

EXPLORE

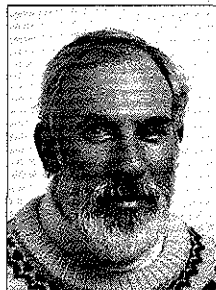
Newsletter for the Association of Exploration Geochemists

NUMBER 84

JULY 1994

PRESIDENT'S MESSAGE

This President's message represents my Presidential Report to the postponed Annual General Meeting on Wednesday 27 April, which was conducted by telephone hook-up.



A Period of Change

As with the world that we live in, the Association of Exploration Geochemists has undergone some changes during the past twelve months which are designed to keep us relevant, make us more international and to improve the services we offer to you, our members.

With the decline in exploration activities in North America there was an obvious need for the AEG to have a more international outlook. My Presidency has been the first of what I trust will be many from outside North America. Despite the long distances, modern communications have allowed me to keep in constant touch with other members of the Executive and Council. At the same time, we have increased the number of Regional Councilors with new appointments in SE Asia, United Kingdom and Ireland, Chile and a nomination for PR of China. The expansion of the AEG is dependent on promotion by Regional Councilors, particularly in those countries which are part of the present exploration boom.

Our experiment in appointing a full-time Business Manager in Vancouver failed and resulted in a great deal of dissatisfaction for our members, those wishing to join AEG, Elsevier and Council. We can do little more than apologise. With the appointment of Betty Arseneault and the transfer of the Business Office to Ottawa, the mess is being cleared very rapidly and services to our members are regaining the professionalism that is expected.

Our Past-President, Jeff Jaacks has developed a Strategic Plan which will be the foundation for the future of the AEG. Once the Plan has been ratified by Council, it will be published in EXPLORE.

Activities

The 16th IGES in Beijing during 1993 was the first held in Asia. With the associated 5th Chinese Exploration Geochemistry Symposium it provided a great opportunity to learn of the technologies developed by the Chinese and their application to mineral exploration and analysis. The meeting was attended by many Councilors and Regional Councilors

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STANLEY J. HOFFMAN



Dr. Stanley J. Hoffman, one of the leading members of our Association, died in Vancouver, on April 7th, 1994. He was 47.

Originally from Montreal, Stan graduated from McGill University in 1969 with a double First in Chemistry and Geology. He then attended the University of British Columbia for graduate research in exploration geochemistry: first a Masters, completed in 1972, and then his Doctorate, "Mineral Exploration on the Nechako Plateau, central British Columbia, using Lake Sediment Geochemistry," in 1976. From 1973 to 1987 he was chief geochemist for BP Minerals and later formed the consulting firm Prime Geochemical Methods Ltd.

Stan Hoffman joined the Association of Exploration Geochemists, as a Student Member, in 1972 and became a Voting Member in 1977. During the 1980's he was on Council for nine years, serving as a Vice-President in 1985-1987 and then President in 1987-1988. As President he made it his goal to expand the membership of the Association through improved services and publicity. He later continued this initiative as the Association's Business Manager, Chairman of the Publicity Committee, and Chairman of the Directory Committee. He also actively advanced the AEG and the science of exploration geochemistry by being a driving force behind symposia (GOLD-81 and GEOEXPO/86) and short courses (Exploration Geochemistry: Design and Interpretation of Soil Surveys) sponsored jointly by the AEG and other professional organizations. Although

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Information for Contributors to EXPLORE

Scope This Newsletter endeavors to become a forum for recent advances in exploration geochemistry and a key informational source. In addition to contributions on exploration geochemistry, we encourage material on multidisciplinary applications, environmental geochemistry, and analytical technology. Of particular interest are extended abstracts on new concepts for guides to ore, model improvements, exploration tools, unconventional case histories, and descriptions of recently discovered or developed deposits.

Format Manuscripts should be double-spaced and include camera-ready illustrations where possible. Meeting reports may have photographs, for example. Text is preferred on paper and 5- or 3-inch IBM-compatible computer diskettes with ASCII (DOS) format that can go directly to typesetting. Please use the metric system in technical material.

Length Extended abstracts may be up to approximately 1000 words or two newsletter pages including figures and tables.

Quality Submittals are copy-edited as necessary without re-examination by authors, who are asked to assure smooth writing style and accuracy of statement by thorough peer review. Contributions may be edited for clarity or space.

All contributions should be submitted to:

EXPLORE

c/o USGS, Box 25046, MS973, Denver Federal Center
Denver, CO 80225, USA

Information for Advertisers

EXPLORE is the newsletter of the Association of Exploration Geochemists (AEG). Distribution is quarterly to the membership consisting of 1200 geologists, geophysicists, and geochemists. Additionally, 100 copies are sent to geoscience libraries. Complimentary copies are mailed to selected addresses from the rosters of other geoscience organizations, and additional copies are distributed at key geoscience symposia. Approximately 20% of each issue is sent overseas.

EXPLORE is the most widely read newsletter in the world pertaining to exploration geochemistry. Geochemical laboratories, drilling, survey and sample collection, specialty geochemical services, consultants, environmental, field supply, and computer and geoscience data services are just a few of the areas available for advertisers. International as well as North American vendors will find markets through EXPLORE.

The EXPLORE newsletter is produced on a volunteer basis by the AEG membership and is a non-profit newsletter. The advertising rates are the lowest feasible with a break-even objective. Color is charged on a cost plus 10% basis. A discount of 15% is given to advertisers for an annual commitment (four issues). All advertising must be camera-ready PMT or negative. Business card advertising is available for consultants only*. Color separation and typesetting services are available through our publisher, Network Graphics, Inc.

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EXPLORE

Newsletter No. 84

JULY 1994

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NOTES FROM THE EDITOR

Preparation of this issue of EXPLORE has been particularly difficult. Not only because the North American field season is in full swing, but primarily because we were reminded every time we examined the issue that Stan Hoffman is no longer with us. A memorium in this issue, prepared by Kay Fletcher and starting on the cover of this issue, reminds us of Stan's many contributions to the AEG. May I propose that as we travel the byways and outbacks of the ever expanding exploration world, we give toasts to Stan. I think he would like that.

Many of you may have noted that the last few issues of EXPLORE have been delivered later than usual. The reasons for this are many, but most relate to the demise of the mailing house we have been using for the past few years. We have located another mailer, but their services are more expensive and we are still searching for better service at a lower cost. Until we have this all sorted out, to our satisfaction, EXPLORE may not be as timely as it has been. In this regard, we ask that anyone receiving a "tardy" issue of EXPLORE drop us a postcard with the issue number and date of arrival. We are particularly interested in non-North American deliveries, as this seems to be a weak point. Your assistance would be appreciated.

Contributor's deadlines for the next four issues of EXPLORE are as follows:

Issue	Publication date	Contributor's deadline
85	October 1994	August 31, 1994
86	January 1995	November 30, 1994
87	April 1995	February 28, 1995
88	July 1995	May 31, 1995

Owen Lavin
Editor EXPLORE



President's Message

Continued from Page 1

which enabled us to have an informal meeting, at which a number of pressing matters were discussed. Of immediate need is development of a mechanism whereby geochemists from developing countries, without access to US dollars, can join the AEG. All those who attended were impressed with the history and culture of China, the intense agriculture needed to feed the huge population (and the consequent environmental impact) and the exotic foods.

With the appointment of the first Business Manager, Council believed that publicity and marketing would take a leap forward — not so! Peter Rogers has Chaired a Publicity Committee since mid-1993 which has been responsible for the collation of posters and display boards which can be used at any geoscientific meeting throughout the world, and the preparation of a promotional leaflet for widespread distribution. They are also preparing for our 25th Anniversary celebrations in Townsville.

At the same time Graham Closs, Eric Grunsky and a hard-working team have developed a comprehensive bibliography of exploration geochemistry. Although the format is yet to be decided, this epic will be launched at 17th IGES in Townsville next year.

I think we all (except the Editors) take the Journal of Geochemical Exploration and EXPLORE for granted. And yet these two publications are the highly successful flagships of the AEG. We have recently seen the publication of Volume 50 of JGE — "Mineral deposits in Indonesia - Discoveries of the past 25 years" - a slight but very welcome departure from normal themes. Eion Cameron's editorship of this publication since its inception has previously been recognised by AEG. However, I would again congratulate him for his stewardship over 50 volumes of a highly respected scientific journal. Owen Lavin and his small group in Denver have developed EXPLORE into a most informative newsletter which all members look forward to receiving on a quarterly basis. One of the editorial group, Steve Zuker, has moved to Chile and we are looking for a volunteer replacement (preferably in the Denver area). To all those associated with these two publications, congratulations and many thanks.

Our Distinguished Lecturer, Dr. Jane Plant, from England, had to relinquish this role after successful tours through SE Asia and Australia. We are now seeking nominations for the 1995/96 Distinguished Lecturer. Similarly, David Jenkins, our Treasurer, resigned because of work commitments and he has been replaced by Eion Cameron in Ottawa.

