

Mineral Exploration in the Iberian Pyrite Belt

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Introduction

The Iberian Pyrite Belt (IPB) occupies the south-western corner of the Iberian Peninsula, extending from Seville, in Spain, to the Atlantic Ocean south of Lisbon, in Portugal, making up an arcuate belt of about 230 km in length and 40 km in width (Fig. 1). It is a world class ore province and one of the most important metal reservoirs in Western Europe. It is characterized by giant and supergiant massive sulphide deposits, including, among others, Riotinto, Neves Corvo, Aljustrel, Tharsis, Aznalcóllar, total reserves of which exceed 1400 Mt. The mining history in the region began in pre-Roman times and persisted until nowadays with minor idle periods (Pinedo Vara, 1963). Early mining targets were mainly copper and silver, won from supergene enrichment zones of massive sulphides and from some vein-type deposits. During Roman times, active mining operations have

been reported in Riotinto, Tharsis, Sotiel, Aljustrel and many other localities. This is corroborated by important archaeological finds, including the two metal tablets discovered at Aljustrel (Portugal), which record the Roman mining law for the Boetica province. The period of greatest mining development coincides with the Industrial Revolution during the nineteenth and early twentieth centuries. At that time, more than sixty mines were operating for copper, sulphur, gold and silver. Massive sulphides are currently mined at Neves Corvo (Cu, Sn), in Portugal, and Sotiel Coronada (S, Cu, Pb, Zn), Aznalcóllar (S, Cu, Pb, Zn, Ag) and Tharsis-Filón Norte (S), in Spain. Oxidized ores are exploited for gold and silver at Riotinto and Tharsis-Filón Sur.

(*See to page 7*)

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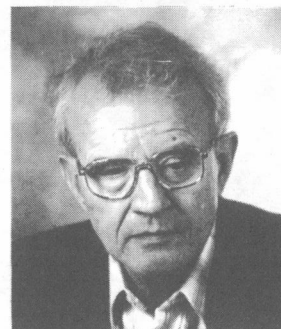
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◆ What is M.I.R.O.?

see page 13

From the President of the SGA

E. F. Stumpfl, Institute of Mining Geology, University of Leoben, Austria



It was a pleasure to take over the presidency of our Society for the 1997/98 term at a time when the level of activities is at an unprecedented high, when membership is growing and when our journal, *Mineralium Deposita*, is strengthening its position amongst the leading geoscience publications. All this did not happen by accident: I would like to express my special thanks to the past President, Zdenek Johan, for his dynamic leadership, to our treasurer, Peter Herzig, for superb management of our finances, to Maurice Pagel, our Secretary, who administered all these manifold activities in his usual understated manner and with great efficiency, to David Rickard, the Editor, for making *Mineralium Deposita*, and thereby our Society, so attractive for new members, and to Lluís Fontboté for an excellent public relations job by creating and producing the SGA News. Thanks are also due to all members of Council for their constructive ideas and for their excellent co-operation, which includes enthusiastic participation in Council meetings, even if they take place in remote Alpine villages, such as Seckau, Austria. All this is no reason to lean back and relax but it should stimulate us to maintain this high output and to secure for our Society the place it deserves amongst the world's leading geoscience associations. Where is our Society going, and what should we try to achieve in the years to come? There are several points which I consider important. The first is underlined by the theme of our Biennial Meeting in Turku: research and exploration - where do they meet? Indeed, where?

There is no need to elaborate the fact that many of us cooperate closely with mining and exploration companies. In this context, problems from the distribution of silver carriers in base metal ores, to structural control of mineralization and to regional models of ore genesis are being addressed. This work should be intensified and our Society should take on a leading role in this context. It is important not only to attack problems of interest to researchers - we should listen to what is of interest to industry and adjust our research accordingly. Members of our Society are increasingly asked to deal with problems at the interface of mining and smelting activities, environmental issues, geochemistry and mineralogy. The International Kola Project is a case in point; it will be highlighted at the Turku meeting.

Another important aspect is the teaching of mineral deposits geology. We should not complain about problems with the harvest if the seeds are not protected. Teaching in mineral deposits geology is, presently, a weak point in many universities, certainly in Western Europe and in North America. We cannot allow the temporary fluctuation of exploration and mining activities, and associated provincial thinking, to further erode the spectrum and the standard of economic geology courses in the curricula of our universities. A sound understanding of earth resources in a global context does not start at the Ph.D. level - it must be presented to undergraduates and to pupils in secondary schools. Our Society should take the initiative here by organizing short courses for earth science teachers, stressing the role of mineral raw materials and using all modern tools, including video, CD-ROMS and interactive computer information in the process. A further step might be to consider the delegation of SGA members to teach mineral deposits courses in universities which do not provide for such activities. These problems are not limited to Europe - they are of global significance and they also concern our colleagues in Australia and Canada.

Last but not least we should be aware of the fact that one of the very roots of the success of our Society, international attitudes and global activities, is under attack these days from the dark forces of provincialism, nationalism and fundamentalism. The deplorable manifestations of these attitudes are manifold: restrictions on the export of rock and ore samples; and even on the export of geological information, have been (re-)introduced in many countries, publication in international journals is still hindered, or at least not encouraged, by some local science matadors, and we are still far from full acceptance of English as the language of science. One of our eminent past-presidents, Ian Plimer, is - while these lines are being written - locked in legal battle with the Australian creationist movement, a movement which tries to institutionalize contempt for the achievements of the earth sciences by insisting that the Earth is just over 6000 years old.

Let us, therefore, strive for open, global communication, let us speak up for free flow of information, data, samples, whenever and wherever we are confronted with restrictive attitudes and practices. Freedom is one of the human rights of science, and here we can certainly rest assured of the support of the founding fathers of our Society. ♦

SGA News

N.º 3 May 1997

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SGA News is a publication of SGA (Society of Geology Applied to Mineral Deposits) and appears twice a year. Articles of SGA News can be read also in the SGA homepage on Internet: <http://www.immr.tu-clausthal.de/sga.html> maintained by Bernd Lehmann and Jan Heinhorst, Institut für Mineralogie, TU Clausthal, Adolph-Roemer str. 2a, D-38678 Clausthal-Zellerfeld; Fax: +49 5323 72 2321; e-mail: heinhorst@immr.tu-clausthal.de

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Information for contributors

Items for publication may be sent to: SGA News (see address below). Manuscripts should be sent in computer diskette in Macintosh or DOS formats using Microsoft Word or WordPerfect. Please always send a paper copy and indicate the format you are using.

