



# THE ASSOCIATION OF EXPLORATION GEOCHEMISTS

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## NEWSLETTER

No. 22

JUNE 1977

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*Councillors:*

1977-78  
**R. W. Boyle**  
**R. G. Garrett**  
**L. D. James**  
**K. A. Lovstrom**  
**J. H. McCarthy**  
**P. K. Theobald**

1977-79  
**M. A. Chaffee**  
**L. G. Closs**  
**I. L. Elliott**  
**G. J. S. Govett**  
**A. W. Rose**  
**I. R. Webber**

*Australian Regional Councillor*  
**J. F. Gilfillan**

This is the first Newsletter to be issued during the 1977-1978 Association year. The Association has a new Executive and a new slate of Councillors. We express our gratitude to the outgoing Executives and Councillors and look forward to a progressive year for the Association.

The process of incorporation of the Association under the Canada Corporation Act as a corporation without share capital has been completed. The legal procedures followed and completed were approved by the Annual Meeting and the Special Meeting held in Vancouver in April 26, 1977. The incorporated Association's non-profit status is established.

Another landmark in the history of the Association has been reached with the election of the first Honorary Members, H.W. Lakin, H.E. Hawkes, and J.S. Webb. We are pleased, in this way, to be able to record our respect for the outstanding scientific accomplishments of these men. It is through their endeavours that the field of Applied Geochemistry has passed from the simple and untested sampling and analytical methods of the 'early days' to the refined techniques now commonly employed in mineral exploration the world over.

### REVIEW OF THE ANNUAL GENERAL MEETING

The Annual General Meeting of the unincorporated Association and a Special Meeting of the incorporated Association was held during the GAC/MAC/SEG joint meeting in Vancouver, BC at the Hyatt Regency Hotel on April the 26th, 1977. At the Meetings a number of matters were acted upon as detailed in the following reports of the outgoing officers.

PRESIDENT'S REPORT - G.J.S. Govett

"The seventh year of the Association of Exploration Geochemists was one of continued growth and innovation combined with consolidation of earlier activities. You will witness one of the more important achievements here today--the incorporation of the Association as a non-profit organization; this together with the organization of a permanent office in Toronto, is adequate testimony that the Association is firmly established. In this, and in many other events of the past year, the Association owes much to our first President, Dr. J. A. Coope, who accepted the office of Secretary part way through this year. I am personally extremely grateful to him for his many labours and his support.

The Chairman of the Admissions Committee, Dr. L.D. James reports that there have been 73 new applications processed during the past 12 months. This is an increase of 33 per cent over the past year -- and is probably a reflection of the AEG meetings held during this period. For your information, the number of "paid-up" members for the past six years was:

<u>Year</u>	<u>Members</u>	<u>Students</u>	<u>Total</u>	<u>Annual % Increase</u>
1971	256	9	265	---
1972	313	27	340	28.3
1973	387	31	418	22.9
1974	405	28	433	3.6
1975	411	32	443	2.3
1976	460	40	500	12.8

The trend, noted by our last President Dr. R.W. Boyle, that an increasing number of new members are from outside of North America, continues. This confirms the international character of the Association (it has members in 53 countries), and increases the responsibility of the Executive to ensure that the needs of overseas members are served. One of the responses to this is the intent to elect a European Regional Councillor in the coming year. Also, since people overseas experience problems in finding other members they know to act as sponsors, your Executive, with your approval has modified the requirements for Affiliate status to facilitate their joining (see Newsletter No. 21). This, together with Dr. L.D. James' simplification of the admissions procedures should ensure that the satisfying renewed growth of the Association in the past year will continue.

The Bibliography Committee, under the Chairmanship of Dr. H.E. Hawkes, completed the 1972-1975 bibliography which was published as the Association's Special Volume No. 5. This is sent free to members as of July 1, 1977. In addition to compiling current bibliographic supplements and preparing selected references for inclusions in the Newsletter, Dr. Hawkes and his committee is now working on a pre-1965 bibliography which, when published will provide along with the previously published Bibliographies, a complete record of exploration geochemistry papers. Future generations of exploration geochemists will probably judge this comprehensive bibliographic record as one of the outstanding scientific achievements of the Association.

Dr. Hawkes is also acting as a one-man advertising committee. The initial fruits of his labours can be seen in the journal, Economic Geology, which is carrying an advertisement for AEG Special Volumes.

The Case History Committee, under the chairmanship of Dr. P.M.D. Bradshaw, continues to be active; the second volume, "Conceptual Models in Exploration Geochemistry -- Norden, 1975", edited by L.K. Kauranne, has been published as a 253-page Special Issue of the Journal of Geochemical Exploration (Vol.5, No.3, 1976). Another volume, on the Southwestern United States, is being prepared.

