Uranium
H.T. Millard, Jr. and F.N. Ward	U.S. Geological Survey	Uranium Analytical Techniques
W. Dyck	Geological Survey of Canada	Geochemical Principles and Techniques of Uranium Exploration Applied to Canadian Environments
D.H. Dahlem	Energy Research & Development Admin.	A Large Scale Hydro-Geochemical Reconnaissance for Uranium
P. Dodd	Energy Research & Development Admin.	Airborne Surveys and Borehole Logging for Uranium
J.B. Squyres	Mobil Oil Corporation	Uranium Deposits of the South San Juan Basin, New Mexico
R.I. Rackley	AMAX Uranium Corporation	Geology and Geochemistry of Uranium Occurrences in Fluvial Sediments
J.F. Davis	Rocky Mountain Energy Corp.	Exploration Horizons: Where do we go from here?

The geology and metallogenesis of uranium deposits was discussed from several standpoints. A general classification of uranium deposits was reviewed, and detailed attention was given to the characteristics of sandstone-type uranium deposits as exemplified by those of the western United States. The uranium content of granites was discussed both as a possible resource for the future, and as an original source for uranium now found in sandstone-type deposits.

Certain aspects of organic geochemistry, of particular relevance to the behavior of uranium in the geochemical cycle, were discussed; and techniques applicable to the analysis of geochemical media for uranium were reviewed.

There were several valuable discussions of practical technology applicable to a search for uranium resources; the formal sessions concluded with some thoughts on future uranium exploration strategy.

The third day of the Workshop, devoted to attendees' case histories, also proved interesting. Several illuminating case histories of uranium deposits and their discoveries were presented; and there was considerable additional discussion concerning the practicalities of geochemical exploration for uranium.

Further Information

Much of the material presented at the Workshop either has recently been, or will shortly be, published. Those desiring further information on any of the Workshop topics are advised to contact the speakers directly. The Committee members will be happy to assist A.E.G. members in making contact with Workshop speakers should this be necessary.

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EMPLOYMENT OPPORTUNITY

THE FEDERAL UNIVERSITY OF BAHIA, BRAZIL, Dept. of Geochemistry has an immediate opening in teaching and field research at the post-graduation level in exploration geochemistry. Applicants should have a strong interest in economic geology, statistics, and computer treatment of data. Interest in field work in sometimes remote areas essential. MS + experience are minimum requirements. Send resume to:

Prof. Adelaide M. Santos
Coordenadora do Projeto de Geoquimica
do Instituto de Geociencias
Universidade Federal da Bahia
123 Rua Caetano Moura
Salvador, Brazil 40.000

ANNUAL GENERAL MEETING

The 1976 Annual General Meeting of the A.E.G. was held in Sir Leonard Tilley Hall, University of New Brunswick, Fredericton, New Brunswick, Canada, on 23 April. The meeting was opened with the Presidential Address by Dr. R.W. Boyle (this is given in full below).

REPORT OF RETIRING PRESIDENT R.W. BOYLE TO ANNUAL
MEETING OF THE ASSOCIATION OF EXPLORATION GEOCHEMISTS
FREDERICTON, NEW BRUNSWICK, April 23, 1976

Good afternoon, fellow members of the Association. I am pleased to welcome you to the 7th Annual General Meeting of the Association of Exploration Geochemists.

First of all, I should like to comment on the very successful meeting on Exploration Geochemistry in the Appalachians which has now come to an end. We are most grateful to Professor Gerry Govett and his charming wife Marjorie and their efficient organizing committee who have made this meeting possible and who saw it through to such a successful conclusion. I understand there were many who helped in the organizational details whose names do not appear in the Abstracts and Program, and we also wish to thank them, particularly the post-graduate geochemical students and their wives, and especially Mrs. Norma McAllister for the ladies program. We are also especially grateful to the President of the University of New Brunswick, Dr. J.M. Anderson, and his administrative staff for their hospitality and for the use of the University facilities, to Dr. A.L. McAllister of the Department of Geology, and to the Director, Dr. R.R. Potter, and his staff of the Mineral Resources Branch of the New Brunswick Department of Natural Resources for assistance in organizing the symposium. We also wish to acknowledge the help and cooperation of the Province of New Brunswick, the Tourism Departments for the Provincial Government and the City of Fredericton, and Analytical Services, Limited of St. John, New Brunswick. We wish especially to acknowledge the financial aid which a number of companies and consultants in New Brunswick have provided for various purposes. The list of those who have contributed is given in the Abstracts and Programme. Finally, we desire to thank the following mining companies for arranging field-trips to their operations: Anaconda Canada Ltd., Brunswick Tin Mines, Ltd., Consolidated Durham Mines and Resources, Ltd., and Heath Steele Mines, Ltd.