Deadline for SGA News

Nr. 4:

30 SEPTEMBER 1997

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NEWS OF THE SOCIETY

4th Biennial SGA Meeting, Turku, Finland, August 11-13, 1997: last minute's information

The 4th Biennial SGA Meeting will be held in Turku, Finland, August 11—13, 1997. The organizers have been delighted of the indicated interest. We got more than 400 pre-registrants, and the number of registered participants is growing every day. 267 abstracts have been offered for presentation. We will publish extended abstracts of the meeting presentations of which all participants will get a copy at the registration. The preliminary abstracts, arrived within the first two weeks of February, were reviewed and the authors were informed about the conditions of acceptance by the end of February. The following list indicates the distribution of abstracts between the different sessions:

Session	Number of abstracts
1 organics and mineral deposits	25
2 gold and precious metals	60
3 sea floor hydrothermal deposits	12
4 deposits related to mafic-ultramafic rocks	39
5 ores in sedimentary environment	30
5b deposits in felsic intrusives	24
6 industrial minerals	19
7 diamonds and exploration	7
8 metamorphism of ore deposits	14
9 ore deposit modelling	13
10 environmental aspects	12
11 general themes	12
Total	267

The gold session seems to be the most successful, but the distribution among all sessions is quite good. The authors have well noted the theme of the Meeting, and the exploration viewpoint has been emphasized in many contributions. Session 1 "Organics and mineral deposits" (renamed session!) will be sponsored by the IGCP Project 357, and session 5b "Silicic magmatism and ore formation" will be sponsored by the newly founded IGCP Project 373 (leaders Dr. R. Seltnann and Prof. A. Kremenetsky). IAGOD/ WGOM is the sponsor of session 8 and the leaders have been active in organization of the session programme. If all the accepted abstracts will be corrected and finalized according to the instructions of the Abstracts Committee and of the Publisher, there will be 124 oral presentations and 143 posters, and a few new oral presentations are still to be coming, e.g. in session 7, where the geology and mineralogy of the newly discovered Finnish kimberlites will be described.

Due to the considerable number of oral presentations, we have to organize four parallel sessions. We have a number of distinguished keynote lecturers (R.E.T. Hill, A.J.A. Janse, A.J.Naldrett, J.Pasava, J.A.Plant, S.D.Scott, R. Sillitoe, N.White, and others) and as many of the topics will be of general interest, we plan to have a keynote session common for all participants whereas some of the keynote lectures will be held in the beginning of the particular sessions. Two hours on Tuesday afternoon will be allocated for the poster session. The definitive programme will be settled in May when we will know the final titles of the presentations. We intend to send the programme to all authors and registered participants.

We offered four pre-meeting (A) and four post-meeting (B) field trips to visit different mining areas of Finland, Sweden and NW Russia. Field trip A1 will concern Archaean Metallogeny of eastern Finland and the Kostamuksha iron ore deposit, and will visit the Siilinjärvi Archaean carbonatite-hosted P-deposit, a soapstone industry built on an Archaean talc-carbonate rock, Late-Palaeozoic kimberlites and the Kostamuksha iron mine in Russia. Field trip A2 will visit the Proterozoic massive sulphide deposits, lode gold and Ni-Cu sulphides in the Skellefte field, Sweden and western Finland. B3(=A3) is a two day trip to gold and base metal deposits in southwestern Finland. A4 is the IGCP Project 373 field trip to visit the metamorphosed black shales and associated ore deposits in eastern Finland. Field trip B1 will visit the ore deposits in northern Finland and Sweden: the iron mine of Kiruna and the Aitik Cu-Au mine will be visited in Sweden and the Pahtavaara gold mine in northern Finland. Field trip B2 will study the ore deposits of the Bergslagen area, Central Sweden, and B4 will travel to the Kola Peninsula, northwestern Russia, to study the Pechenga Ni-Cu deposit, Olenegorsk BIF-hosted iron ore, the Khibiny alkaline intrusion (P-deposit) and the Monchegorsk and Imandra layered mafic igneous complexes.

The field trips have had a variable success. Field trips A2 (fully booked), A4 (20 participants), B1 (24), B3 (14) and B4 (22) have been most successful, but, apart from A2, there are still free places for more participants. By April 21 we reached what we consider to be the 50% of foreseen participants registered and on that basis we anticipate that almost all of the field trips will be realized except B2 and A1 which will probably be cancelled. Field trip A3 is definitely cancelled, but participants can join field trip B3. By April 21 we had 32 registrations for the Gold Workshop and 16 for the Isotope Geology Short Course. Also the social events will be well attended including the accompanying person's programme and the conference banquet (151 participants registered, with a number still growing).

CHANGE OF ADDRESS FORM

If you have changed or will change in the next future your address please fill in this form and send it to:

Peter M. Herzig, SGA Treasurer - Institut für Mineralogie, TU Bergakademie Freiberg, Brennhausgasse 14 - D-09596 Freiberg, Germany; Tel: +49 3731 39-2662/2626; Fax: +49 3731 39-2610; email herzig@mineral.tu-freiberg.de

Name:

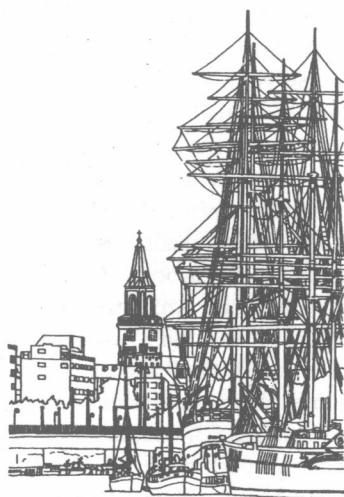
Old address:

Complete new address (including phone, fax and e-mail)

The deadline for registration and payment of the excursion fees is May 15, 1997 and the participants are kindly asked to contact the Congress Office and send the registration forms (Congress Office/ SGA Meeting 1997, University of Turku, Lemminkaisenkat. 14-18 B, FIN-20520 Turku, Finland; fax +358-2-333 6410, e-mail: cescon@utu.fi.). Please note that FINNAIR has been appointed the official carrier of the Meeting. Additional information can be found on internet at the following address: <http://WWW.utu.fi/ml/geologia/sga.htm>

Tervetuloa Turkuun - Welcome to Turku !

Heikki Papunen, chairman of the Organization committee



4th Biennial SGA Meeting
August 11-13, 1997, Turku, Finland

News of the Council

The council has agreed to sponsor the following activities (see complete list under "Announcements", page 15, and "Forthcoming Events", page 17):

- 4th Annual Short Course on "Modern Seafloor Hydrothermalism and Metallogeny", Brest, 2-7 July, 1997 (see details under "Announcements", page 15). Travel grants for junior and student members are available.

- IUGS/UNESCO workshop on "Paleozoic granite-related Au, Cu, Mo, W, REE deposits and epithermal gold deposits in Kazakhstan and Kyrgyzstan", August 31-September 15, 1997 (see "Announcements", page 15).