The Geochemical Analysis Committee (G.H. Allcott, Chairman) now has analytical data for 44 elements on standard geochemical samples; this is to be published in the U.S.G.S. Open File Series in the next few months. The Research and Education Committee (A.A. Levinson, Chairman) has completed a study of university undergraduates curriculum requirements for exploration geochemistry and has also investigated scientific publishing costs.

The greatest visible growth is probably in the Journal of Geochemical Exploration. We are extremely fortunate to continue to have the services of Dr. E.M. Cameron as Editor-in-Chief and Dr. H.A. Hansuld as Business Editor. The very high scientific standards of the content of the Journal have been maintained, and the number of pages published per year has doubled. Apart from the regular articles, in the past year the Journal has included the case history Special Issue referred to above and the Proceedings of "Exploration Geochemistry in the Appalachians" (298 pages, edited by G.J.S. Govett, Vol.6, No.1/2, 1976).

By any standards, the Journal is a high-quality publication; its circulation continues to increase, and the Association is now receiving royalties that will be used to help defray possible future cost increases and to improve services to AEG members. It is perhaps appropriate to again comment on the cost (\$32.50) of the annual subscription to the Journal. The major costs of publishing a journal of this type are not the printing or the paper. One of the major costs is a copy editor (provided by the publisher) who ensures consistency of format, checks references, directs the setting up of tables in readable fashion, and performs all the other unseen tasks of converting a ragged typescript into a polished paper. This is an expensive service for which we must pay. Another significant cost is the distribution of the Journal; this factor was brought home to your Executive when consideration was being given to allowing reduced subscription rates for students. We were forced to abandon the idea simply because of the high cost of distribution by mail.

Any comparison between the cost of the Journal of Geochemical Exploration and some national journals (which may be cheaper) must take into consideration the fact that much of the latter's copy-editing is done by "volunteers". The AEG membership is small and is largely made up of busy professional geochemists who are not able to give the amount of time that the task would entail. Also, many national journals receive government subsidies for production and/or distribution. We have a very good journal at a reasonable price; for this we are indebted largely to our Editor-in-Chief and our Business Editor -- and to the ready cooperation and assistance from our publishers, Elsevier Scientific Publishing Company.

In August of 1976 the Sixth International Geochemical Symposium was held in Sydney, Australia. This is the first time that one of the biennial meetings has been held in the southern hemisphere. Despite the distance from the main centres of membership, it was well attended.

The proceedings will be published later this year as a Special Issue of the Journal of Geochemical Exploration. Arrangements are now well-advanced for the Seventh IGES to be held in Golden, Colorado in April of 1978. The Eighth IGES is to be held in Hannover, Germany in 1980.

As part of the continuing policy of your Executive to broaden the base of exploration geochemistry, the possibility of holding joint meetings with other organizations is being investigated. The first of these joint meetings has been arranged by our Australian Regional Councillor. An Announcement is included in this Newsletter.

### TREASURER'S REPORT

The Association maintains several bank accounts which will be consolidated into one Branch of the Canadian Imperial Bank of Commerce now that incorporation is completed and non-profit status obtained. A summary of the transactions and balances is presented here. A more detailed account can be obtained from the Treasurer on request.

	Golden Acct.(US\$) Year Ended 3/31/77	Toronto Acct.(Can\$) Year Ended 12/31/76	Vancouver Acct (Can.\$) Year Ended 4/18/77
<u>Receipts</u>			
Dues	\$ 3,847.36	\$ 6,176.00	
Publication and Journal	14,380.46	2,532.50	
Transfers		6,428.17	\$ 152.00
Miscellaneous	12.81		
<u>Disbursements</u>			
Transfers			\$ 5,000.00
Printing and Publications	\$20,251.06	\$ 3,022.73	247.94
Wages		1,290.13	
General	711.29	2,120.27	649.41
CASH BALANCE - Beginning of Year	\$10,472.29	\$ 0.00	\$ 7,119.51
CASH BALANCE - End of Year	\$ 7,750.57	\$ 8,703.54	\$ 1,374.16

In addition, the Association maintains a non-chequing US\$ account in Toronto. The balance in this account at the time of the Annual Meeting was \$6,169.37.

### AEG COUNCIL 1977-1978

Dr. J.A. Coope submitted his resignation as Secretary of the Association in April and in order that a full complement of Councillors could be named, the Special Meeting approved the election of those seven persons who received the largest number of votes in the Ordinary Councillor ballot. Two hundred and three ballots from the Voting Membership were examined by the scrutineers at the Meeting.

At the Council Meeting held following the Special Meeting of the Association, Dr. R.C. Armstrong, Cominco, Toronto was elected Secretary.