Our association is now 6 years old, just an infant, but we have sustained a rapid period of growth. We now have some 422 members and 41 student members, resident in nearly all countries where mineral exploration is active. Our journal goes to each member and also to a number of corporate members and to many government, university, mining school, and industrial libraries throughout the world. The circulation of the Journal, I am told, will exceed 1,250 in 1976 -- not bad for a publication which began in July, 1972. The quality of the papers has been high from the inception of the Journal, for which we owe a particular debt of thanks to the Editor in Chief Dr. E.M. Cameron of the Geological Survey of Canada.

The various committees of the Association have been active during the year: Dr. L.D. James of the Admissions Committee reports that during the year, 55 applications were processed of which 32 applicants were admitted to membership, 10 to affiliate membership, and 13 to student membership. The number of applicants was not as large as in the previous year (72) presumably because of an absence of any major A.E.G. symposia which, in the opinion of Dr. James, generally seems to aid recruitment to the Association.

H.W. Lakin, Chairman of the Committee on Geochemical Analysis, reports that completion of the evaluation of the data on the reference sample program has suffered a slight setback due to the fire at the Denver Federal Centre. Original data received from 189 laboratories for 50 elements, plus standard rock analysis, have been sorted by method of sample digestion and by method of estimation. The data on Cu, Pb, Zn, Ni, Co, and Ag should be published in the near future; the remainder of the data is tabulated and awaiting typing and statistical evaluation.

The Committee on Case Histories under the Chairmanship of Dr. P. Bradshaw has been particularly active in co-ordinating case histories for other parts of the world, similar to the volume which appeared in January, 1975 on the Canadian Cordillera and Canadian Shield. Case histories for Norden (Norway, Sweden, and Finland) are in an advanced stage of preparation and should appear in the last part of 1976. A further case history volume on the southwest United States is in the early stage of preparation and should appear in late 1977.

The Technical Meeting Committee chaired by Dr. C.F. Gleeson reports that guidelines for symposia and regional technical meetings have been established and those for workshops are under consideration. The International Symposia projected include those to be held in Sydney, Australia (August 16-25) in conjunction with the International Geological Congress, and the forthcoming Symposium in Denver, Colorado, in 1978. The only regional meeting is that we have just attended here in Fredericton. A workshop on Uranium Prospecting was held at the Colorado School of Mines at Golden, Colorado from November 12-14, 1975. The workshop was chaired by Prof. H. Bloom and was most successful, attracting a large number of mining and energy company geologists and geochemists, mainly from the western United States. Such workshops are most valuable, and it is hoped that they will continue to be held in various parts of the world where particular geological and climatic conditions prevail.

The Bibliography Committee, chaired by Dr. H. Hawkes, reports that a supplementary bibliography covering the period 1972-1975 has been typed and should be published by mid-June.

Prof. A.A. Levinson, chairman of the Research and Education Committee, writes that they have a number of projects in mind with respect to the introductory undergraduate courses in Applied Geochemistry and are pursuing a number of research ideas. Prof. Levinson has arranged for the translation of the book "Geochemical Exploration Methods for Deposits of Solid Raw Materials" published in 1975 by Drs. A.A. Beus and S.V. Grigorian, of the U.S.S.R. After editing it is hoped that the book will be published under the sponsorship of the Association.

R.G. Garrett, chairman of the Committee on Computer Applications, reports that the committee has been involved in two areas in the last year. Firstly, it reviewed a good field manual on cumulative frequency distributions written by A.J. Sinclair of the University of British Columbia, and recommended that the Association assist in its publication. The manual has now been published. Secondly, a manuscript on the recording of analytical precision and accuracy, detection limits, etc., has been prepared at the request of the Editor of the Journal of Exploration Geochemistry. The purpose of the document is to establish criteria for describing these parameters in Journal papers. Final comments by committee members will be reconciled and the manuscript forwarded to the Editor during the coming summer.