The Future

Our major activities next year revolve around the 17th IGES in Townsville, Australia and our 25th Anniversary. I am confident that those of you who attend the 17th IGES will learn of geochemical exploration techniques for arid and humid tropical terrains — arguably the most intensely explored regions of the globe in the 1990's. Some excellent field trips, including one to the Great Barrier Reef are planned. This will be an opportunity to enjoy Australian hospitality, and help celebrate our 25th Anniversary. (Further details are available in the Second Circular which

will be available soon).

Our other major endeavour in the coming 12 months is to negotiate a new 5-year contract with Elsevier for publication of the Journal of Geochemical Exploration. We are presently commenting on their draft contract which suggests that the AEG will have reduced responsibilities and privileges as well as greatly reduced income. The negotiating committee is working hard to insure that the AEG obtains the most favorable conditions possible; however, there is no doubt that if we remain with Elsevier, the cost to members of the Journal will rise for the first time in many years. The Council is committed to publishing a high quality journal and if necessary will seek other publishers if a reasonable contract cannot be negotiated with Elsevier.

Acknowledgements

There are many people who give of their valuable time to ensure the future of AEG. This has been a difficult year and it has largely fallen upon Sherman Marsh, Wendy Hall, Eion Cameron and Bill Coker to get our business affairs in order. Their choice of Betty Arseneault as Business Manager was inspired and she has also put in many hours straightening the Association's financial matters. Owen Lavin and Eion Cameron as editors of EXPLORE and the JGE respectively have maintained the high standards we have come to expect. To all Council members who have endured late nights and early morning meetings, I extend my appreciation for their commitment to AEG.

Finally, to all members, thank you for your continued support and understanding. It is my belief that the Association has heeded the recommendation of Alan Coope's committee on "The Identity of AEG" and is assured of a very bright future.

Stanley J. Hoffman

Continued from Page 1

many were involved, Stan's energy and ability to generate a similar enthusiasm in others, was a catalyst to the intellectual and financial success of these events.

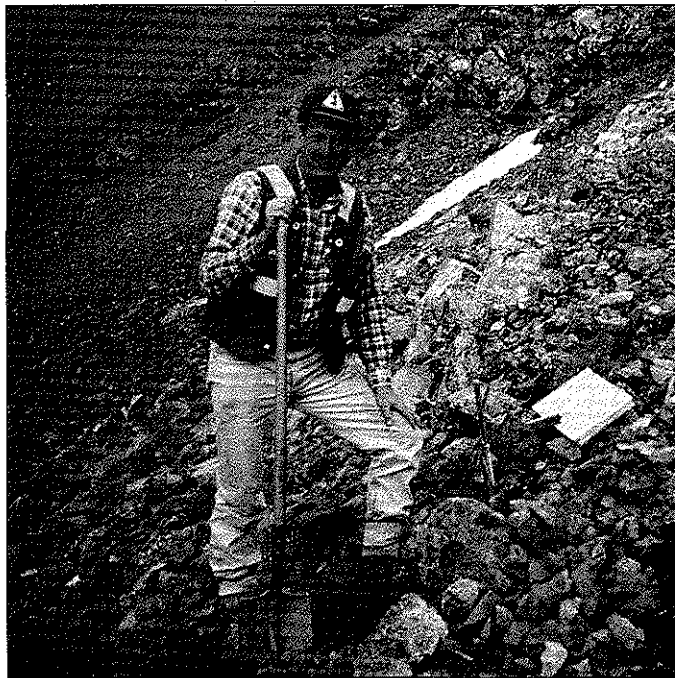
Stan will probably be best remembered by the AEG's membership worldwide for the thought provoking "Pearl Harbor" files published in EXPLORE. Through these case histories, that often took failed geochemical surveys as their starting point, Stan reminded us of the importance of high-quality sampling and the value of interpretations based on multielement analyses. He further shared his knowledge with the exploration community through scientific papers in the Journal of Geochemical Exploration and contributions to symposium volumes. He also compiled a manual on "Writing Geochemical Reports," distributed as AEG Special Volume 12.

Despite the many demands on his time, Stan's efforts to promote proper use of geochemical methods extended beyond his activities on behalf of the AEG. Through courses held by the British Columbia Department of Mines and the British Columbia and Yukon Chamber of Mines, he

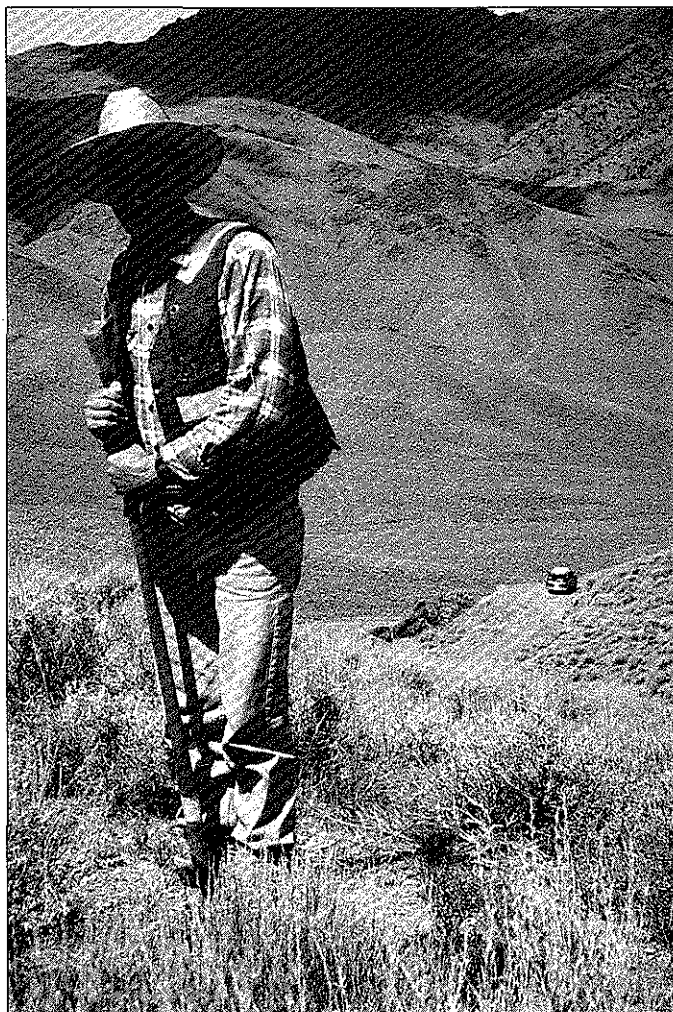
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Stanley J. Hoffman

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influenced many hundreds of prospectors. Similarly, he could be relied upon to share his experience, and vast



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collection of photographs of soil profiles, with students at UBC. He also devoted his efforts to ensuring that the practise of geochemistry was recognized for registration of professional geoscientists in the Province of British Columbia.

Stan was a firm believer in exploration geochemistry, and often suggested that geochemistry was commonly under, or poorly utilized, creating opportunities for those who could recognize its potential contribution.

".....Look for case histories and technological advances to make it evident that traditional approaches practised by the majority of companies leave "gaping holes" though which an ore deposit can quietly slip. These holes represent opportunities for mineral discovery at low cost for those of the competition which possess the skills to recognize the deficiencies or omission of other." Stanley J. Hoffman, President's Message, *EXPLORE* No. 63, July 1988.

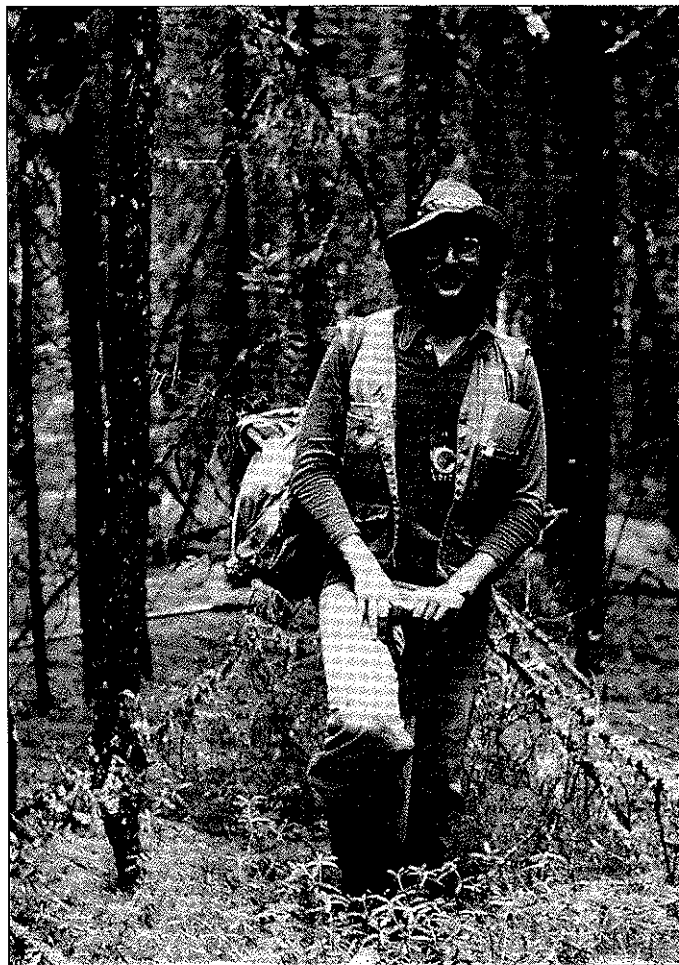
His willingness to share knowledge, and the unflagging enthusiasm and energy that Stan brought to exploration geochemistry and to the affairs of the Association of Exploration Geochemists will be remembered by all those who knew and worked with him.