The new Councillors of the Association are as follows: -

### Councillors

#### Officers

President:	Dr. R.F. Horsnail
First Vice President:	Dr. P.M.D. Bradshaw
Second Vice President:	Dr. R.H. Carpenter
Secretary:	Dr. R.C. Armstrong
Treasurer:	Dr. F.N. Ward

#### Ordinary Councillors and Past President Councillors

##### 1977-78

R.W. Boyle  
R.G. Garrett  
L.D. James  
K.A. Lovstrom  
J.H. McCarthy  
P.K. Theobald

##### 1977-79

M.A. Chaffee  
L.G. Closs  
I.L. Elliott  
G.J.S. Govett  
A.W. Rose  
G.R. Webber

#### Australian Regional Councillor

J.F. Gilfillan

Mr. W.F. Bondar of Ottawa is the new representative of the Association on the Canadian Geoscience Council.

HIGHLIGHTS FROM PRESIDENTIAL ADDRESS BY G.J.S. GOVETT TO THE ASSOCIATION OF EXPLORATION GEOCHEMISTS following the ANNUAL GENERAL MEETING, VANCOUVER, B.C. APRIL 1977.

(text to be published in full in Journal of Geochemical Exploration)

Professor Govett stated that to meet the rising expectation that geochemistry will play a significant role in finding new mineral deposits to meet escalating world demand, considerable technical improvement is necessary and economic and political conditions need to be conducive to mineral exploration. He briefly reviewed the role of government, industry, and the university, and examined at more length the conditions of training geochemists -- again decrying the lack of departments of applied geochemistry in universities. He repeated the plea he made at the Sixth I.G.E.S. in Sydney in 1976 for universities to devote more time to research on processes of element dispersion; he singled out background areas as being a particularly fruitful field of study, suggesting that greater efforts be made to involve "pure" geochemists, soil scientists, biologists, and other scientists in research.

Professor Govett then turned his attention to interpretation of geochemical data, stating "... the greatest hinderance to this is the well-entrenched 'anomaly' concept -- i.e., the expectation that mineralization will be revealed by an abnormally high (and, more rarely recognized, low)

content of an element. A more useful approach, especially where the geochemical response is weak, is to seek anomalous patterns rather than anomalous values". The importance of pattern was further discussed and illustrated. The use of the dimension of a halo was also discussed and illustrated by examples of the Soviet technique of calculating "linear productivities".

The last part of the address was devoted to an examination of the role of geologists -- and exploration geochemists in particular -- in a modern industrial society, emphasizing the fundamental importance of those in mineral exploration to the generation of industrial activity which ultimately supplies the consumers with the wide range of goods characteristic of a modern economy. Despite the vital role of the geologist, "...exploitation of mineral resources is ...regarded as a 'bad thing' in many developed countries...something that it is politically expedient to oppose. The reasons for this attitude are...environmental clamour, economic nationalism, unreasoned fear of foreign investment... Canadians are unhappy about being 'hewers of wood and drawers of water'; the politician is in full cry against primary industry, forgetting that it was -- and -- precisely this primary industry that has allowed and continues to allow Canadians a standard of living that is the envy of most of the world. The minerals industry is itself partly to blame for the bad image that mining has -- it is quietly self-effacing to the point of being apologetic in the face of determined and vociferous opposition... the greatest defaulters in the battle for public support are probably the geologists".

Professor Govett concluded by stating that the mining industry -- and the public -- that pays the taxes to support universities have a right to expect that those in universities undertake the fundamental research necessary to improve the capability of mineral exploration, that governments should support this research on a scale commensurate with the importance of the mining industry, and that the mining industry itself should re-examine its own exploration policies and be more willing to collaborate with those outside industry. The address ended with the following plea to "...exploration geochemists (whether they are in industry, government or university) to be adventuresome and innovative both in the field and in the laboratory".

#### FROM THE SECRETARY'S OFFICE

The address of the Association's recently elected Secretary is Dr. R.C. Armstrong, Cominco Ltd., Suite 1700, 120 Adelaide St. West, Toronto, Ontario M5H 1T1, Canada. Mrs. Ines Filicetti, following on from her very efficient first year, continues to operate the Association's permanent office to provide service to the membership.

#### European Regional Councillor

Council has decided that Europe (Western European countries inclusive of Great Britain and Ireland) should be represented by a Regional Councillor. This will be an active position, especially in the years preceding the 1980 Hannover Symposium.