- 7th International Kimberlite Conference to be held at the University of Cape Town, 3 - 17 April, 1998 (see "Announcements", page 15).

- 10th Quadriennial IAGOD Symposium, Broken Hill, Australia, August 1998. Proposition of two Symposia: "European gold deposits" and "Precambrian ore deposits and associated alteration" (see "Forthcoming Events", page 17)

- 8th International Platinum Symposium, Rustenburg, South Africa, 29 June-2 July, 1998 (see "Forthcoming Events", page 17)

- IMA '98 Symposium in honor to Tony Naldrett with the theme "Mineral Deposits Associated with Mafic and Ultramafic Rocks", Toronto, 10-14 August 1998 (see "Forthcoming events", page 17).

- 31st International Geological Congress, Rio de Janeiro, Brazil, 6-17 August, 2000. Proposition of two symposia: "Pre-Atlantic metallogeny of West Africa and Eastern South America" and "Ore deposits of the Central Andes".

Requests for (co-)sponsorship of Scientific Meetings and Short Courses should be sent to the Executive Secretary (see address below). A request form is available on the SGA homepage (<http://www.immr.tu-clausthal.de/lager/sga.html>).

Sponsorship should be requested before printing the first circular.

SGA General Assembly and Council Meeting in Turku

The next SGA Council Meeting will be held in Turku on Monday August 11, 1997. If you have suggestions, criticisms, ideas about the activities of the Society you may pass them to any Council Member for discussion in the council. All SGA members are invited to actively participate at the SGA General Assembly in Turku on Tuesday August 12 after lunch. The President, the Executive Secretary, the Treasurer and the Editor will present their reports. We would like to welcome many SGA members.

Prizes

A SGA Award (3.000 DM) on the best paper in Mineralium Deposita has been created. The prize is open to first or single authors (SGA or non SGA members) of a contribution published in Mineralium Deposita during 1997 or 1998. The award will be presented during the 5th Biennial Meeting in London (August 1999) where the recipient will be an invited lecturer. The winner will be selected by an international committee.

The Editorial Board of Mineralium Deposita has decided to indicate its appreciation of the hard work done by the referees by annually awarding a citation for the **Best Mineralium Deposita Referee**. The first winner is **David Smith**, of San Diego (see pages 5 and 11).

Elections for the SGA Council 1998-1999

If you are interested to serve in the SGA Council, please contact the executive secretary (see address below) before July 1, 1997.

Your suggestions and ideas for any topic of interest to SGA are welcome! They can be addressed to any Council member or to

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The Frank M. Vokes Symposium: Formation and Metamorphism of Massive Sulphides (Trondheim, Norway, 16-19 March 1997)

The Symposium took place from March 16 to 19 at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway. It has been arranged in honour of Frank M. Vokes, Emeritus Professor of Mining Geology at NTNU. For those who had arrived on time there was a field trip to the Loekken Mine on Sunday, March 16, lead by himself, the indefatigable Frank Vokes. Almost 100 participants had assembled for the occasion, about half of them from Norway, the rest from all corners of the world. They met on Monday morning for registration and, after lunch, for the introductory session, with keynote lectures by R. L. Stanton, J.R. Craig, D.F. Sangster, G.C. Amstutz, A. Bjoerlykke, G. Juve and E.F. Stumpfl. Afterwards participants were taken by buses to the Geological

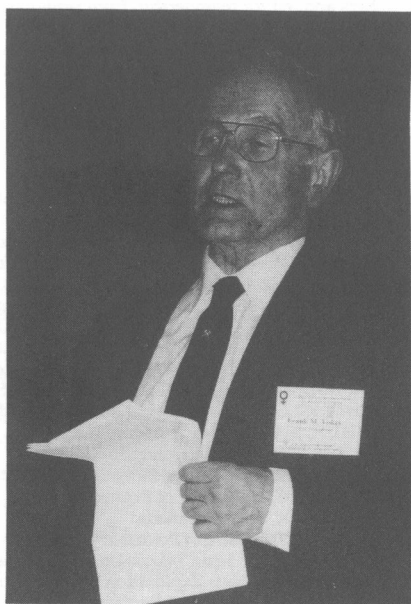
Survey of Norway for an Icebreaker party which provided an excellent and informal opportunity to meet.

The scientific programme continued on Tuesday, March 18, with a session on the "Correlation of Caledonian and Appalachian Sulphide deposits". This provided an excellent overview of new work in Norway, especially on the Bleikvassli Zn-Pb-Cu-Deposit and mineralisation in the Lokken, Skorovass, Joma and Vaddas districts.

These were then compared with deposits in Newfoundland and in the Bathurst mining camp, New Brunswick.

Later in the afternoon there was a session on "Regional Metallogeny and Setting of Sulphide Deposits" where deposits from the Urals, the Iberian Belt and Northern Pakistan were discussed. The day's programme concluded with a poster session; 12 posters, well prepared and spaciouly arranged provided additional stimuli; your reporter found some exotic topics particularly interesting such as the Citronen Fjord Zinc deposit, North Greenland, the massive sulphide deposits of the Agordo-Trento Belt, North East Italy, and the Podolskoye massive sulphide deposit in the South Urals.

In the evening there was the Symposium dinner at Ringve Museum, an elegant country residence on the slopes above Trondheim, which now houses a museum of old musical instruments. This candlelight function, with Frank and Ingrid Vokes at the head table, stood out because of excellent food, superb service, almost unlimited supplies of good wine and Gunnar Juve as toast master with his inimitable sense of humour. Gunnar directed the tidal wave of moving, informative and always heartfelt toasts to Frank Vokes into an amusing programme which just gave you enough time to eat and drink until it was all over at midnight. On behalf of SGA I had the pleasure of congratulating Frank on his achievements, and to pass on to him the best wishes of our Council and membership.



Professor Frank Vokes

On Wednesday there followed a session on "Formation, Metamorphism and Deformation of Sulphide Deposits" with excellent contributions on Tasmanian, Greenland, South African and Chinese Deposits. A selection of papers will be published in *Mineralium Deposita*; the guest editor, Arne Bjoerlykke, has already received 20 manuscripts. Finally, there was a field trip to the Folldal and Joma deposits.

This was a Symposium of high scientific standards, excellent international companionship and splendid organisation. The organizers also had thrown in 30 cm of new snow and brilliant sunshine, just to remind us that Trondheim is at 63 degrees northern latitude - like Frobisher Bay, Baffin Island. Happy birthday, Frank Vokes.