Stan is survived by a sister and two brothers. In his memory, the family has established The Stanley J. Hoffman Endowment Fund, in support of students of exploration

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Stanley J. Hoffman

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geochemistry in the Department of Geological Sciences at the University of British Columbia.

W.K. Fletcher

University of British Columbia



LETTERS

RE: The AEG: a blurring focus?

Dear Sir:

From the sidelines, I have followed the debate about identity of the AEG with increasing concern. Although a long time member of the Association, I have worked almost exclusively in (what now has become "trendy") environmental geochemistry since getting my Ph.D. in hydrogeochemistry from London in 1975. Accordingly, I have not been a practicing exploration geochemist per se, but have followed the fortunes of the AEG aside from the mainstream of its intent. On this basis, I may have a somewhat different perspective on the identity of the AEG from many of the Association's members.

When brought into being, the AEG was a sharply focussed organization with the clear intent to foster and improve on the application of geochemistry as a tool in the location and development of ore deposits. There was considerable involvement by individuals in the mining industry and from mining companies themselves. There was little doubt, to me at least, as to the *raison d'être* of the AEG.


But now we see what appears to be a reaction to the current decline in the mining industry of North America. In order to expand the membership to counteract losses imposed by the current regulatory climate in North America, the AEG is flirting with the idea of appealing to environmental geochemists, hence broadening the scope of the Association. In doing so, the focus of the AEG is being blurred.

Environmental geochemistry is almost tangential to exploration geochemistry in intent and purpose. Only the term geochemistry is the same. Environmental geochemists spend their lives responding to ever increasing bizarre regulatory impositions and numeric criteria which have almost nothing to do with science and everything to do with political ideology. Is this what the AEG and its members wish to enjoy?

In terms of changing focus away from an industry led Association, the erosion of the number of AEG officers from industry is cause for concern. It cannot be healthy for the all five officers to be from quasi-governmental organizations, irrespective of their personnel merits, and three from Ottawa in particular. Further, the setting up of an environmental committee is no panacea to perceived woes with respect to the identity of the AEG. Again we see represented at least two members from quasi-government organizations, one from South Africa where environmental regulation is limited (and likely to be more limited with time) and a USEPA contractor. I do not for one moment doubt the expertise and commitment of these individuals but, again, where is industry in this committee and where is the AEG focus?

Should the mandate of the AEG be broadened, I think it would be tragic in all senses for the AEG. The Association is valued by some of its members, myself included, in that its identity is clear and focussed. While much of the Association efforts are not directly in my field, this does not stop my appreciation for its rationale and purpose. I can only offer a non exploration geochemist's opinion that

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Letters

Continued from Page 6

dilution of the focus of the Association would be retrogressive and harmful to the AEG.

Sincerely,

Adrian Smith, Ph.D.

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Dear Sir:

June 15, 1994

I wish to advise that I received my copy of the April 1994 issue of *EXPLORE* on June 13, 1994. The reason may very well be related to the vicissitudes of the U.S. Postal Service and the 4th class delivery, but this late receipt overlaps the deadline for contributions to the next issue and I would appreciate whatever additional efforts *EXPLORE* can initiate to ensure that the membership receives the newsletter promptly.

The April issue is particularly important in view of your urging of the membership to take particular note of the President's Message regarding some potential changes in the objectives and purposes of the Association that will soon be proposed. The AEG and the Journal of Geochemical Exploration have established prominent and respected

reputations for objectiveness within the exploration community. Although the theatre is changing, the application and importance of geochemistry in exploration in today's numerous active frontiers continues to be very high and, in all areas, environmental aspects are becoming integrated into exploration practice. Members whose activities and interests are largely tied to political and social agendas in those countries where most of the AEG membership resides should not forget that the majority of this membership is much more mobile and the majority of the new membership has geochemical exploration needs which can be served by an Association that recognizes this.

It will be a very unfortunate if a successful society like the AEG succumbs to motivations developed in institutions with conflicting ideals instead of acknowledging the needs of the exploration membership that has supported it for almost a quarter century.

Yours sincerely

J. Alan Coope

Dear Sir:

Re: Cross contamination of samples during preparation.

In *EXPLORE* No. 82 Lynda Bloom of XRAL, Toronto, presented data on levels of cross contamination from laboratory pulverisers and suggested that a silica cleaner sample should be pulverised between samples. The level of cross contamination depends on both the type of sample being pulverised and the amount of scratching of the internal surfaces of the pulveriser. Samples that adhere to the surface of the pulveriser parts are the most obvious problem, but this material can be easily removed. Much more difficult to remove is material trapped in scratches on the surface of metal parts. This may persist for several cleaning cycles. There is one simple procedure that can help prevent inter-sample problems, i.e. record the order that samples are prepared, either by preparing samples in the order of their sample numbers (noting the change from one batch to another), or by the operator noting down the sample numbers in the order they are processed. Once the results are obtained, they can be checked against the processing order, looking for instances where there are unusually high results. The sample following a very high grade sample can then be checked for possible cross contamination.

Sample No.	1	2	3	4	5	6	7	8	9	10
ppm Copper	10	12	13	9	1850	26	1	6	10	9

It is highly likely that the true results for sample 6 is not 26, but similar to the other "background" samples. If it is important to know the true result for number 6, another split may be able to be pulverised for a check analysis. Recording the order of preparation of samples seems a very simple idea, but is not practised in many laboratories. Apart from the above situations, recording the order can save a lot of

Continued on Page 7

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Letters

Continued from Page 6

cleaning time. If a batch of samples are known to be from one area and most are likely to be "background" level, cleaning between samples may not be necessary. Where high results could have lead to intersample contamination, a few repeat pulverisings may take much less time that a lot of wasted cleaning time. If the samples are collected and numbered in an organized way, e.g. along grid lines, adjacent samples are likely to be of similar value, lessening the chances of gross inter-sample contamination. This is another instance where geologists/ geochemists should be working to make the analyst's life easier, not work as though one is trying to catch the other out.

Ian Devereux (Dr)
 Manager
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AEG PUBLICITY

Calling All Geochemists

The AEG is mounting a Publicity Program to raise the visibility of the Association to generate new members and

widen our support base. One of the integral parts of this program is the preparation of a series of thematic posters on geochemical exploration and related activities. All AEG members are encouraged to participate in the design and development of these posters.

Suggested topics include: Geochemical Baselines, Analysis, Sampling, Prospecting, Gold, Base Metals, PGE, REE, Environment, Statistical methods. etc.

As a guide, the posters will be on panels that measure approximately 32 x 22 inches. There is no restriction on the number of panels although you might wish to group them in four panel packages for presentation purposes. All material will be returned and full acknowledgement given to authors.

Your Association needs your help to communicate our activities to others! Please send in material in hardcopy or digital form to:

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- 1) The GOLD MEDAL is to be awarded to a person for outstanding scientific achievement in exploration geochemistry, and
- 2) The PAST PRESIDENTS' MEDAL, to be awarded to a member of the Association of Exploration Geochemists for dedicated service to the Association.

The Awards Committee is now seeking nominations for the award of these medals in 1995. Acceptable nominations shall be signed by a minimum of four Voting Members of the Association in good standing and shall include the following:

- (a) A letter of nomination (to be signed by a minimum of four Voting Members);
- (b) A resume or curriculum vitae of the nominee;
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Dr. Eric L. Hoffman
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- (d) Other pertinent documentation relevant to the achievements and/or qualifications of the nominee may include endorsements from other individuals whether or not Voting Members of the Association.

Since members of the Awards Committee may not have personal knowledge of a nominee, the completeness and quality of the nominations will be critical in evaluation and selection.

Nominations should be sent to:

Graham F. Taylor
CSIRO Div. of Exploration and Mining
P.O. Box 136
North Ryde, New South Wales 2113
AUSTRALIA
TEL: (61 2) 887-8737
FAX: (61 2) 887-8183

The deadline for receiving nominations is December 1, 1994.

* See New AEG Medals (EXPLORE Number 75, April 1992) for the history of the Medals and the Guidelines for their award.

NEWS RELEASE

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ANNUAL GENERAL MEETING

On April 27, 1994, The Association of Exploration Geochemists (AEG) held their Annual General Meeting (AGM) at the Federal Center in Denver, Colorado. The meeting was held via conference telephone with Australia, the United States, and Canada. Eleven Fellows were present at the Denver location. This meeting was convened in accordance with By-law 9.06 as a result of the cancellation of the regularly scheduled Annual General Meeting in February, 1994.

I. Call to Order

- A. a. The President called the meeting to order at 3:00 PM (MDT) and established that a quorum was present.

II. Minutes of the 1993 AGM

- A. The President asked if there were any matters arising from the 1993 AGM minutes as published in EXPLORE No. 80.

There were no matters arising.