Council has nominated Professor G.H.W. Friedrich to the position of European Regional Councillor and Prof. Friedrich has accepted the nomination. The Association's By-Law states that any 4 Voting Members

located in the European geographical area defined above may nominate any Voting Member in good standing resident in the same European geographical area for the position of Regional Councillor. Nominations must reach the Association's permanent office before November 1, 1977 together with written acceptance of the nominee indicating willingness to serve if elected. Receipt of more than one nominations will require a balloting procedure similar to that used to elect Ordinary Councillors with ballot forms being to all Voting Members in the European geographic region. The results of the Regional Councillor ballot will be announced at the Annual Meeting in April 1978. If no additional nominations are received by November 1, 1977, Prof. Friedrich will be deemed elected on that date.

VOTING MEMBERS RESIDENT IN THE EUROPEAN GEOGRAPHIC AREA SHOULD CONSIDER THIS ANNOUNCEMENT RE THE EUROPEAN REGIONAL COUNCILLOR TO BE A FORMAL NOTIFICATION OF COUNCIL ACTION AND CONSTITUTIONAL PROCEDURE.

### Symposium News

The 1978 AEG Symposium to be held in Denver, Colorado, is on track. All AEG members should have received their second circular by this time. Further information can be obtained from the Secretary of the Organizing Committee

M.A. Chaffee  
U.S. Geological Survey  
Branch of Exploration Research  
5946 McIntyre Street  
Golden, Colorado 80401 U.S.A.

The 1980 AEG Symposium will be held in Hannover, West Germany in cooperation with the West German Federal Institute for Geoscience and Natural Resources.

### Membership Lists

Many members have enquired concerning the availability of an AEG Membership List. The last such List prepared is several years old and outdated. Several of the enquiries have suggested that regional membership lists be prepared to aid prospective candidates for admission to membership to locate references or supporters.

Elsevier provides the AEG office with a computer print-out of members receiving the Journal of Geochemical Exploration at approximately half-yearly intervals. This print-out conveniently lists members according to country and xerox copies of countries or regions can be made available on request. Regional Councillors will be provided with reference copies and revised lists will become available as Elsevier produces them.

It is anticipated that these xeroxed membership lists will be available in August-September 1977.

### Membership Applications Forms

Applications for membership in the AEG are distributed with this Newsletter. Membership is urged to locate and invite potential new members to make application and swell the membership ranks. Expanded membership will result in improved services to members inclusive of cost savings in the form of Journal royalties which will provide a hedge against inflationary pressure.

Members should advise potential candidates that the requirements for referees and supporters detailed on the white information form "Referee Support Requirements" are revised and up to date and take precedence over the requirements printed on the yellow Application Form.

It should also be emphasized that the applicant is responsible for distributing the referee report forms to his or her supporters.

Present Affiliate and Student Members who desire to change their membership status in the AEG are reminded that reapplication using the enclosed application form is necessary. Up-to-date qualifications and experience details together with the additional referee support needed to satisfy By-law requirements must be received before action is possible by the Applications Committee.

### 1978 DUES NOTICE

Membership's attention is directed to the 1978 Dues Notice included with this Newsletter. Subscriptions are due January 1, 1978 and all members are urged to pay promptly to avoid the inconveniences experienced when names are excluded from mailing lists because of late or non-payment. This early distribution of the 1978 Dues Notices should enable all members to meet the subscription deadline. The Elsevier mailing lists are revised in January of each year.

### Changes of Permanent Address

The Association has urged its membership to provide information promptly of any change of permanent address. The permanent office will be pleased to process these changes expeditiously by informing all persons monitoring mailing lists and membership lists. During the past year the office has received several letters from members requesting their recorded address be changed for short periods -eg. six months - while on a field assignment. After such a short period instructions are received to place the original address on record.

As will be appreciated such frequent changes are an administrative headache and for the purpose of the AEG records, membership is asked to use discretion in directing a change of address notice to the AEG rather than to their home office when absences of less than twelve months from home-base are anticipated.

Members are also asked to be consistent in their use of their office or home addressess in their various communications with the permanent office.

A change of address form is attached for your convenience and file record.



### Membership Certificates

Requests for Membership Certificates continue to come in very slowly. The deadline for requests has been extended until the end of 1977 in anticipation that a sufficient number will be received to justify the AEG printing a number of Certificates, suitable for framing which could then be distributed at a cost of \$5.00 each. Approximately 20 more requests are needed to justify the printing of Membership Certificates.

### Advertising in the Newsletter

The Secretary would appreciate hearing from all members who wish to advertise their services as consultants, suppliers, analysts, etc., in the future Newsletters of the Association. Newsletters are distributed four times per year to the total membership (currently approx. 500) in many countries of the world (currently 53).

Advertisements of professional card size can conveniently be carried and a limited number of the small advertisements could also be included. An indication of interest in this potential advertising service (together with specimen advertising copy) will allow the AEG Council to determine costs for single and multiple insertions.

Revenue from the advertisements will be used to offset the costs of the Newsletters and also improve the contents and format.