Of interest to the Canadian members of the Association is the report by Prof. G.J. Govett, the A.E.G. council member representative to the Canadian Geoscience Council. Prof. Govett reports that during the year C.G.C. formally became the National Committee of Geoscience for Canada, and in so doing accepted responsibilities for Canadian participation in international organizations (e.g. International Union of Geological Sciences and its various projects such as the International Geological Correlation Programme and the International Geological Congress). The Association of Exploration Geochemists is a member of the Canadian Geoscience Council, and a Canadian member of A.E.G. sits on the Council. An A.E.G. member, Dr. G.J. Govett, represented the Canadian National Committee of I.U.G.S. at the Canadian National Committee meeting of the International Council of Scientific Unions.

Three items of C.G.C. business during the year are of direct interest to Canadian members of A.E.G.

1. C.G.C. was invited to submit names for an ad hoc advisory committee to the Geological Survey of Canada to be jointly chosen by Energy, Mines and Resources and C.G.C. The committee of six includes an A.E.G. member, Dr. J.A. Coope.
2. A submission has been made to E.M.R. requesting that E.M.R. substantially increase funding for geoscience research in industry and universities.
3. The C.G.C. has been given an opportunity to participate in the Canada - U.S.S.R. technical agreement on industrial applications of science and geology. This is of particular interest to Canadian members of A.E.G. with respect to Russian work in exploration geochemistry.

At the Council meeting of the Association held prior to the meeting here in Fredericton, the decision was made to incorporate the Association as a non-profit organization, either under the laws of the Province of Ontario or the Dominion of Canada, whichever is the most favourable. It was also decided to establish the Association's permanent office in the city of Toronto, Ontario.

The results of the ballots for the incoming slate of officers for the year 1976-1977 were as follows:

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I would like to turn now for a few minutes to some thoughts on the progress and prospects of exploration geochemistry. During 1975, I estimate that some 5.5 million samples were taken for hard mineral exploration purposes throughout the world. In U.S.A. the number approximates 400,000; in Canada 1.1 million; in U.S.S.R. 3.5 million, and in the rest of the world about 500,000. Of these samples about 50 percent were soils, 20 percent stream and lake sediments, 20 percent rocks, 5 percent waters, and 5 percent vegetation.

The elements most commonly used as indicators were Cu, Pb, Zn, Ag, Au, Ni, Mo, and U; ancillary indicators were Hg, F, As, and Sb. I think that we can conclude from these statistics that exploration geochemists have convinced the hard mineral (mining) industry of the value of geochemical prospecting methods. The results of geochemical prospecting surveys carried out over the last twenty years have been spectacular to say the least, hundreds of thousands of anomalies having been discovered, thousands of mineralized zones located, and hundreds of orebodies and potential orebodies, some of immense dimensions, having been outlined in various parts of the world.

The situation in the petroleum and natural gas industries is not so bright. We have failed to convince these industries of the value of geochemical prospecting for hydrocarbons, despite the fact that the targets are many times greater in size than those of mineral deposits, and the hydrocarbon halos in the rocks and overburden are consequently large both in area and volume. There appears to me to be a hang-up in the petroleum industry with respect to the use of geochemical methods, the reasons for which are not clear to me. We hear much today about energy crises in many parts of the world. To me there seems to be only one crisis and that is in the research and employment of new methods, particularly geochemical, in the discovery of oil and gas deposits. I am sure that if geochemical methods were properly employed in the search for oil and gas we should find many more of these hydrocarbon deposits and at a minimal cost.

The other points I wish to discuss concern the techniques of geochemical prospecting. The first concerns indicators or pathfinders of mineralization. For many years economic geologists have been talking about the mineralizers, including B, S, Se, and F. These are the elements which provide the ligands for ready transport of the elements in epigenetic as well as sedimentary processes. One or more of these elements are universal in practically all types of deposits, yet we have not employed them to full advantage in geochemical prospecting methods. Two of the elements, B and F, are universal indicators of practically all types of epigenetic deposits; if one is not present the other is, and in many deposits both are indicators.

The second point concerns the use of bogs (muskegs) as sampling media in northern terrains, especially those that have been glaciated. Many of these bogs represent ancient lakes infilled with gyttja and peat during the long interval since the last glaciation. Sampling of the bogs, particularly the lower horizons (which in actual fact represent ancient lake sediments), on a regional basis could be an effective method of locating mineralized belts and zones that are heavily drift-covered and not generally amenable to other methods of geochemical prospecting.