It was moved (Jeff Jaacks) and seconded (Fred Siegel) that the minutes of the 1993 Annual General Meeting of The Association of Exploration Geochemists, as published in EXPLORE No. 80 and filed with the Secretary, be approved. The President asked for a vote on the motion. Passed unanimously.

III. Presidents Report

- A. The President noted that the Association was in a period of change with the Presidency moving overseas (Australia) for the first time, a move that will make The Association of Exploration Geochemists more international.
- B. In 1992 the Association elected two additional Regional Councillors for Great Britain and Ireland and for Southeast Asia. Additional Regional Councillors are planned for China and Chile. This is an important step for exploration geochemistry and the Association.
- C. In 1992 the Association appointed a Business Manager in Vancouver, BC, Canada to handle the business affairs. This, unfortunately, did not work out and the Business office has been moved to Ontario, Canada, with a new Business Manager being appointed. The new office and Business Manager have been very successful.
- D. The Association has implemented a strategic plan which will look to the future of the AEG. The President thanked Jeff Jaacks for his work on the strategic plan.
- E. The AEG held a successful 16th International Geochemical Exploration Symposium in Beijing, China. This meeting afforded the opportunity to talk with the Chinese exploration geochemistry community and allowed several Regional Councillors to meet and discuss Association business.

- F. The Association is working on an aggressive publicity plan, headed by Peter Rogers that includes a color pamphlet describing the AEG and its representation at several large meetings in North America. These meeting materials will be available for meetings in other countries.
- G. The current Treasurer, Dave Jenkins, has resigned and a new Treasurer, Eion Cameron has been nominated.
- H. The Distinguished Lecturer for the last year has been Jane Plant and she has lectured successfully in Asia and Australia.
- I. The 17th IGES will be held in Townsville, Australia, May 15-19, 1995 and planning is well underway.
- J. The AEG is entering into contract negotiations with Elsevier, the publisher of the Journal of Geochemical Exploration (JGE). The current contract will expire at the end of 1994 and negotiating an acceptable new contract has been difficult.
- K. The President stated that he thought there were great opportunities to extend our membership to include disciplines that are not presently within our scope. This will be part of the AEG's strategic plan and will ensure the continued good health of the Association.
- L. The President thanked the members of Council and the Executive for working so hard to make his presidency a success. He also thanked the new Business Manager, Betty Aresneault, for her excellent efforts in organizing the business affairs of the Association.

IV. Secretary's Report

- A. Business office
- a. The move of the business office to Ottawa, Canada, has improved communications with members and if any member is having a problem with the Association they should contact the new business office immediately.
- b. The membership data base has been transferred to Ottawa and is functioning normally and has been brought up to date.
- B. EXPLORE is being published four times a year and is being sent throughout the world.

Continued on Page 10

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Annual General Meeting

Continued from Page 9

C. Membership

- a. The Association gained over 100 new members during the last year.
- b. A complete membership listing will soon be available from the membership data base.

V. Treasurer's Report

- A. The Treasurer stated that a report from the auditor was expected in about two weeks and a report would follow.
- B. The entire accounting for the AEG has been successfully entered into a computer accounting program and accounts are in balance.
- C. The current balance is \$(US)160,519

VI. Introduction of the 1994 Executive

- A. By-law change
 - a. The President announced that the proposed By-law changes had been overwhelmingly approved by the Fellows of the Association. (126 in favor, 4 against).
- B. Because of the change in the By-laws the President for 1994 would remain the same for the remainder of 1994, the First Vice President would remain Gwendy E.M. Hall, the Second Vice President would remain William B. Coker, the Secretary would remain Sherman P. Marsh, and the nomination for Treasurer would be Eion Cameron.

It was moved (Graham Taylor) and seconded (Gwendy Hall) that the Eion M. Cameron be appointed as Treasurer of The Association of Exploration Geochemists. The President asked for a vote on the motion. Passed unanimously.

VII. Announcement of 1995-97 Councilors

- A. The following candidates for Council have been elected to serve a two year term, starting January 1, 1995
 - a. Barry Smee
 - b. R. Steve Friberg
 - c. Alastair J. Sinclair

- d. Steve Cone
- e. Mark Fedikow

- B. The President will inform the candidates of their election.

VIII. Motion to Destroy Ballots

It was moved (Sherman Marsh) and seconded (Maurice Chaffee) that the 1995-1997 Ordinary Councilor ballots be destroyed. The President asked for a vote on the motion. Passed unanimously.

IX. Appointment of Auditors

It was moved (Sherman Marsh) and seconded (Eion Cameron) that the Treasurer be given permission to reappoint the existing accounting firm of Nemoth Thody and Associates as auditors for The Association of Exploration Geochemists for the year 1994. The President asked for a vote on the motion. Passed unanimously.

X. Other Business

- A. J. Alan Coope made several suggestions for changes to the By-laws in order to make them consistent. The Council will review these suggested changes and make recommended changes to the Fellows in the membership.

XI. Adjournment

It was moved (Fred Siegel) and seconded (Steve Friberg) that the Annual General Meeting of The Association of Exploration Geochemists be adjourned. The President asked for a vote on the motion. Passed unanimously.

The 1993 Annual General Meeting of the Association of Exploration Geochemists was adjourned at 4:15 PM (MDT)

Sherman P. Marsh, Secretary

U.S. Geological Survey
PO Box 25046, MS 973
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TECHNICAL NOTES

Molybdenum distribution in stream sediment grain fractions: A test programme from the Eastern Province, Zambia.

Abstract

A brief geochemical test programme was done to find out why a "routine" stream sediment reconnaissance survey failed to detect outcropping molybdenite mineralisation in gneisses at the Chipirinyuma prospect in the Eastern Province of Zambia.

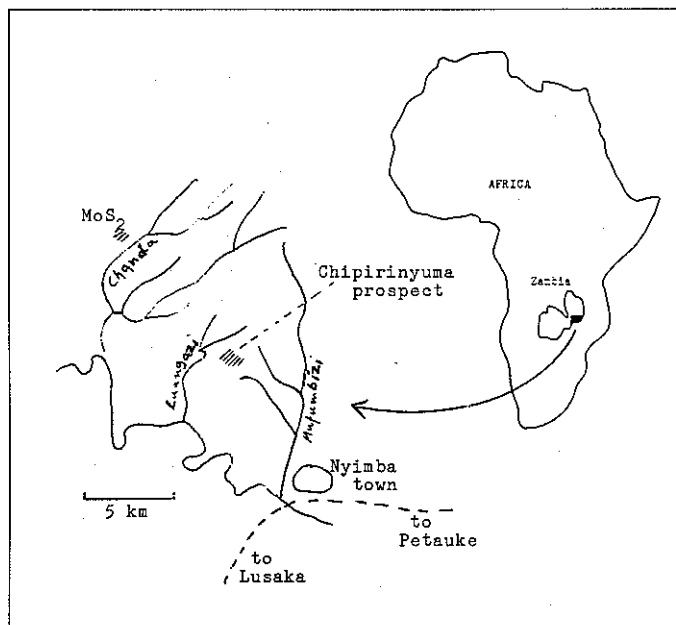


Figure 1. Location Map.

It was found that distribution patterns of molybdenum are best developed in coarser grain size fractions and are almost unrecognisable in the "standard" -80 mesh fraction.

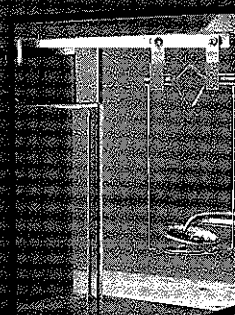
Introduction

During detailed geological mapping of the Zn-Cu prospect of Chipirinyuma, Eastern Province of Zambia (Fig. 1), traces of molybdenite were found in gneisses. Although the mineralisation is outcropping, only very faint and diffuse anomalies were detected in stream sediments during the original geochemical reconnaissance in which the "standard procedure" was applied: sampling at 500m intervals and analysing the -80 mesh fraction, then using the mean + two standard deviations = threshold approach to determine follow-up targets. Consequently, no further work was done as these very faint anomalies were not recognised as such.

A brief study was done to find out why the geochemical stream sediment survey failed to indicate molybdenite mineralisation at the surface, located quite close to the drainage channels of the Luangazi and Mufumbizi rivers and rich enough to be recognised during detailed mapping. The rivers were resampled at 100 m intervals, and various grain size fractions were analysed. *Continued on Page 12*

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Technical Notes

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A neighboring river system, the Chanda river, was included in this test programme as it also had shown some weak and diffuse anomalies in the reconnaissance survey. Follow-up work proved these anomalies to be related to minor molybdenum mineralisation in graphitic gneisses.

It may be noted that not all Mo anomalies in these rivers are explained by the indicated mineralisation. However, more detailed follow-up work would have been beyond the scope of this test and also would most probably have added nothing more to the point.

Sample preparation and analysis

The stream sediment samples were taken from the active part of the river bed, dry at the time of sampling. Four hundred and thirty samples were sieved to three grain size fractions :

- 10 +20 mesh (-1.68 +0.84 mm)
- 20 +80 mesh (-0.84 +0.18 mm)
- 80 mesh (-0.18 mm)

The +10 mesh fraction was discarded.