### Annual Bibliographies

Elsewhere in this Newsletter it is noted that the Bibliography Committee, guided by its Chairman, H.E. Hawkes, is preparing a pre-1965 bibliography which will be a companion volume to Special Volumes 1 and 5 already published.

Additionally, each Newsletter contains a list of most recent references for membership information.

Council has decided to prepare a Bibliography List for each calendar year incorporating cross-referenced publications to keep the information as current as possible in a readily useable form. These Annual Bibliography Lists will be printed on Standard 8½" x 11" paper and will be available at a nominal charge to both members and non-members on request. Details will be forthcoming in later Newsletters.

### Referee Report Forms

The permanent office of the Association is holding application forms which do not have the full complement of supporting referee report forms from qualified Voting Members or other geoscientists. Delayed completion of the referee report forms delays the processing of applications and some have been delayed for periods in excess of six months. Voting Members agreeing to support an applicant are asked to submit their written comments promptly to the Rexdale Office.

If any AEG members have been asked by persons who have completed application forms about the status of an application forwarded to the permanent office in excess of three months previously, please ask the applicant to contact a Regional Councillor or the AEG permanent office for information. There are instances of application forms having been sent from distant locations not received by the AEG and it is possible that the mails have failed in other instances.

An acknowledgement postcard is being prepared so that new applicants can be advised immediately of the receipt of their forms.

## EDUCATION COMMITTEE REPORT

### Proposed Undergraduate Curriculum in Exploration Geochemistry

The following presentation has been prepared by the Research and Education Committee and submitted to the AEG Council. During the Council Meeting in Vancouver, it was decided to publish the Research and Education Committee submission in the Newsletter and request comments from the membership on its contents. Interested persons are therefore asked to send their comments and opinions to the permanent office (c/o Research and Education Committee) and these communications will then be forwarded to the 1977-1978 Committee.

### A Proposed Undergraduate Curriculum in Exploration Geochemistry

(prepared by the Research and Education Committee, 1976-1977)

All members of the Research and Education Committee have agreed that a recommended undergraduate curriculum be proposed for students with interests in exploration geochemistry.

As a starting point, the Committee decided:

1. not to try to encompass all of applied geochemistry but to concentrate on the largest area of applied geochemistry, namely exploration geochemistry. We definitely recognize that such important areas as environmental geochemistry are within the framework of applied geochemistry but we feel that, for the present at least, this area of specialization is still evolving and an attempt to recommend a curriculum is premature.
2. to prepare a recommended curriculum which would be equally applicable to those universities (also colleges and institutions) which do not offer formal courses, or have staff trained in, exploration geochemistry. The feeling is that with the proper undergraduate background a student would (a) be prepared for graduate work in exploration geochemistry at a university in which this is a recognized area of specialization by virtue of having an exploration geochemist on its staff, or (b) be qualified to begin his industrial career after a 4-year undergraduate degree in an intermediate capacity within the field of exploration geochemistry.

The Committee also concluded that flexibility in the proposed curriculum must be recognized and accepted because: (1) universities the world-over have varying requirements for graduation, including maximum limits on the number of courses in specific subjects (e.g., geology) and in specific areas (e.g., science); (2) many universities do not offer

courses in subjects we consider extremely desirable, if not essential (e.g., many universities do not have courses in Soil Science); and (3) courses with the same catalogue title and description can differ so markedly in their content that they have, in effect, no relationship to each other (e.g., "geochemistry" in some universities may be a course in solution chemistry, whereas in others it might be primarily thermodynamics, or stable isotopes, or trace element geochemistry, etc.).

As a frame of reference within to recommend specific courses, the Committee concluded that an exploration geochemist must be qualified and prepared to:

1. apply chemical principles to geological problems, especially those related to mineral deposits;
2. be familiar and proficient with as many analytical (particularly instrumental) techniques as possible primarily to be able to choose the best method for the sample in question, and to be aware of the limitations on the data when it is forthcoming.

It is within the framework of the above two points that we have prepared a proposed curriculum for undergraduates.

The following university-level courses are considered an absolute minimum:

- a. two years of chemistry
- b. one year of physics
- c. mathematics through calculus, and
- d. within the geology department, the conventional combination of physical and historical geology, structural geology, crystallography, mineralogy, petrology, petrography, economic geology, and geochemistry.

With respect to the two years of chemistry, one year of general chemistry plus any two one-semester elective courses will be satisfactory; these courses should include a significant content of physical, inorganic and analytical chemistry. Among the elective courses we particularly recommend a course in instrumental analysis in the chemistry department (unless a similar, broad-based course is available in geology). A course in physical chemistry is very desirable as a preparation for graduate work. A course in organic geochemistry is certainly acceptable because of its importance in soil chemistry, the exploration for oil and natural gas etc. With respect to the required course in economic geology, all members of the Committee agree this is essential because one cannot effectively search for ore deposits unless one has a good grasp of the concepts relating to the formation, emplacement, and characteristics of ore deposits.