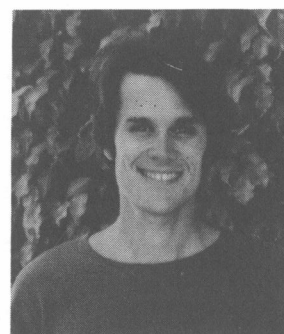
E.F. Stumpfl, Leoben, Austria

International Symposium on Principal Genetic Problems related to Mineral Deposits of magmatic Affiliation (Moscow, Russia, 8-10 April 1997)

The symposium was dedicated to the memory of A. G. Betekhtin (1897-1962), the world-famous mineralogist who consecrated a large part of his work to the study of mineralization associated with basic and ultrabasic complexes. The symposium was organized by the Institute of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry (IGEM), Russian Academy of Sciences, and sponsored by SGA and IAGOD. About 200 participants attended the event which included 48 papers and 94 posters. An Abstract Volume of 311 pages has been published, along with a 63-page collection of the English version of the abstracts from the invited Russian participants. The organizers have also prepared two guidebooks (in English) on the symposium field trips; one for the Safyanovka copper deposit in the Urals (27.5 Mt of ore grading 3% Cu), and the other for the gold mineralization of the Ekaterinburg district. The papers were divided among five thematic sessions entitled "Hydrothermal fluids, their nature and the processes of ore formation", "Modern ore-forming systems", "Mineral paragenetic assemblages, stages and other periods of ore mineralization", "Genetic interpretation of mineral structures and textures: new techniques of investigation", and "Problems of formation of manganese, uranium and platinum deposits". Unfortunately, with a few exceptions, the Russian papers were presented in Russian, a linguistic problem that made them inaccessible to the western participants and considerably reduced the scope of discussion.

**Best Referee Award
for *Mineralium Deposita* 1996
is to
Mr. David Smith
of San Diego**

**nominated by Associate Editor Mark Reed (University of Oregon)
"For contributions to the continued progress of international science"**



V. Distler (IGEM) presented new unpublished data on the Sukhoi Log gold deposit recently discovered in Proterozoic black shales of the Lake Baikal area. The deposit contains finely disseminated mineralization associated with organic matter. Reserves are estimated at about 1000 t of gold, plus 500 t of platinum + palladium.

This symposium dedicated to A. G. Betekhtin was a useful occasion for informal discussions between scientists from Russia, Europe, North America, South Africa and Japan.

Zdenek Johan, Orléans, France

SGA sponsored the following members to attend the Betekhtin Symposium. They were selected by the organization committee (chairman Prof. N. Bortnikov):

Dr. Stanislav Elen, Slovakia (postdoc)
D. Foustoukus, Greece (graduate student)
Dr. J. Ch. Andersen, Leoben, Austria (postdoc)

SGA Special Publications

Strongly reduced prices on SGA Special Publications (see page 14).

SOCIETY FOR GEOLOGY APPLIED TO MINERAL DEPOSITS (SGA)

SGA COUNCIL 1997

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1997-Past Vice-President	B. Lehmann (Germany)
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S. America	W. Vivallo (Chile)
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S. Africa	H. Frimmel (South Africa)

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J. Boulègue (France)
J.F. Sureau (France)
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B. Stribrny (Germany)

Councillors: term ending on December 31, 1999

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C. Marignac (France)
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Ex officio Members, SEG

President	B. Skinner (U.S.A.)
Executive Secretary	T.A. Thoms (U.S.A.)

SOCIETY FOR GEOLOGY APPLIED TO MINERAL DEPOSITS

Report of the Executive Secretary about membership

29 Regular Members, 1 Senior Member, 3 Junior Members and 8 Student Members applied for membership from September 1996 to March 1997.

LIST OF NEW SGA MEMBERS (September 1996 - March 1997)

Regular Members

Maria SASS-GUSTKIEWICZ, University of Krakow, Poland
Bruno GOFFE, Ecole Normale Supérieure, France
Silvia AMETRANO, University of La Plata, Argentina
Ricardo SALLET, Rio de Janeiro, Brazil
Galina IVANOVA, Institute of Geochemistry, Moscow, Russia
Hans Georg FIEDERLING KAPTEINAT, Bad Marienberg, Germany
Zoltan BACSO, Geological Survey of Slovak Rep., Kosice, Slovakia
Christopher MORRISSEY, RTZ, Bristol, United Kingdom
Robert R. SEAL, U.S. Geological Survey, Reston, U.S.A.
Cliff TAYLOR, U.S. Geological Survey, Denver, U.S.A.
Fazli COBAN, Istanbul Technical University, Turkey
Robert J. BODNAR, Virginia Tech, Blacksburg, U.S.A.
Vladimir GUGUSHVILI, Geological Institute Georgia, Tbilisi, Georgia
Noel WHITE, BHP Minerals, London, U.K.
Ted EGGLESTON, Hillside, Colorado, U.S.A.
Pasi EILU, University of Turku, Finland
Nicholas ARNDT, University of Rennes, France
Lloyd A. CLARK, Surrey, Canada
Vitaly SHATOV, VSEGEI, St Petersburg, Russia
Migrac AKCAY, Karadeniz Teknik University, Trabzon, Turkey
Ilmars GEMUTS, Gemuts Exploration, Arvada, Colorado, U.S.A.
John E. GRAY, U.S. Geological Survey, Denver, U.S.A.
Ernesto IGLESIAS, La Paz, Bolivia
Marti L. MILLER, U.S. Geological Survey, Anchorage, U.S.A.
Bjorn THOMASSEN, Copenhagen, Denmark
Paul KLIPPEL, San Jose, U.S.A.
Robert P. FOSTER, University of Southampton, U.K.
Dieter WOLF, TU Bergakademie, Freiberg, Germany
J. Bruce GEMMELL, University of Tasmania, Hobart, Tasmania, Australia

Senior Member

Rong-Long CAO, Guangzhou Institute of Geochemistry, China

Junior members

Massimo CHIARADIA, University of Geneva, Switzerland
Peter BUCHHOLZ, University of Freiberg, Germany
Lance MILLER, Echo Bay Mines, Juneau, U.S.A.

Student members

Alexander IRIONDO, University of Colorado, Boulder, U.S.A.
Svetlana G. TESALINA, Institute of Mineralogy, Miass, Chelyabinsk, Russia
Yves HAEBERLIN, University of Geneva, Switzerland
Elisabet ALM, Stockholm University, Sweden
Sönke NICKELSEN, Freiberg University, Germany
Carl Jesper PETERSSON, Göteborg University, Sweden
Cornelia STEGMANN, Freiberg University, Germany
Christian SCHARDT, Freiberg University, Germany

"LOST" MEMBERS (can you help us with the address of these "lost members?")