After grinding, the sample fractions were analysed for Mo by emission spectrography, using the semi-quantitative " straight fire procedure " which does not compensate for any matrix effects. The lower detection limit was 10 ppm. Experiences and various tests over the years have shown that the Mo data provided by this method are fairly reliable and consistent, in relative terms, and are enhanced by a factor of about 10 as compared to AAS determination (after perchloric acid extraction). They may therefore be well used, as relative data, for prospecting purposes.

Results

The analytical data show that the concentration and distribution patterns of molybdenum vary systematically with the grain sizes: the range of concentrations, the arithmetic mean values and, to a much lesser extent, the (local) background values, calculated as the 50th percentile values. Consequently, the contrast figures, the maximum concentration to background ratios, increase systematically with increasing grain sizes (Table 1, Figure 2).

Table 1. Summary of geochemical data of Mo in stream sediments from the Chpirinyuma area - Luangazi, Mufumbizi, Chanda rivers

fraction	-10+20 mesh	-20+80 mesh	-80 mesh
number of samples	430	432	432
concentration range	<10 to 300 ppm	<10 to 200 ppm	<10 to 50 ppm
arithmetic mean value	28 ppm	24 ppm	9 ppm
background value local (1)	14 ppm	13 ppm	11 ppm
maximum contrast (2)	21.4	15.4	4.5
average contrast (3)	2.0	1.8	0.8

- (1) - calculated as the 50th percentile value
- (2) - ratio highest value to background value
- (3) - ratio arithmetic mean value to background value

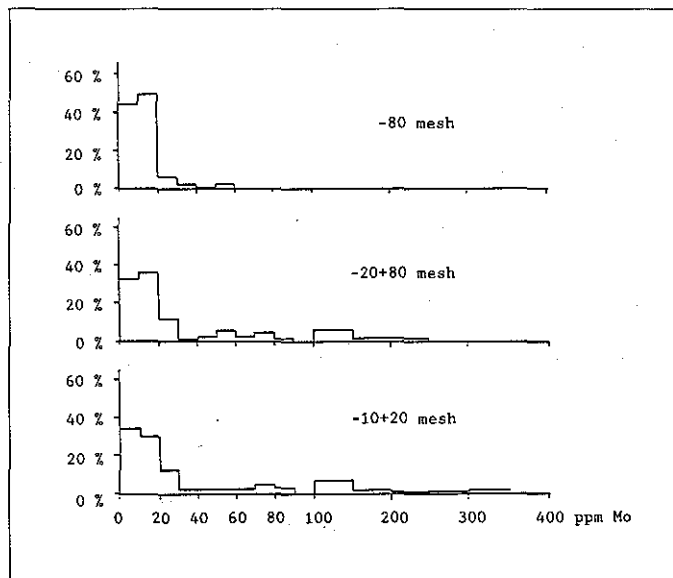


Figure 2. Frequency distributions of Mo concentration in stream sediments from Chipirinyuma area (Luangazi, Mufumbizi, Chanda Rivers).

At this point, note should be taken of the fact that the background values for all three fractions are nearly identical, with only a slight though systematic variation. This may indicate that the matrix of the sample material (quartz, silicates, Fe oxides etc.) contains a rather constant concentration of molybdenum, the "true" background probably unrelated to any mineralisation. The strong variations in the ranges of concentration and hence in the

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Technical Notes

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average values must then be caused by definite grains of Mo minerals (molybdenite) the concentrations of which increase with the grain sizes.

Although the anomalies can be recognised in the -80 mesh fraction, the patterns are rather weak and diffuse, with most anomalous points at or just above the analytical detection limit of 10 ppm Mo. Only few points reach 30, 40 or 50 ppm Mo, in a quite erratic distribution. At a background level of 11 ppm, the maximum contrast is thus about 4.5. On the other hand, both +80 mesh fractions give very distinct, well defined and strong anomalies in all three rivers, with maximum values of 200 to 300 ppm Mo and maximum contrast values of 15 to 21.

The distribution patterns in the -10+20 mesh and the -20+80 mesh fractions seem to be almost identical, although the coarser fraction gives a somewhat more erratic picture (as usual). On the other hand, two distinct differences exist between the -20+80 mesh and the -80 mesh fractions. This fact suggests that the molybdenum is found in the sample grain fraction around 20 mesh (=0.85 mm), possibly as discrete flakes of molybdenite or in rock fragments which have not yet been disintegrated as they are still quite close to their source (Figs. 3 and 4). This dimension of about 0.8 mm also coincides roughly with the common mineral crystal sizes in the gneisses.

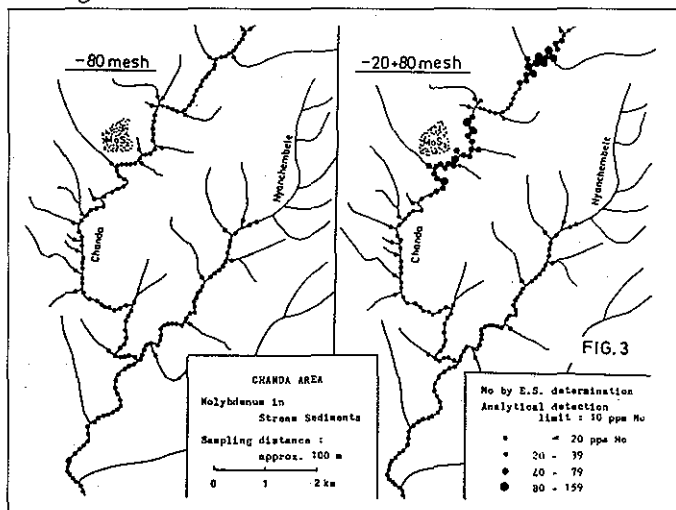


Figure 3. Distribution of Mo in the -80 and -20+80 mesh fractions for the Chanda area.

Conclusions and Discussion

The results and information obtained from this test programme in the Chipirinyuma area show that the -80 mesh stream sediment fraction is not necessarily the best one in prospecting for molybdenum (molybdenite) mineralisation.

Significant anomalies are easily missed in routine reconnaissance work. Also, because of their weak and diffuse representation, they may not receive any attention, especially when the "standard" data interpretation (mean + two standard deviations = threshold) is applied without consideration.

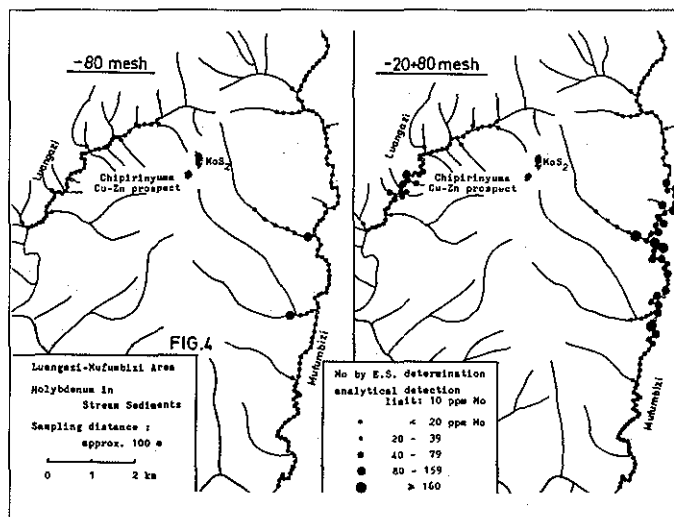
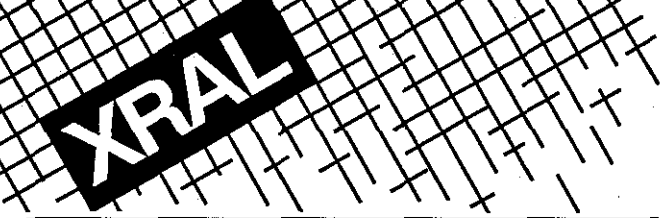


Figure 4. Distribution of Mo in the -80 and -20+80 mesh fractions for the Luangazi-Mufumbizi area.

Later routine soil sampling data suggest that this interpretation of the test results may also apply to the Mo distribution in soils (in the test area).

Consequently, a grain size fraction coarser than 80 mesh should be selected straight away for analysis, preferably

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Technical Notes

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about 20 mesh as indicated by the test as optimal. Which fraction, or fraction range, actually will be chosen will have to be decided after appropriate tests and also according to the overall work programme.

Although sample spacing of 100 m has been quite dense in this test the maps show that routine 500 m spacing would be adequate to detect the anomalies safely in the 20 mesh fraction while quite some luck would be necessary to get any indication at all in the -80 mesh fraction. Therefore, if only the -80 mesh fraction is available (for whatever reasons), then careful consideration has to be given to even very weak and diffuse clusters of slightly elevated values, not forming "anomalies" in the conventional sense, if these clusters make sense geochemically and if they occur in a favourable lithological environment. Naturally, such indications need reconfirmation by resampling a coarser fraction.