Other highly recommended courses include soil science (including rock weathering), elementary statistics, computer programming, mining geophysics, water chemistry, and plant nutrition (the latter particularly recommended by one member). As many field trips and excursions as possible, without regard to the specific area of geology being stressed, are also highly recommended.

The course in geochemistry mentioned in (d) above, should be a course in the principles of basic geochemistry (also called fundamental or introductory), as opposed to exploration or applied geochemistry. As indicated previously, courses with such titles vary enormously in content and, at present, we are not prepared to recommend an ideal content for such a course. The Committee feels that, at this time, no one text book fulfills what we have in mind and, in fact, we are of various minds on this matter of course content. However, in an attempt to "apply chemical principles to geological problems", students must be familiar with the distribution of chemical elements in the materials of the Earth, and with the principles governing the distribution of elements as originally elucidated by Goldschmidt and elaborated on by many others. We realize, and fully accept, the fact that these topics may be considered within the mineralogy-petrology sequence in some universities. Of course, if a course in exploration geochemistry is offered, it should also be taken at the undergraduate level. In order for such a course to be effective it will be necessary for someone on the staff to have an interest and background in exploration geochemistry.

We do not propose that the curriculum set out here should be resurrected, rediscovered, or in anyway used, should, in the future, an attempt be made to set standards for accreditation of exploration geochemists. Our discussions, both verbal and written, have only been concerned with developing a curriculum to be recommended for undergraduates wishing to enter the field of exploration geochemistry with the proper scientific background.

..... A.A. Levinson, Chairman, 1976-77

### SPECIAL FEATURE

#### U.S. Geochemical Activity in 1975 by F.C. Canney and E.V. Post

Early in 1976, Dr. Robert W. Boyle of the Geological Survey of Canada and President of the Association of Exploration Geochemists wanted to include worldwide data on the volume of activity in exploration geochemistry in his Presidential Address to be given at Fredericton, New Brunswick on April 23, 1976. He had acquired data for Canada, USSR, Australia, and most of the rest of the world, but needed comparable figures for the United States. He therefore asked the assistance of E.V. Post, then Secretary of the Association and President, Skyline Labs, Inc., for assistance. Post realized that to contact all of the mineral exploration companies in the U.S. in such a short time would be impossible, but he believed that whereas the great bulk of geochemical analytical work is done by customs laboratories and the private labs of the major mining companies, a reasonably reliable figure could be acquired through these organizations. Accordingly, he designed a questionnaire that was sent to 27 custom laboratories and six company-operated laboratories. In order to keep data on individual company operations confidential, Post arranged with F.C. Canney of the U.S. Geological Survey to receive all replies and compile all responses.

The questionnaire posed the following questions:

1. Number of samples analyzed during 1975 for geochemical exploration purposes.
2. Average number of elements requested per sample.

3. Elements most commonly requested, in order of frequency.
4. Approximate gross dollar amount spent for geochemical analyses during 1975.
5. Can you identify any mineral deposit discoveries during 1975 attributable principally to geochemical exploration?

### Results

A very gratifying 73 percent of the questionnaires were returned, indicating, we believe, that the majority of businesses do indeed think it worthwhile periodically to take an overall look at the magnitude of this industry, even though it involves appreciable work and the release of confidential business data. Most returns were complete, with only a few blanks on numbers 1 and 4.

### Question No.1 - Number of Samples

Based on these returns and other data and estimates, a minimum of 374,000 samples were collected and analyzed in the United States in 1975. This figure was arrived at as follows:

Industry (firm figures)	257,000
Industry (estimates)	82,000
Government (USGS)	<u>35,000</u>
	374,000

The estimated industry figure was for two labs known to have substantial sample loads, but who did not supply volume or dollar figures. The U.S.G.S. figure was mostly for samples collected in its mineral studies on the Public Lands.

The above figure (374,000) is less than the 400,000 estimates reported by Boyle for the United States, because of a downward revision we made in the estimated category. It shows that the U.S. is considerably behind Canada (1.1 million) and lags far behind the U.S.S.R. (3.5 million).

How do we compare with ourself? The only available data of a similar nature that we are aware of was obtained by the Geochemical Analysis Committee of the AEG who circulated a similar questionnaire to laboratories around the world in 1971-72. Their report showed that for the year ending June 30, 1971, 621,384 geochemical samples were taken in the United States. Obviously, 1975 volume is way under 1970-71; what a long term line would show demands figures that are not available. It is possibly significant, however, that for Canada, 1976 volume (1.2 million) was greater than in 1970-71 (0.8 million). The earlier AEG survey did not report on the U.S.S.R.