Finally, I would like to comment briefly on the state of geochemical exploration with respect to interpretation of the data obtained in the various types of surveys. We now have an enormous amount of data available from which we should be able to apply the methods of vector analysis in both two and three dimensions. The simplest vector is of course a stream with increasing concentration of elements in the water or stream sediments upstream to the site of a mineralized zone or deposit. It seems to me that we should now be able to quantify such vectors obtained from surface surveys and also those obtained in three dimensions. In my opinion, we have at our disposal in many cases vectors with direction and magnitude (including concentrations or ratios between various elements) from which we should be able to predict precisely which kinds of vectors are likely to lead to orebodies.

Fellow members of the Association, my term of office now expires. I have been honoured to serve you as President and now turn the reins of office over to Prof. Gerry Govett in whose capable hands, we shall, I am sure, see further progress for our Association.

Copies of the Secretary's and Treasurer's reports are available from: Mr. Edwin V. Post, Skyline Labs, Inc., 12090 West 50th Place, Wheat Ridge, Colorado 80033, U.S.A.

Thank you and Good Afternoon.

The results of the A.E.G. election were declared, as indicated above in Dr. Boyle's address.

* * *

SPECIAL PUBLICATIONS

The following special publications are still available:

- A.E.G. Special Volume No. 1. H.E. Hawkes, 1972, Exploration Geochemistry Bibliography, January 1965 to December 1971. 118 pages. Price Can. \$7.50, A.E.G. Office, P.O. Box 523, Rexdale, Ontario M9Q 5L4 Canada
- A.E.G. Special Volume No. 2. I.L. Elliott and W.K. Fletcher (Eds.) 1975. Geochemical Exploration 1974. Proceedings of the Fifth International Geochemical Exploration Symposium, Vancouver, B.C. 720 pages. Price U.S.\$62.50/Dfl 150.00, Elsevier Scientific Publishing Co., P.O. Box 211, Amsterdam, The Netherlands.
- A.E.G. Special Volume No. 3. P.M.D. Bradshaw (Ed. and Compiler), 1975. Conceptual Models in Exploration Geochemistry. The Canadian Cordillera and Canadian Shield. (Reprinted from the Journal of Geochemical Exploration, v. 4, No. 1.) 216 pages. Price U.S.\$16.25/Dfl 39.00, Elsevier Scientific Publishing Co., P.O. Box 211, Amsterdam, The Netherlands.

The following new publications are now available:

- A.E.G. Special Volume No. 4. A.J. Sinclair, 1976, Applications of Probability Graphs in Mineral Exploration. 95 pages, soft-cover. Price \$8.00 non-members; \$6.00 A.E.G. members and students. A.E.G. Office, P.O. Box 523, Rexdale, Ontario M9Q 5L4, Canada.
- A.E.G. Special Volume No. 5. H.E. Hawkes, July, 1976, Exploration Geochemistry Bibliography, January 1972 to December 1975. Copies of this book will be sent free-of-charge to all paid-up present members of A.E.G. and to all new members for a period of one year from the July, 1976 publication date. The volume may be purchased by non-members and members joining after July 1, 1977, from the A.E.G. Office, P. O. Box 523, Rexdale, Ontario M9Q 5L4 Canada, price to be announced.

FORTHCOMING MEETINGS OF INTEREST

SIXTH INTERNATIONAL GEOCHEMICAL EXPLORATION SYMPOSIUM - 1976

The Sixth International Geochemical Exploration Symposium will be held in conjunction with the 25th International Geological Congress in Sydney, Australia, 16-25 August, 1976. All technical sessions for the Symposium are being organized by the Association of Exploration Geochemists under the able direction of:

Dr. C.R.M. Butt
Division of Mineralogy
C.S.I.R.O.
Private Bag, Post Office
Wembly, W.A. 6014
Australia

A.E.G. members who have not yet made arrangements to attend the International Geological Congress and the Sixth International Geochemical Exploration Symposium should request registration information by airmail immediately from:

The Secretary-General
25th International Geological Congress
P.O. Box 1892
Canberra City, A.C.T. 2601
Australia

ANALYTICAL CHEMISTRY IN EXPLORATION, MINING, AND PROCESSING OF MATERIALS, sponsored by the International Union of Pure and Applied Geochemistry, at Rand Afrikaans University, Johannesburg, South Africa, August 23-27, 1976. Program includes 15 plenary lectures by experts from Western Europe, North America, and Australia, plus parallel sessions of research papers covering prospecting and mining, metals, coal, instrumental analytical techniques, classical and modern chemical techniques, standard reference materials, automation, and computation. For information, write:

Conference Division, IUPAC
Symposium CSIR
P.O. Box 395
Pretoria 0001
Republic of South Africa

INTERNATIONAL CONFERENCE ON ATOMIC SPECTROSCOPY, Philadelphia, Pennsylvania, U.S.A., November 15-19, 1976 -- more specifically of interest to analysts involved with atomic absorption and emission spectroscopy. Their very successful "5th Conference" was held last August in Australia, and the forthcoming meeting promises to be well attended by those whose names appear often in A.A. literature.

THE PACIFIC CONFERENCE ON CHEMISTRY AND SPECTROSCOPY, to be held in Phoenix, Arizona, U.S.A., during the last week of October, appears to be attracting a good number of geochemical analysts. For information, write:

Mike Parsons
Arizona State University
Tempe, Arizona 85281
U.S.A.
telephone: (602)965-3321

SME-AIME FALL MEETING AND THIRD MINING AND METALLURGICAL INSTITUTE OF JAPAN/AIME JOINT MEETING, Denver, Colorado, U.S.A., September 1-3, 1976.

Two and one-half days of technical sessions plus surface field trips to molybdenum and coal mines in the Colorado Rockies. Technical papers of interest to exploration geochemists include sessions on Canadian Exploration, Solution Mining, and the Geology session, comprising papers on: 1) The Geology of the Nickel Mountain Mine, Riddle, Oregon; 2) Porphyry Copper Deposits of the Island Arc System from Japan to Bougainville through the Philippines; 3) MacMillan Tungsten Deposit, B.C.; 4) The Outline of the Mamut Mine, Malaysia, and 5) Application of Track Etch Radon Prospecting to Vein Uranium Deposits, Front Range, Colorado. Contact:

Meetings Dept., SME-AIME
P.O. Box 8800
Salt Lake City, Utah 84108
U.S.A.

INTERNATIONAL SYMPOSIUM ON GEOLOGY, MINING AND EXTRACTIVE PROCESSING OF URANIUM WITH SPECIAL REFERENCE TO EUROPE, London, 17-19 January 1977.

An international symposium, co-sponsored by the Institution of Mining and Metallurgy and the Commission of the European Communities, will be held in London from 17 to 19 January, 1977, for the presentation and discussion of some twenty papers on the geology, mining and extractive processing of uranium, with special reference to Europe. The symposium will be followed by short field visits to southwest England and southern France.

The Organizing Committee has invited specialists to present some six keynote papers, but others who wish to contribute are asked to send 250-word abstracts in English, French or German -- the official languages of the symposium -- of their proposed papers for consideration by the Committee. Abstracts should be submitted to:

The Secretary
Institution of Mining & Metallurgy
44 Portland Place
London W1N 4BR
England

before 1 May, 1976.

Completed manuscripts will be required before 1 September, 1976, as it is intended to publish the papers for distribution to all registrants in early January, 1977.

Requests for further information and for copies of the second circular/registration form should be made to the address given above.

PROSPECTING IN AREAS OF GLACIATED TERRAIN -- 1977

The third symposium on prospecting in areas of glaciated terrain to be organized by the Institution of Mining and Metallurgy will be held, in association with the Geological Survey of Finland, in Finland in August, 1977 (previous symposia in this series were held in Trondheim, Norway, in 1973 and in Edinburgh, Scotland, in 1975). The Organizing Committee now invites the submission of 300-word abstracts of authors' proposed papers. Any contributions within the scope of the symposium title will be considered, but descriptions of the use of geophysical, geological, drilling and other techniques of prospecting and exploration in glaciated terrain are particularly requested. Abstracts should be sent to the Secretary of the Institution before 25 September, 1976.

Authors of abstracts of papers provisionally accepted for presentation will be required to submit their completed manuscripts before 1 March, 1977, as it is intended to publish the volume of papers -- Prospecting in areas of glaciated terrain 1977 -- in July, 1977, for distribution to all registrants in advance of the symposium.