This little test may only have confirmed what should be common-place knowledge, but it demonstrated very clearly the importance of preliminary tests and also the pit-falls of "routine procedures" applied without consideration. In this particular case, the crucial factor was the right choice of grain size fractions for analysis in a stream sediment survey. The test also indicated the existence of fairly large mineral grains (molybdenite flakes) close to the source in the drainage system. Apparently, however, these flakes disintegrate quite rapidly and "disappear" into the geochemical dilution or, more correctly in this case, the anomaly level falls below the detection limit of the analytical facilities available. Consequently, no "anomaly" could be formed which was detectable by the "standard procedures".

The experience from the original reconnaissance survey showed, once again, very clearly that there is no such thing as a "standard procedure" in geochemical prospecting (anywhere else?), neither in sampling and analysis nor in data interpretation. Unfortunately, such "standard" approaches appear to be still quite commonly applied indiscriminately to various targets in various environments, and one may wonder how many anomalies, to start with, have thus been missed or calculated away by the "standard" formulas.

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UPCOMING JGE

Volume 51, Number 2 of the Journal of Geochemical Exploration is soon to be published and distributed. An advanced copy of the contents follows.

Volume 51 No. 2

July 1994

CONTENTS

The separation of geochemical anomalies from background by fractal methods

Q. Cheng, F.P. Agterberg and S.B. Ballantyne

A freeze-sampling technique for the collection of active stream sediments used in mineral exploration and environmental studies

M.C. Thoms

Geochemical maps of Finland and Sweden

N. Gustavsson, E. Lampio, B. Nilsson, G. Norblad, F. Ros and R. Salminen

Platinum distribution in soil profiles of the Tulameen ultramafic complex, southern British Columbia

S.J. Cook and W.K. Fletcher

Geomicrobiology applied to mineral exploration in Mexico

A. Melchior, J. Cardenas and L. Dejonghe



CALENDAR OF EVENTS

International, National and Regional Meetings of Interest to Colleagues Working in Exploration and Other Areas of Applied Geochemistry.

■ June 6-10, '94, Mining History, mtg., Golden, CO, by Colorado School of Mines (Mining History Association, Box 15030, Denver, CO 80215)

■ July 17-19, '94, Conf. on Lead and Arsenic Exposure in the Rocky Mountains, Salt Lake City, Utah (Society of Environmental Geochemistry and Health, Rocky Mountain Region, P.O. Box 70915, Salt Lake City, UT 84170, FAX: (801) 322-8398 or (801) 261-2194)

■ Aug. 28-Sept. 3, '94, European Association of Geochemistry Meeting and 4th Goldschmidt Conference, Edinburgh (Dr. B. Harte, Department of Geology and Geophysics, Grant Institute, University of Edinburgh, West Mains Road, Edinburgh, EH9 3JW, UK)

■ Aug. 29-Sept. 1, '94, Proterozoic crystal and metallogenic evolution, Windhoek, Namibia (G.I.C. Schneider, Geological Society of Namibia, TEL: 264-61-37240; FAX: 264-61-228324)

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Calendar of Events

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- Sept. 5-7, '94, **Prospecting in Areas of Glaciated Terrain**, mtg., St. Petersburg, Russia (Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR, UK, TEL: (071) 580-3802; FAX: (071) 436-5388)
- Sept. 8-12, '94, **Joint International Symposium on Exploration Geochemistry**, Irkutsk: a tribute to Academician L.V. Tauson (Pavel Koval, Institute of Geochemistry, P.O.Box 4019, 664033 Irkutsk-33, Russia; TELEX: 133 163 Taiga SU; TEL: 395(2) 46-59-78)
- Sept. 12-15, '94, **3rd Symposium on Environmental Geochemistry**, Kraków, Poland (Dr. hab. Edeltrauda Helios Rybicka, Faculty of Geology, Geophysics and Environmental Protection, University of Mining and Metallurgy, Al. Mickiewicza 30, 30-059, Poland; TEL: (48) 12-333290; FAX: (48) 12-332936)
- Sept. 18-22, '94, **Geoanalysis '94, International Symposium on Analysis of Geological and Environmental Materials**, UK (Doug Miles, British Geological Survey, Keyworth Nottingham NG12 5GG, UK; TEL: 44-36-602-3100; FAX: 44-36-602-3200)
- Sept. 18-22, '94, **Mineral Exploration '94** (including a 1-day symposium on **Latin American Mineral Deposits**), Lake Tahoe, NV, U.S.A. (Dr. Phil Newall & Dr. Alan Butcher, CSM Associates Ltd., Pool, Redruth, Cornwall TR15 3SE, UK; TEL: 44 (0)209 717724; FAX: 44 (0)209 716977)
- Sept. 19-21, '94, **Exploration and Mining Geology of World Class Deposits**, Sudbury, Ontario, Sudbury Geological Discussion Group, and Canadian Institute of Mining, Metallurgy and Petroleum (Ruth Debicki, MNDM, A3-933 Ramsey Lake Road, Sudbury, Ontario P3E 6B5 Canada; TEL: (705) 670-5627; FAX: (705) 670-5622)
- Sept. 26-27, '94, **Manganese Mineralization: Geochemistry and Mineralogy of Terrestrial and Marine Deposits**, London, England (Dr. Keith Nicholson, School of Applied Sciences, Robert Gordon University, Aberdeen AB1 1HG, Scotland; TEL: 0224-262821/262802, FAX: 0224-262828)
- Oct. 2-5, '94, **1994 Annual Meeting of the Geothermal Resource Council (GRC)**, theme: Restructuring the Geothermal Resource Council, Salt Lake City, UT, USA (Philip M. Wright, Geothermal Resource Council, PO Box 1350, Davis, CA 95617-1350, TEL: (916) 758-2360, FAX: (916) 758-2839)
- Oct. 5-7, '94, **Porphyry Copper Deposits from Alaska to Chile Symposium**, Tucson, AZ, by Arizona Geological Society, Society for Mining, Metallurgy and Exploration, and U.S. Geological Survey (Jim Laukes, The University of Arizona Extended University, 1955 E. Sixth St., Tucson, AZ 85719-5224; TEL: (800) 955-8632; FAX: (602) 621-3269; E-mail

(Internet): jlaukes.ccit.arizona.edu)

- Oct. 25-27, '94, **Geological Society of America, ann. mtg.**, Seattle, WA (Vanessa George, G.S.A., Box 9140, Boulder, CO 80301; TEL: (303) 447-2020)
- Oct. 26-29, '94, **4th Asia Pacific Mining Conference and Exhibition**, Jakarta, Indonesia (Warjono Soemodinoto or Joe Widartoyo, IMA Secretariat, Jl. Prof. Dr. Supomo SH No.10, Jakarta 12870, Indonesia; TEL/FAX: 62 (021) 828-0763 / 830-3632)
- Oct. 30-Nov. 1, '94, **RANDOL Latin American Mining Opportunities**, conference, Vancouver, British Columbia (RANDOL International LTD., 21578 Mountsfield Drive, Golden, CO 80401, TEL: (303) 526-1626; FAX: (303) 526-1650)
- Feb. 20-25, '95, **South Asia Geological Congress**, Colombo, Sri Lanka (N.P. Wijayananda, GEOSAS II Secretariat, NARA, Crow Island, Mattakkuliya, Colombo 15, TEL: 941-522008; FAX: 941-522932)
- Mar. 6-9, '95, **Society for Mining, Metallurgy and exploration**, ann. mtg., Denver (SME, Box 625002, Littleton, CO, 80162-5002, TEL: (303) 973-9550; FAX: (303) 979-3461)
- Apr. 3-7, '95, **Centennial Geocongress 1995**, Johannesburg, The Geological Society of South Africa (The Congress Secretariat, Centennial Geocongress, P.O. Box 36815, Johannesburg 0102, South Africa; TEL/FAX: 27-12-47-3398)
- Apr. 10-13, '95, **Geology and Ore Deposits of the American Cordillera**, Geological Society of Nevada Symposium III (Bob Hatch, Geological Society of Nevada, P.O. Box 12021, Reno NV 89510; TEL: (702) 323-4569; FAX: (702) 323-3599)
- May 15-19, '95, **17th International Geochemical Exploration Symposium, "Exploring the Tropics"**, Townsville, Queensland, Australia (Russell Myers, 17 IGES, National Key Centre in Economic Geology, James Cook University, Townsville, Queensland 4814, Australia; TEL: 61 (77) 814486; FAX: 61 (77) 815522)

Continued on Page 16

Shea Clark Smith

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Calendar of Events

Continued from Page 15

- May 24-26, '95, 5th V.M. Goldschmidt Conference, University Park, PA, USA (Technical Program Chair, Mike McKibben, TEL: (909) 787-3444; FAX: (909) 787-4324; E-mail: McKibben@UCRAC1.UCR.EDU)
- June 3-6, '95, International Field Conference on Carbonate-hosted Lead Zinc Deposits, SEG Anniversary Field Conference (David Leach or Martin Goldhaber, USGS, Branch of Geochemistry, MS 973, P.O. Box 25046, Federal Center, Denver, CO 80225, USA, FAX: (303) 236-3200, e-mail: dleach@helios.cr.usgs.gov)
- June 7-9, '95, African Mining '95, Windhoek, Namibia (IMM, 44 Portland Place, London W1N 4BR, UK; TEL: (071) 580-3802; FAX: (071) 436-5388)
- Sept. 4-8, '95, International Symposium on Environmental Biogeochemistry, Rio de Janeiro, Brazil (Symposium Secretariat, Prof. Luis Henrique Melges, FAX: 55-(0)21-248-4870; E-mail: iseb@bruerj)
- Nov. 6-9, '95, Geological Society of America, ann. mtg., New Orleans, LA (Vanessa George, 3300 Penrose Place, Boulder, CO 80301; TEL: (303) 447-2020; FAX: (303) 447-1133)

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Fred Siegel

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Washington, DC 20052
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NEW MEMBERS

To All Voting Members:

Pursuant to Article Two of the Association's By-Law No.1, names of the following candidates, who have been recommended for membership by the Admissions Committee, are submitted for your consideration. If you have any comments, favorable or unfavorable, on any candidate, you should send them in writing to the Secretary within 60 days of this notice. If no objections are received by that date, these candidates will be declared elected to membership. Please address comments to Sherman P. Marsh, Secretary AEG, U.S. Geological Survey, Mail Stop 973, Box 25046, Federal Center, Denver, Colorado 80225, U.S.A.