The lower volume of geochemical sampling in the United States in 1975 as compared to 1971 suggests a change in the focus of exploration activities with less raw reconnaissance effort and more detailed prospect evaluation in recent years. Canada, on the other hand, and no doubt the Soviet Union, still has vast unexplored tracts of land suitable for reconnaissance work.

Question No. 2 - Average Number Elements Requested

<u>Average number elements requested per sample</u>	<u>Number laboratories reporting each number (* = 1 lab)</u>
1	
2	
3	***** <u>1/</u>
4	*****
5	***
6	*
7	*
8	
9	
10	
15	*
30 <u>2/</u>	*
31 <u>3/</u>	*

- 1/ U.S.G.S. chemical  
2/ U.S.G.S. emission spectrographic  
3/ emission spectrographic scan

Question No. 3 - Elements Most Commonly Requested

<u>Relative Rank</u>	<u>Element</u>
1	Cu
2	Zn
3	Pb
4	Mo
5	Ag
6	Au
7	As

Uranium could not be ranked, as it was highly laboratory dependent; e.g., it ranked no.1 on the list of one high-volume laboratory and yet did not even make the first ten for another such laboratory. It was listed by five laboratories.

Besides the above, the following 17 elements also made the lists of from 1 to 6 laboratories as shown in the following tabulation:

<u>Element</u>	<u>No. of labs reporting</u>	<u>Ranks assigned by reporting labs</u>
Ba	3	7, 8, 9
Bi	2	7, 9
Cd	3	6, 8, 10
Co	1	10
F	4	6, 8, 9, 10
Fe	2	4, 7
Hg	6	7, 7, 8, 9, 9, 10
Mn	3	5, 6, 9
Ni	2	7, 10
S	1	8
Sb	4	6, 7, 8, 8
Se	3	6, 9, 10
Sn	1	5
Th	1	10
Tl	1	8
V	2	7, 7
W	5	6, 8, 9, 9, 10

By and large the above data show no surprises. The rather erratic figures for uranium probably reflect geographical proximity of certain labs to exploration companies heavily into uranium coupled perhaps with a lack of analytical capacity in certain labs. The data also indicate some interest in the use of As, Sb, W, and Hg as pathfinders. There still appears to be a fair demand for mercury, with nearly one-third of the labs reporting it, but its relatively low ranking certainly indicates an appreciable degree of disillusionment compared with its status a few years ago when predictions were freely made that it would soon become the "universal pathfinder" applicable to nearly all problems.

Question No. 4 - Gross Dollar Amount Budgeted or Spent

Industry (firm figures)	\$1,733,000
Industry (est. figures)	442,000
Government (USGS)	<u>525,000</u>
	\$2,700,000

We have estimated gross dollar amounts for the two companies that did not supply these figures and whose sample volumes were estimated. The U.S.G.S. figure represents spectrographic analysis on 35,000 samples plus approximately 3-4 chemical determinations per sample.

Question No. 5 - Geochemical Discoveries

Very little interesting concrete data resulted. Answers ran the gamut from "no" to "too many to mention". We question whether this type of question should be included in future surveys.

In spite of the delay in compiling and presenting this report, caused in part by the disastrous fire in the U.S.G.S. laboratories that partly destroyed Dr. Canney's office, we hope that the results are found useful and that organizations utilizing geochemical exploration techniques will be willing to participate in similar surveys in future years.

Applied Geochemical Activities in West Germany

Drs. G. Friedrich and H. Gundlach have supplied the following note regarding geochemical work currently being carried out by the Geological Survey (Bundesanstalt für Geowissenschaften und Rohstoffe) in cooperation with the State Surveys:

1. geochemical prospecting studies for base metal deposits in the Rhenoharzynikum (Devonian stratiform sulphide deposits) using multi-element analysis and "proximity indicators"
2. detailed geochemical studies in areas of: "Kupferschiefer-type mineralization", Ni bearing mafic and ultramafic rocks (Hessen and Bayern), Cu mineralization in Permian rhyolites (Saar-Nahe-Gebiet), Baryte mineralization in the Harz mountain, W mineralization in the Black Forest.

The geochemical studies in the Rhenoharzynikum are carried out in cooperation with the geochemical groups of the universities of Aachen and Braunschweig and with industrial partners. The research work is sponsored by the German Bundesministerium für Forschung und Technologie (Minister of Research and Technology). In addition to the geochemical studies, geophysical methods and drilling were used. The three year programme ends in 1977.