Field visits are planned to follow the symposium, full details of which will be given in the Second Circular/Registration Form (available February-March, 1977). Requests for copies of the Second Circular and all enquiries should be addressed to:

The Secretary
Institution of Mining & Metallurgy
44 Portland Place
London W1N 4BR
England

EXPLORATION 77 - Ottawa, Canada, Chateau Laurier Hotel, October 16-20, 1977. An international symposium on the state-of-the-art of applying geophysics and geochemistry to the search for metallic ores, sponsored by the Canadian Geoscience Council. Approximately 24 review papers will be delivered in single-sessions by internationally known authorities, over three days, with evening discussion sessions. On the fourth day there will be a series of international exploration case-histories, and on the fifth day there will be a choice of local excursions. An exhibition of Canadian exploration equipment and services will be held in conjunction with the Symposium. The Proceedings will be published. The decision to plan the meeting around single sessions will place an upper limit on attendance.

This preliminary announcement will be followed in January, 1977 by a detailed notice, listing the program and inviting a response from those who hope to attend. A further notice calling for pre-registration and accommodation reservations will be issued in May/June, 1977. For further information, contact Dr. A. G. Darnley, Chairman, Organizing Committee, EXPLORATION 77, 601 Booth Street, Ottawa, Canada K1A-0E8.

CORPORATE MEMBERSHIPS IN A. E. G.

Since their establishment in 1972, Corporate Memberships have contributed significantly to the financial support of a young professional association, and they have provided a copy of the Journal of Geochemical Exploration as well as each AEG Newsletter for company libraries or reading rooms. The receipt of these publications is important, especially where no staff member is willing to make his personal copies of AEG publications available for general company use.

With the re-structuring of subscription costs for the Journal of Geochemical Exploration, Corporate Membership fees have been increased by Council to \$100 annually. If your company office would like to provide the AEG publications for the general use of all staff members, as well as support the Association's activities in furthering the profession of exploration geochemistry, write the Secretary for an application form for Corporate Membership.

NEW MEMBERS

Applications for membership in the Association from the following individuals have been recommended for acceptance by the Admissions Committee and approved by Council. The Bylaws provide that if, after a minimum of 60 days have elapsed following the submission of a candidate's name to the voting membership in the newsletter, no signed letters have been received objecting to the admission of the candidate, he will be declared elected.

Member

R. V. Bailey	Denver, Colorado, U.S.A. - President, Power Resources Corporation
J. J. Cramer	Norway - Geologist, Geological Survey of Norway
G. J. Dalton	Kaysville, Utah, U.S.A. - Geologist, Self Employed
W. Duchscherer, Jr.	Dallas, Texas, U.S.A. - President, Geochemical Surveys
A. Erler	Ankara, Turkey - Asst. Professor, Middle East Tech University
W. D. Goodfellow	Newcastle, N.B., Canada - Analytical Technician, Fraser Company, Ltd. (transfer from Student to Full Membership)
N. B. Hollander	Lysaker, Norway - Consulting Geologist
G. R. Kent	Toronto, Ontario, Canada - Chief Geologist, U.N.D.P.
R. D. Moss	Toronto, Ontario, Canada - Exploration Manager, BP Minerals, Ltd.
R. K. Rinkenberger	Denver, Colorado, U.S.A. - Geologist, Interior Dept., Mining Enforcement & Safety Administration (transfer from Affiliate to Full Membership)
M. M. Shouls	United Kingdom - Lecturer in Geology, Cambourne School of Mines
C. H. von Hessert	Toronto, Ontario, Canada - Contract Engineering, Watts, Griffis & McOuat
S. P. Vriend	Titograd, Yugoslavia - Chemist, United Nations
I. J. Wu	Salt Lake City, Utah, U.S.A. - Research Geochemist, Kennecott Exploration, Inc.

Affiliate

B. I. Collins	Charlottesville, Virginia, U.S.A. - Geologist, North American Exploration (transfer from Student to Affiliate Membership)
W. B. Fortune	New Zealand - Geologist, A.H.I. Minerals, Ltd.
D. L. Garnett	Johannesburg, South Africa - Research Geochemist, Johannesburg Cons. Investment
K. L. Stollenwork	Denver, Colorado, U.S.A. - Geochemist-Geologist, Westinghouse Electric Corporation

NEW MEMBERS

Student

- O. Fakorede Graduate Student - Queen's University, Kingston, Ontario, Canada
- S. M. Johnson Graduate Student - Colorado School of Mines, Golden, Colorado, U.S.A.
- N. W. Sheppard Graduate Student - University of New Brunswick, Fredericton, N.B., Canada