Editors note: Council has decided that all new applicants will receive the journal and newsletter upon application for membership. The process of application to the Nepean office, recommendation by the Admissions Committee, review by the Council, and publication of applicant's names in the newsletter remains unchanged.

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Barker, Michael C.
Geologist
Great Southern Mines
Kalgoorlie, WA, Australia

Chen, Hangxin
Geochemist
IGGE
Langfang, Hebei, China

Continued on Page 17

New Members

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Fox, Kevin P.
Exploration Manager
Rio Tinto Zimbabwe
Amby, Harare, Zimbabwe

Henckel, Johannes
Gold Fields
Oberholzer, South Africa

Li, Weitian
Director, Assoc. Prof.
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IGGE
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Rivera, Sergio
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RECENT PAPERS

This list comprises titles that have appeared in major publications since the compilation in EXPLORE Number 83. Journals routinely covered and abbreviations used are as follows: Economic Geology (EG); *Geochimica et Cosmochimica Acta* (GCA); the USGS Circular (USGS Cir); and Open File Report (USGS OFR); Geological Survey of Canada Papers (GSC Paper) and Open File Report GSC OFR); Bulletin of the Canadian Institute of Mining and Metallurgy (CIM Bull); Transactions of Institute of Mining and Metallurgy, Section B: Applied Earth Sciences (Trans IMM). Publications less frequently cited are identified in full. Compiled by L. Graham Closs, Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO 80401-1887, Chairman AEG Bibliography Committee. Please send new references to Dr. Closs, not to EXPLORE.

- Aleksandrov, S.M., 1994. Dolomite skarning at granitic-magma contacts. *Geochem. Intern.* 31(1): 32-51.
- Appelo, C.A.J. and Postma, D., 1993. *Geochemistry, Groundwater and Pollution*. Balkema. 536 p.
- Basuki, A., Sumanagara, D.A. and Sinambela, D., 1994. The Gunung Pongkor gold-silver deposit, West Java, Indonesia. *J. Geochem. Explor.* 50: 371-391.
- Botros, N.S., 1993. The possible occurrence of placer gold in areas lacking quartz veins in Egypt. *J. Geochem. Explor.* 49(3): 287-290.
- Bowell, R.J., 1994. Sorption of arsenic by iron oxides and oxyhydroxides in soils. *Applied Geochem.* 9(3): 279-286.
- Bowell, R.J., Gize, A.P. and Foster, R.P., 1993. The role of fulvic acid in the supergene migration of gold in tropical rain forest soils. *GCA* 57(17): 4179-4190.
- Boyle, D.R., Cox, D.L. and Vandebek, R.R., 1993. Groundwater sampling methodology for mineral exploration in glaciated terrain using reverse circulation overburden drilling. *J. Geochem. Explor.* 49(3): 213-231.
- Braun, J.J. and Pagel, M., 1994. Geochemical and mineralogical behavior of REE, Th and U in the Akongo lateritic profile (SE Cameroon). *Catena* 21(2/3): 173-177.
- Brewis, T., 1994. Mineral reserves. *Min. Mag.* (Feb.): 86-89.
- Bulnayev, K.B., 1993. Vertical geochemical zoning of fluorite deposits in Transbaykalia. *Geochem. Intern.* 30(6): 141.
- Callahan, J.E., Miller, J.W. and Craig, J.R., 1994. Mercury pollution as a result of gold extraction in North Carolina, USA. *Applied Geochem.* 9(2): 234-241.
- Carlile, J.C. and Mitchell, A.H.G., 1994. Magmatic areas and associated gold and copper mineralization in Indonesia. *J. Geochem. Explor.* 50: 91-142.
- Champigny, N. and Armstrong, M., 1993. Geostatistics for the estimation of gold deposits. A review and survey of current practice up to 1989. *Mineralium Deposita*. 28(4): 279.
- Cooke, R., Warren, A. and Goudie, A., 1993. *Desert Geomorphology*. UCL Press (London). 526 p.
- Dahlkamp, F.J., 1993. *Uranium Ore Deposits*. Springer-Verlag. 460 p.
- Ettner, D.C., Bjorlykke, A. and Andersen, T., 1993. Fluid evolution and Au-Cu genesis along a shear zone: a regional fluid inclusion study of shear zone-hosted alteration and gold and copper mineralization in the Kauto Keino greenstone belt, Finnmark, Norway. *J. Geochem. Explor.* 49(3): 233-267.
- Folger, P.F., Goldfarb, R.J. and Cieutat, B.A., 1992. *Geochemical Survey of the Baird Mountains 1° x 3° Quadrangle, Northwest Alaska*. USGS Bull. 2003, 77 p.
- Freyssinet, Ph., 1994. Gold mass balance in lateritic profiles from savanna and rain forest zones. *Catena* 21 (2/3): 159-172.
- Gasparini, C., 1993. *Gold and Other Precious Metals*. Springer-Verlag. 335 p.
- Grechishnikov, A.V., 1994. Defining geochemical criteria for predicting gold-silver mineralization. *Geochem. Intern.* 31(1): 104-109.
- Gushchina, L.V., Belevantsev, V.I. and Obolenskiy, A.A., 1994. Hg_{aq}^0 in mercury transport by hydrothermal solutions. *Geochem. Intern.* 31(1): 93-99.
- Hale, M. and Porto, C.G., 1994. Geomorphological evolution and supergene gold at Posse, Goias State, Brazil. *Catena* 21(2/3): 145-157.
- Heroux, Y. and Chagnon, A., 1994. Petrographie de la matiere organique et assemblages des mineraux des argiles du caracterisation des anomalies associees aux gites. *Explor. Mining Geol.* 3(1): 53-65.
- Heroux, Y., Chagnon, A. and Savard, M.M., 1994. Anomalies des proprietes de la matiere organique et des assemblages argileux associes augite de Pb-Zn de Gays River, Nouvelle-Ecosse, Canada. *Explor. Mining Geol.* 3(1): 67-69.
- Horan, M.F., Morgan, J.W., Grauch, R.I., Coveney, R.M., Jr., Murowchick, J.B. and Hulbert, L.J., 1994. Rhenium and osmium isotopes in black shales and Ni-Mo-PGE-rich sulfide layers, Yukon territory, Canada and Hunan and Guizhou Provinces, China. *GCA* 58(1): 257-265.
- Hunter, R.L. and Mann, C.J., (Eds.) 1992. *Techniques for Determining Probabilities for Geologic Events and Processes*. Oxford Univ. Press. 364 p.