Anton-Robert FOISTER, Regensburg, Germany
Juan Luis GUTIERREZ VILLARIAS, Burgos, Spain
Uta HELD, Mainz, Germany
David JONES, Springwood, Australia
Claudine MENDOUSSE, Vendoeuvre, France
Raymond SCHARRER, Tervuren, Belgium
Wolfgang SCHNORR, Aachen, Germany

SGA NEWS - MAILBOX

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We expect your letters with comments, news, criticisms, ...

from 1: EXPLORATION IN THE IBERIAN PYRITE BELT

Mining policy

The IPB encompasses Spain and Portugal. As both countries are members of the European Community (EC) this facilitates financial investment in the mining industry. Many international companies (RTZ, Navan, SEIEMSA, Outokumpo, Boliden, among others) are currently operating exploration programs in this area. As a result, several new deposits have been recently located in the IPB, notably Los Frailes, Migollas, Las Cruces, Masa Valverde and Aguas Teñidas in Spain and Lagoa Salgada, Lombador and Neves Norte in Portugal (Fig. 1 and Table 1). Apart from private investment, in Spain the regional government of Andalusia supports mining and exploration activities by means of economic and technical aids. The latter include improvement on the information services via an internet open file integrating most of the available geological, geophysical, geochemical and drill-core information generated by many years of exploration in the region. In Portugal, government agencies keep and provide the records of past exploration (including drill-cores), and give technical advice. The onset of mining operations is negotiated with the government. There are usually five years of fiscal exemption, and other benefits depending on each specific situation.

Geological overview

The most recent comprehensive review of the geology of the IPB and its associated deposits is from Sáez et al. (1996), Carvalho et al. (in press), Barriga and Carvalho, eds., (1997) and is being published in 1997 as a thematic issue in *Mineralium Deposita* (Leistel et al., 1997; Sáez et al., 1997). The IPB is the central part of the South Portuguese Zone, which is the southernmost zone of the Variscan chain. Its sedimentary record consists of Devonian and Carboniferous rocks, with intense bimodal magmatic activity and abundant large-sized massive sulphide deposits. The general stratigraphic sequence for the IPB was established by Schermerhorn (1971) and comprises three main units, from bottom to top: the Phyllite-Quartzite Group (PQ), the Volcanic-Siliceous Complex (VS) and the Culm (or Flysch) Group.

The PQ represents the lower part of the stratigraphic record in the IPB and consists of a detrital sequence of shales, quartzites and litharenites, with limestone lenses near the top of the series that have provided conodonts and other fossils of Famennian age (Boogaard and Schermerhorn, 1975). The extension of the group at depth remains unknown, although some thickness estimates exceed thousands of meters. The sedimentary facies of the PQ represents marine deposition on a shallow platform and nearshore environment including emergent areas (Moreno and Sáez, 1991; Moreno et al., 1996).

Table 1

	Reserves Mt	Cu %	Zn %	Pb %	Sn %	Ag ppm	Au ppm
Aguas Teñidas (including Py ores)	41						
Polymetallic rich ore	14	1,1	5,8	1,7		57	0,4
Cu rich ore	11	2,5	0,9	0,2			
Aljustrel (*)	250	0,8	3	1		38	0,8
Aznalcóllar Group							
Aznalcóllar	43	0,4	3,3	1,8		67	
Los Frailes	70	0,4	3,8	2,2	0,01	63	
Concepción	11	1,2	0,3				
Las Cruces	10 -15	6					
La Zarza	100	0,7	1,5	0,6		22	0,6
Lousal	50	0,7	1,4	0,8			
Masa Valverde	120	0,5	1,3	0,6		38	0,8
Neves Corvo (including Py ores)	270	1,6	1,4	0,3	0,05		
Cu-rich ore	38	7,5	1,2		0,3		
Sn-rich ore	4	11,7	1,7		2,5		
Zn-rich ore	47	0,5	6,2	1,2			
Riotinto							
massive sulphides	250	1	2	1		30	0,3
stockwork	200	0,4					
gossan	100					56	1
Sotiel Group							
Sotiel	59	0,6	3,8	1,6			
Migollas	58	0,9	2,2	1,1			
Tharsis	115	0,5	2,7	0,6		22	0,7

(*) Ore grade in Aljustrel refers only to the Moinho orebody.
Data from the literature.

The VS is Late-Famennian - Visean in age, and hosts the massive sulphide and manganese deposits. It consists of a heterogeneous group of rocks with rapid lateral and vertical facies changes. The thickness of the VS varies widely, ranging from a few tens to more than a thousand meters. Felsic and mafic volcanics interfinger with detrital and chemical sediments. Volcanic rocks are mainly felsic fragmentals and mafic lavas. Subvolcanic rocks, both felsic and mafic, are common. Sedimentary rocks comprise three main types: volcanic-derived epiclastites, grey and black shales, and chemical sedimentary rocks including massive sulphides and manganiferous chert and jasper.

The stratigraphic position of the massive sulphide deposits is not regionally consistent although the top of the first felsic volcanic sequence includes most of the main deposits (see Sáez et al., 1996 for more detailed information).

The Culm Group is a thick and monotonous Upper Visean to Westphalian succession of shales, litharenites and rare conglomerates that overlies the VS in the IPB. The estimated thickness for this group exceeds several thousands of meters. Sedimentologically, the Culm Group represents the infill of a subsident basin by turbidite sediments whose provenance is within the IPB and the Ossa Morena Zone (Moreno, 1993).

The rocks of the IPB were deformed and regionally metamorphosed during the Asturian phase of the Variscan orogeny (from Upper-Visean to Westphalian-D). Three stages of deformation have been recognized in the IPB, which generated folding, thrusting and low grade regional metamorphism. Both deformation and metamorphism seem to increase in intensity from SW to NE, although detailed metamorphic studies are lacking on a regional scale. The structure of the IPB has been defined as a thin-skinned foreland thrust and fold belt (Silva et al., 1990). Deformation generated asymmetric SW-verging folds, which often show transposed bedding on the short limb, mimicking the structural features of a thrust-belt. Folding is accompanied by development of a penetrative foliation and regional metamorphism.

During Late- and Post-Variscan times, a strike-slip tectonic regime prevailed in the IPB. This produced regional shear, fault

zones and major tectonic activity along the boundary between the South Portuguese Zone and the Ossa Morena Zone. Local transtension related to this tectonic regime favoured the intrusion of bimodal magmatic rocks outcropping especially in the NE of the IPB.

Metallogenesis

The metallogenesis of the IPB includes the massive sulphide and manganese deposits associated with Dinantian volcanism, and vein-type hydrothermal mineralization associated with late-Variscan brittle deformation and magmatic processes in the Upper-Carboniferous.