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MEETINGS

Joint Meeting Organized by Specialist Group in the Genesis of Ore Deposits  
of the Geol. Soc. of Australia and The Association of Exploration  
Geochemists

A SYMPOSIUM ON

CURRENT COMMODITY TRENDS IN MINERAL EXPLORATION AND EVALUATION

with refernce to

URANIUM, TIN, TUNGSTEN, CHROMIUM, AND MANGANESE

December 5 to 7, 1977

The Australian Mineral Foundation, Adelaide

Papers are invited for this symposium. Contributors are asked to submit titles of proposed papers, accompanied by a brief synopsis, to Dr. P.G. Moeskops, C/- Australian Mineral Development Laboratories, Flemington St., Frewville, S.A. 5063, by August 1, 1977. Contributors will have 30 minutes for presentation of papers, with a further 10 minutes of discussion. Shorter contributions of up to 20 minutes will also be accepted. Abstracts of all papers accepted must be submitted by November 1, 1977.

The aim of the Symposium is to bring together geologists with various interests in the broad field of Economic Geology to discuss some commodities that are of current economic significance but which may have received little attention in recent symposia, conferences or literature. The organisers hope that the Symposium will provide discussion over a wide range of issues associated with these commodities, including exploration, evaluation, market trends, ore genesis, etc.

Organising Committee

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Persons wishing to receive further notices concerning this Symposium should write to Dr. P.G. Moeskops.

NEW MEMBERS

Applications for membership in the Association from the following individuals have been recommended for acceptance by the Admissions Committee. 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.

VOTING MEMBERS

Curtis, L.W.	Exploration geologist - Urangesellschaft Canada Ltd. Toronto, Canada.
Hopwood, T.P.	Independent Consultant Geologist - North Adelaide, Australia
Huang, C.I.	Geochemist - Cities Service Mineral Corp., Salt Lake City, U.S.A..
Lowenstein, P.L.	Senior Geologist - Geological Survey of Papua, New Guinea; Port Moresby, New Guinea.
Meineke, D.G.	Supervisor of Minerals Exploration - Minnesota Department of Natural Resources, Hibbing, Minnesota, U.S.A.
Molyneux, T.G.	Geologist - Anglo American Corp. Marshalltown, South Africa.
Munizaga, F.S.	Mineral Analyst - United Nations, OTC New York, U.S.A.
Wilson, W.J.	President, Atlantic Analytical Services Ltd., Saint John, New Brunswick, Canada

AFFILIATE MEMBERS

Bahr, J.R.	Geologist, - Wyoming Mineral Corp., Casper, Wyoming U.S.A.
Clue, J.	Geologist - Exploration Operations Branch, Winnipeg, Manitoba, Canada.
Detra, D.E.	Geologist - U.S. Geological Survey, Golden, Colorado, U.S.A.
Reid, A. R.	Geologist - French American Metals, Lakewood, Colorado, U.S.A.
Smith, S.C.	Geochemist - Houston Oil & Minerals Corp., Denver, Colorado, U.S.A.

STUDENT MEMBERS

- Cağatay, M.N.                      Research Student - Maden Etüd, M.T.A. Enstitüsü, Ankara, Turkey.
- Husain, M.A.                      Research Student - Dept. of Geology, Florida State University, Tallahassee, Florida, U.S.A.
- Larsen, C.R.                      Graduate Student - Dept. of Geological Sciences, Queen's University, Kingston, Ontario, Canada.
- Lavin, O.P.                      Graduate Student - Miller Hall, Queen's University, Kingston, Ontario, Canada.
- Sey, S.K.                      Research Student - Applied geochemistry research group, Geology Dept., Imperial College, London, England.

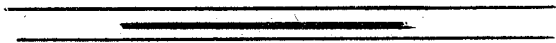
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LOST MEMBERS

Mail addressed to the following members in the cities indicated was returned to the Association office:

- J.A. Criswell, Golden, Colo. U.S.A.
- M.R. Khalie, Beirut, Lebanon.
- W.C. Davies, c/o SAMCOSA, Apartado 7-2070, San Jose, Costa Rica.
- H. Lozano, Calle 19, No.6-72, Ibague, Colombia, South America
- R.A. Martin, Box. 443 Weipa, North Queensland, 4874, Australia.

CHANGE OF ADDRESS INFORMATION FOR THE ABOVE MEMBERS WOULD BE APPRECIATED.



CORRECTION CORRECTION CORRECTION CORRECTION CORRECTION CORRECTION CORRECTION

In Newsletter No. 21 it was incorrectly noted that the editor of the Special Volume containing the Proceedings of the Sixth International Geochemical Exploration Symposium would be C.E.M. Butt and J.F. Gilfillan.

Please note that the editors for this Volume are:

Dr. C.R.M, BUTT & Dr. I.G.P. WILDING

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