Recent Papers

Continued from Page 18

- Iglesias, J.G. and Loredó, J., 1994. Geological, geochemical and mineralogical characteristics of the Asturias Fluorspar District, Northern Spain. *Explor. Mining Geol.* **3**(1): 31-37.
- James, K.P., 1994. The mercury "tromel" mill: an innovative gold recovery technique, and a possible environmental concern. *J. Geochem. Explor.* **50**: 493-500.
- Jobson, D.H., Boulter, C.V. and Foster, R.P., 1994. Structural controls and genesis of epithermal gold-bearing breccias at the Lebung Tandai mine, Western Sumatra, Indonesia. *J. Geochem. Explor.* **50**: 409-428.
- Kavalieris, I., 1994. High Au, Ag, Mo, Pb, V. and W content of fumarolic deposits at Merapi volcano, central Java, Indonesia. *J. Geochem. Explor.* **50**: 257-278.
- Kimura, T., 1993. Geochemistry of trace elements in coal. *Resource Geology* **43**(239): 187.
- Koljonen, T., (Ed.) 1992. *Geochemical Atlas of Finland, Part 2: Tills*. Geological Survey of Finland. 218 p. + map.
- Laznicka, P., 1993. *Precambrian Empirical Metallogeny*. Elsevier. 1622 p.
- Llorea, S.M., 1993. Metallogeny of supergene cobalt mineralization, New Caledonia. *Aust. J. Earth. Sci.* **40**(4): 377-386.
- Lubis, H., Prihatmoko, S. and James, L.P., 1994. Bulagidun prospect: a copper, gold and tourmaline bearing porphyry and breccia system in north Sulawesi, Indonesia. *J. Geochem. Explor.* **50**: 257-278.
- MacDonald, G.D. and Arnold, L.C., 1994. Geological and geochemical zoning of the Grasberg, Igneous Complex, Irian Jaya, Indonesia. *J. Geochem. Explor.* **50**: 143-178.
- Manning, D.C., Hall, P.L. and Hughes, C.R., (Eds.), 1993. *Geochemistry of Clay-Pore Fluid Interactions*. Chapman & Hall.
- Marcoux, E. and Milesi, J-P., 1994. Epithermal gold deposits in West Java, Indonesia: geology, age and crustal source. *J. Geochem. Explor.* **50**: 393-408.
- Marsh, S.P., 1994. *Exploration Geochemistry*. *Geotimes* **39**(2): 22-23.
- Martycak, K., Zeman, J. and Vacek-Vesley, M., 1994. Supergene processes on ore deposits - a source of heavy metals. *Environ. Geol.* **23**(2): 156-165.
- McClenaghan, M.B., 1994. Till geochemistry in areas of thick drift and its applications to gold exploration, Matheson Area, Northeastern Ontario. *Explor. Mining Geol.* **3**(1): 17-30.
- Meldrum, S.J., Aquino, R.S., Gonzales, R.I., Burke, R.J., Suyadi, A., Irianto, B., and Clarke, D.S., 1994. The Batu Hijau porphyry copper-gold deposit, Sumbawa Island, Indonesia. *J. Geochem. Explor.* **50**: 203-220.
- Mertig, H.J., Rubin, J.N. and Kyle, J.R., 1994. Skarn Cu-Au orebodies of the Gunung Bijih (Ertsbert) district, Irian Jaya, Indonesia. *J. Geochem. Explor.* **50**: 179-202.
- Mogollon, J.L. and Bifano, C., 1994. Topography, weather and human activity effects on the behavior of metallic elements in a tropical catchment. *Chem. Geol.* **114**(1/2): 69-82.
- Mullins, E., 1994. Introduction to control charts in the analytical laboratory - Tutorial Review. *Analyst* **119**(3): 369-375.
- NRC, 1993. *Solid-Earth Sciences and Society*. Nat. Acad. Sci. Press. 346 p.
- Perello, J.A., 1994. Geology, porphyry Cu-Au, and epithermal Cu-Au-Ag mineralization of the Tombulilato district, North Sulawesi, Indonesia. *J. Geochem. Explor.* **50**: 221-256.
- Pieters, C.M. and Englert, P.A.J. (Eds.), 1993. *Remote Geochemical Analysis: Elemental and Mineralogical Composition*. Cambridge Univ. Press. 594 p.
- Ponce, B.F., Pingitore, N.E., Jr., Hoffer, J.M., Anthony, E.Y., and Woronow, A., 1993. Discrimination of topaz rhyolites by major-element composition: a statistical routine for geochemical exploration. *J. Geochem. Explor.* **49**(3): 269-285.
- Schellmann, W., 1994. Geochemical differentiation in laterite and bauxite formation. *Catena* **21**(2/3): 131-143.
- Schwab, F., Mehrtens, M.B. and Cook, d.R., 1994. Gold mining due diligence. *Min. Mag. (Feb.)*: 83-85.
- Seeley, J.B. and Senden, T.J., 1994. Alluvial gold in Kalimantan, Indonesia: A colloidal origin? *J. Geochem. Explor.* **50**: 457-478.
- Sewell, D.M. and Wheatley, C.J.V., 1994. Integrated exploration success for gold at Wetar, Indonesia. *J. Geochem. Explor.* **50**: 337-350.
- Sewell, D.M. and Wheatley, C.J.V., 1994. The Lerokis and Kali Kuning submarine exhalative gold-silver-barite deposits, Wetar Island, Maluku, Indonesia. *J. Geochem. Explor.* **50**: 351-370.
- Shalamov, V.I., Popova, M.V. and Savitskaya, L.V., 1994. Content of platinum-group elements in carbonaceous rocks. *Geochem. Intern.* **31**(1): 100-103.
- Sheahan, P. and Janse, B., 1994. Diamond Details (technical information on diamond exploration). *Can. Min. J.* **115**(1): 19-23.

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Recent Papers

Continued from Page 19

- Sillitoe, R.H., 1994. Indonesian mineral deposits - introductory comments, comparisons and speculations. *J. Geochem. Explor.* **50**: 1-11.
- Snow, D.D. and Spalding, R.F., 1994. Uranium isotopes in the Platte River drainage basin of the North American High Plains Region. *Applied Geochem.* **9**(3): 271-278.
- Tarkhanov, A.V., Leonenko, M.P. and Skadum, L.Z., 1993. A REE geochemical anomaly at the Zhelta Reka uranium deposit. *Geochem. Intern.* **30**(5): 84-94.
- Taylor, W.R., Rock, N.M.S., Groves, D.I., Perring, C.S. and Golding, S.D., 1994. Geochemistry of Archean shoshonitic lamprophyres from the Yilgarn Block, Western Australia: Au abundance and association with gold mineralization. *Applied Geochem.* **9**(2): 197-222.
- Thompson, J.F.H., Abidin, H.Z., Both, R.A., Martosuroyo, Rafferty, W.J. and Thompson, A.J.B., 1994. Alteration and epithermal mineralization in the Masupa Rio volcanic center, Central Kalimantan, Indonesia. *J. Geochem. Explor.* **50**: 429-456.
- Todorov, T.A., 1993. Gold and trace elements in the main ore-forming minerals of hydrothermal deposits in the western Carpathians. *Mineralia Slovaca.* **25**(3): 235-248.
- Tossell, J.A. and Baughan, D.J., 1992. *Theoretical Geochemistry: Application of Quantum Mechanics in the Earth and Mineral Sciences.* Oxford Univ. Press. 514 p.
- Turner, S.J., Flindell, P.A., Hendi, D., Hardjana, I., Lauricella, P.F., Lindsay, R.P., Marpaung, B., and White, G.P., 1994. Sediment-hosted gold mineralization in the Ratatotok district, North Sulawesi, Indonesia. *J. Geochem. Explor.* **50**: 317-336.
- Uchida, K. and Inoue, T., 1993. A practical alteration zoning based upon in situ reflective spectroscopy measurements of rock samples in the vicinity of the Omori mine, Shimane Prefecture, Japan. An examination of the method. *Resource Geology* **43**(238): 65-78.
- Valeton, I., 1994. Element concentration and formation of ore deposits by weathering. *Catena* **21**(2/3): 99-129.
- Van Leeuwen, T.M., 1994. 25 years of mineral exploration and discovery in Indonesia. *J. Geochem. Explor.* **50**: 13-90.
- Van Leeuwen, T.M., Taylor, R., Coote, A. and Longstaffe, F.J., 1994. Porphyry molybdenum mineralization in a continental collision setting at Malala, northwest Sulawesi, Indonesia. *J. Geochem. Explor.* **50**: 279-315.
- Vasconcelos, P.M., Brimhall, G.H., Becker, T.A. and Renne, P.R., 1994. $^{40}\text{Ar}/^{39}\text{Ar}$ analysis of supergene jarosite and alunite: Implications to the paleoweathering history of the western USA and West Africa. *GCA* **58**(1): 401-420.
- Warren, L.A. and Zimmerman, 1994. The importance of surface area in metal sorption by oxides and organic matter in a heterogeneous natural sediment. *Applied Geochem.* **9**(3): 245-254.
- Wenwu, H., 1993. Physical-chemical conditions for the ore-forming process of the Hetai gold deposit in Guangdong

province and ore-prospecting directions. *Mineral Deposits* **12**(2): 128-136.

- Williams, P.A., 1990. *Oxide Zone Geochemistry.* Ellis Horwood. 286 p.
- Xu, J., Sun, W. and Jia, S., 1994. Mineralogical and wallrock alteration at the Jinqingding gold deposit in Jiaodong Peninsula, China. *Explor. Mining Geol.* **3**(1): 1-8.
- Yusupov, R.G., 1994. Geochemical features and accessory-mineral parageneses for orogenic-regional diamonds: The Central and Southern Tion Shan. *Geochem. Intern.* **31**(1): 83-92.
- Zang, W. and Fyfe, W.S., 1993. A three-stage genetic model for the Igarape Bahia lateritic gold deposit, Caragias, Brazil. *EG* **88**(7): 1768-1776.



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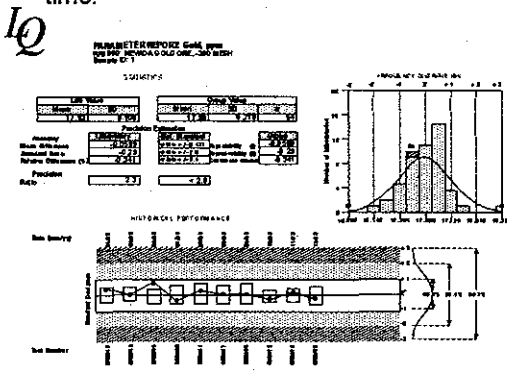
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