Hundreds of small-sized manganese deposits with rhodonite, rhodocrosite and Mn-oxides are associated with shales and Fe-jasper within the VS complex of the IPB. The economic significance of these deposits is small, and production stopped completely few years ago. The Mn-associated lithologies constitute mapable units in a stratigraphic position close to the massive sulphide horizons.

Post-Variscan hydrothermal mineralization is mainly represented by vein-type ores, although it also occurs as replacement bodies within suitable lithologies (Sáez and Ruiz de Almodóvar, 1991). Element associations include F-(Pb,Zn); Sb-(As,Cu); Pb-Zn-(Ag,Ba); As-Cu-Bi-Co-Ni and Sn-W-As. At present there is no mining activity on any of this mineralization on which only minor research has been carried out.

Massive sulphide deposits

About 300 million tonnes of polymetallic ores (though in most of the cases represented only by sulphur and copper) have been processed during the mining history of the IPB. The recovery of other elements (including Pb and Zn) is often hindered by the fine-grained nature of the ores and the pervasive mineral intergrowths. Original reserves and metal grades of selected ore deposits in the IPB, considering major mines and some deposits with project of future activity, are reported on Table 1. Note the huge size of some deposits including Neves Corvo, where great tonnage and high metallic grade occur together.

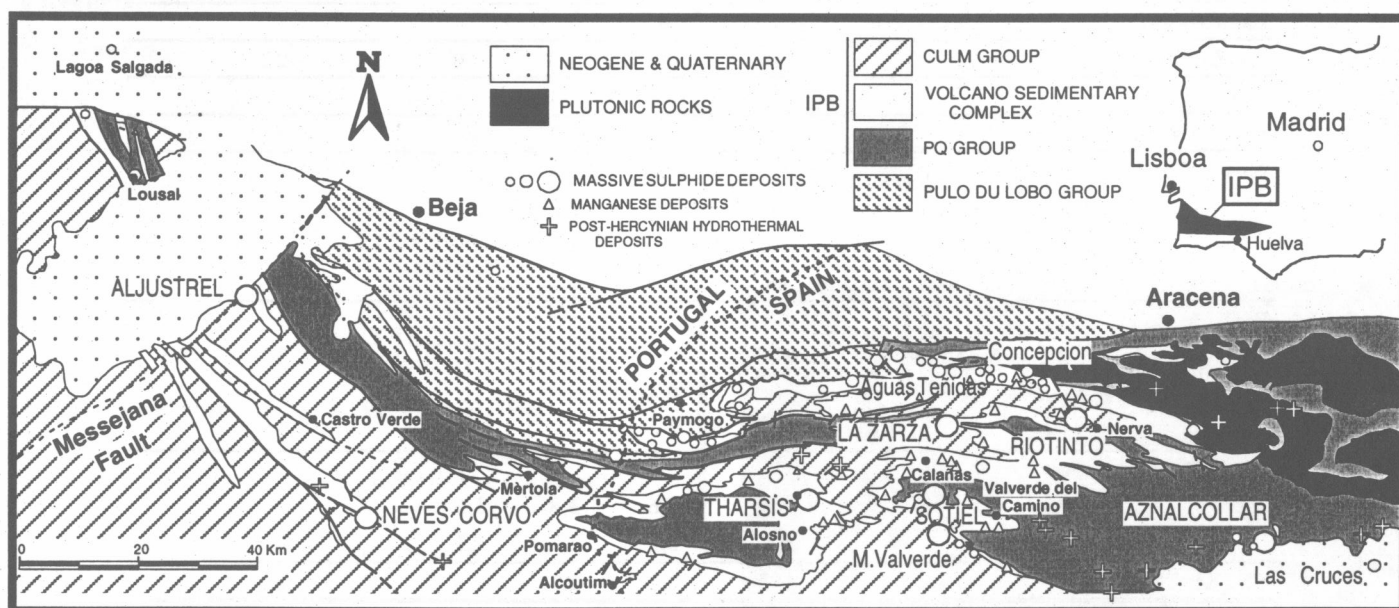


Figure 1: Geological map of the IPB with the location of massive sulphide, manganese and post-Variscan hydrothermal deposits (Modified from Sáez et al., 1996).

Fig. 2 shows the mining production of the IPB during the last few years, as compared with the mining production of the rest of the European Union. Neves Corvo is the major producer of copper and tin, with 85-95% of the Cu and 100% of the Sn produced in the IPB. The production of Cu, Zn, Pb and Ag will probably increase in the next few years if, as planned, exploitation of the newly discovered deposits (e.g. Aguas Teñidas, Las Cruces) will begin. In conclusion, the IPB is a world class ore province and possibly the most important metal reservoir in Western Europe (Fig. 2).

The systematics of regional distribution of massive sulphide deposits in the IPB (Fig. 1) is poorly understood, although palaeogeographic control seems to have operated during massive sulphide deposition (Saez et al., 1996; Saez et al., in press). As a result, three main axes of accumulation have been identified (Saez et al., in press). It is common in the IPB (as in many other VMS provinces) the clustering of orebodies in relatively small areas.

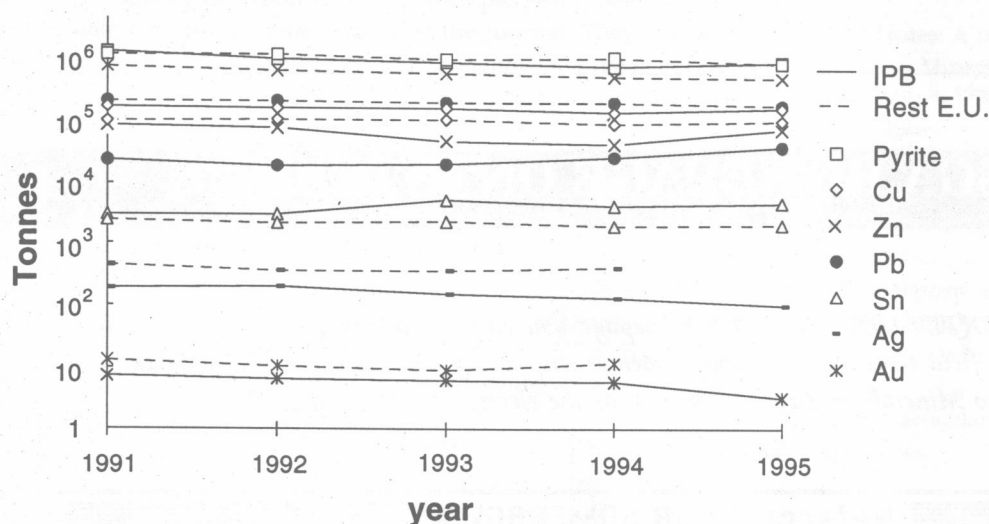


Figure 2: Mining production of the last years in the IPB and the rest of the European Community (E.U.). Data from ITGE (1996).

Stratigraphically, massive sulphide deposits in the IPB are linked to felsic volcanic episodes in different settings of the VS and are associated with waning stages of volcanic activity. They are deposited on top of both the volcanic rocks and of the associated sediments in laterally equivalent stratigraphic positions. An essential exploration tool in the IPB is to recognize productive stratigraphic horizons in the target areas.

The sulphide mineralization occurs as concordant tabular bodies or lenses, sometimes underlain by crosscutting stockworks in which sulphides are found in veins and as pervasive disseminations. Lenses and tabular bodies of massive sulphides are stratabound, concordant and syngenetic, the most common host rocks being black shales and fine grained, felsic fragmental volcanics.

Stockwork mineralization occurs in different rock types sometimes containing economic grade ore (mainly Cu). This kind of mineralization has a conical shape, with diameters ranging from 100 to 600 m, and with a vertical extension of 20 to 250 m.

Exploration in the IPB

The IPB is an outstanding example of success in the exploration for concealed mineral deposits, as a result of adequate ore

geology and exploration models, favourable deposit characteristics (size and mineralogy) and regional physiography. The discovery of Neves Corvo, in 1977, was the ultimate result of a twenty years period of intense geological study, aimed at defining favourable ore-bearing horizons through the application of geophysical and geochemical exploration methods in areas where the favourable horizons were believed to lie at shallow to moderate depths.

The IPB is considered the most promising exploration area for world class deposits in Western Europe. The economic value of the targets, coupled with the advancement of exploration activities, has justified exploration under progressively more adverse conditions, either at greater depths or under particularly unfavourable covers. The latter include Neogene sediments (Los Frailes, Lagoa Salgada, Las Cruces), sedimentary rocks of the PQ group (Migollas) and of the Culm group (Masa Valverde).

As targets become more elusive, new exploration tools are required, to help selecting the best sites for intensive exploration

and drilling. Geophysical studies have been of paramount importance in exploration in the IPB for a long time now. Gravity, magnetic and electrical surveys became particularly useful in areas selected on the basis of sound geological and structural knowledge.

There are promising signs of further advances in the near future through the application of a wide variety of disciplines including sedimentology and basin analysis, physical volcanology, mineralogy and geochemistry of hydrothermal haloes, ore mineralogy (rare minerals) and fluid inclusions.

The overall integration of knowledge should produce new concepts of value in mineral exploration.

The potential of the IPB for new discoveries is still vast, but exploration under more difficult situations means that the targets need to be economically more attractive. The dream of all explorationists is to discover a new Neves Corvo.

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David Rickard

Editor of *Mineralium Deposita*,

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The Editorial Board for *Mineralium Deposita* consists of distinguished Mineral Deposit Scientists from all parts of the globe. They are appointed on the nomination of the Editor and are approved by Council. Their normal term of office is three years and they usually handle around 10 papers per year. They are responsible for the scientific quality of the Journal. They select referees for papers and advise the Editor on how the paper should be handled. Authors can submit manuscripts directly to the Associate Editors.

Mineralium Deposita

Thematic Issues: This year Volume 32 will contain two Thematic Issues. The first Thematic Issue will be on *Exploration Initiatives in South Africa* (Guest Editor: Professor Pat Eriksson). This important Issue looks at new exploration frontiers in South Africa. South Africa has been a major mineral producing country for over a century now and some of the more classical types of mineralization have been well explored. This Issue brings together recent South African thinking on new types of initiative in new areas in South Africa. The second Thematic Issue will be an important one on the *Iberian Pyrite Belt* (Guest Editor: Dr Eric Marcoux). This Issue contains a number of major papers which will bring the international community up-to-date on the exciting developments that have recently increased our understanding of metallogeny of this classical mining camp which continues to produce world-class discoveries. In addition to this there will be a group of five papers plus a Preface from the IGCP Project 356 and the IGUS/UNESCO Deposit Modelling Workshop at Matrahaza, Hungary on the Metallogeny of the Carpathian Balkans. This set of papers is opening up new areas in eastern Europe and includes the southern republics of the former USSR.

Member Services: The free member colour plates have become extremely popular. This is not surprising as the regular cost of a colour plate in *Mineralium Deposita* is DM 1200 for the first and DM 600 for the following colour plates. The membership fee for *Mineralium Deposita* is DM 98. The popularity is such that the free colour plates are now being offered pro rata. That is, the cost is divided by the number of authors that are members of the SGA.

The English correction service at Cardiff is starting to work well. The correction service is free to members of the SGA and costs UK£3.00 per page for non-members. The English correction service opens up, to members whose first language is not English, the whole of the English speaking international world. The

English correction service also makes possible the production of Thematic Issues from areas that do not normally feature in the international literature. I would welcome suggestions for future Thematic Issues based on this possibility.

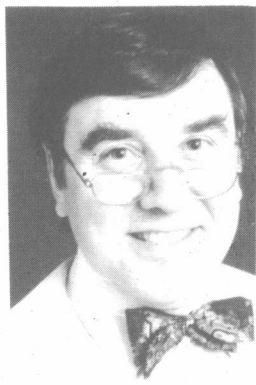
Mineral Deposit Notes: A new feature of *Mineralium Deposita* is the introduction of Mineral Deposit Notes. These have the same format as the Mineral Deposit Letters (ie no more than four pages of text, no more than four display items and fast publication) that will concentrate on short descriptions of new deposits and new mining camps in the world. They should include a location and geological map of the occurrence, a geological cross section, a description of the geology and mineralogy of the deposit and some idea of the size of the resource. We realise that this latter is often highly sensitive information, but the readership needs to know whether the paper is describing a crystal of a particular mineral or a substantial tonnage! We would particularly welcome Mineral Deposit Notes from industry geologists.

Mineralium Deposita Best Referee Award 1996

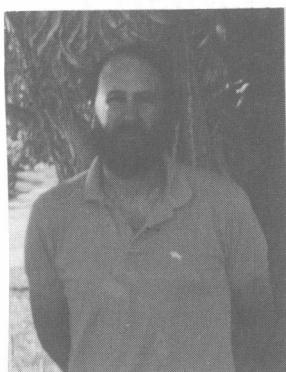
The scientific referees for *Mineralium Deposita* provide an essential service to the international community. Without peer review the whole system of scientific publication would collapse and science would not progress. During 1996, 110 referees contributed their expertise to the Journal. I asked Associate Editors to nominate candidates for the top review of 1996. The referees for *Mineralium Deposita* commonly make detailed analyses of the papers of great help to the authors, which can run into several pages. Several referees, for example, recalculated isotopic and analytical data for the authors. Since *Mineralium Deposita* is a truly international Journal many of the manuscripts that are received are written by authors whose first language is not English. *Mineralium Deposita* referees not only contribute to the science but also to its presentation in some detail. The Editorial Board wish to thank all the referees to contributed to the success of the Journal in 1996.

The Best Referee Award for *Mineralium Deposita* for 1996 is to Mr David Smith of San Diego. He was nominated by Associate Editor Mark Reed. Mr Smith receives a citation which reads "For contributions to the continued progress of international science".

David Rickard ♦

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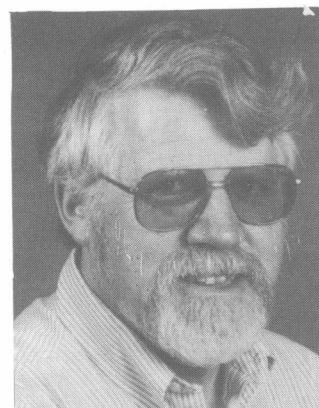
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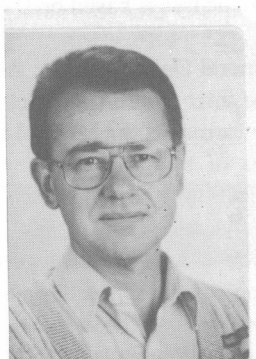
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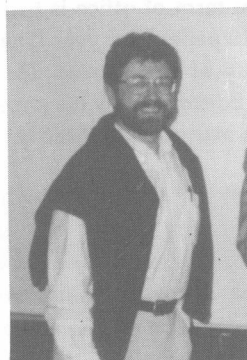
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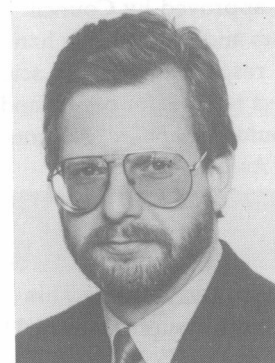
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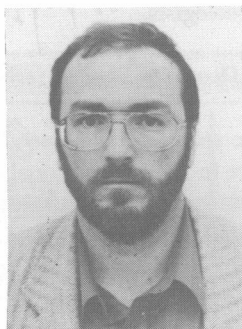
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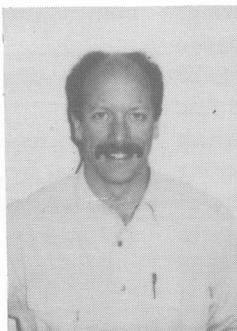
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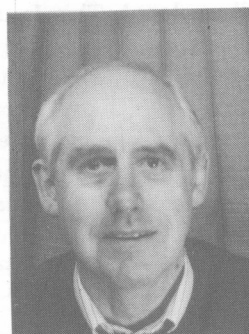
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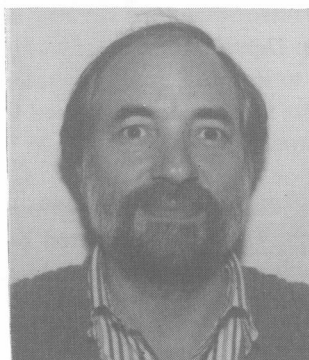
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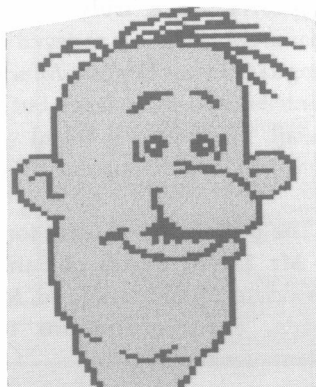
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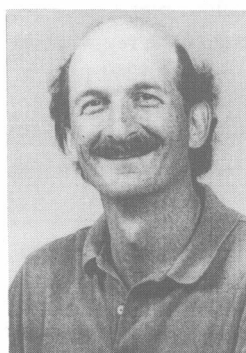
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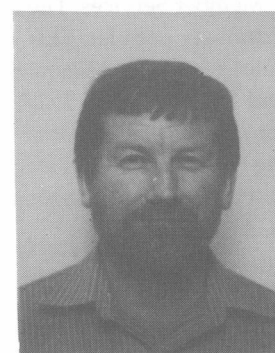
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What is M.I.R.O.?

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M.I.R.O. (Mineral Industry Research Organisation) is a research and information organisation for the international minerals industry. Its main functions are:

- to provide a means for co-operation amongst its members to solve common technical problems.
- to obtain information and data for the Industry and act as a point of contact between its Members and National Governments and International bodies such as the European Commission and United Nations.
- to provide an industry based focus for research, development and innovation.

M.I.R.O. exists to assist its Members to identify new technology, to develop innovative techniques, contain costs and meet the challenge of profitable mineral exploration, extraction and production through environmentally acceptable methods.

Current projects in the geological/exploration sector include:

Automated Mapping Techniques from field Spectrometer Data. Software has been developed which accepts data from a range of spectrometers operating in the visible and shortwave infra red. These spectra can be interpreted in terms of the mineral composition present in rock samples from outcrops or boreholes.

The Application of Electro Kinetic Geophysical Surveying to Mining - A Technical Review. EKS is used to locate the water table, predict water flows or locate zones of high permeability. This review of the technique discusses the theoretical and physical basis of the method, its advantages, limitations and practical applications.

ARIES-1 - Australian Resource Information and Environment Satellite, specifically for geological mapping and resource application. A feasibility study is being undertaken of a satellite equipped with 32 channels

in the near infra red and 32 channels in the shortwave infra red with better than 30m instantaneous field of view. Such a satellite would enable the mapping from space of distinct mineral species.

M.I.R.O. does not have research facilities of its own but utilises its skills and flexibility to launch projects over a wide range of subjects with the most appropriate Centres of Expertise, either from within the membership or at external research centres.

The creation of new technology to meet Members' needs is the paramount objective. Research project proposals are generated by Research Co-ordinators, through discussion with members, research establishments and universities. A Research Advisory Executive Committee, that reflects the widespread interests of more than a hundred members in seventeen countries, appraise and advise on the proposals and the requirements for the sector. Project contracts are established after assessing priorities with Members, evaluating technological developments to avoid duplication, and by matching research contractors' skills and experience with the project expectations. Maximum use is made of external sources of funding, such as the EC and co-operation with other research organisations is encouraged.

Collaboration allows an increased scale of project and gearing ratio, improving the utilisation of resources. Other benefits are achieved by the stimulation of both research and industrial personnel as they interact and speedier, more efficient technology transfer, whilst sponsors retain control of the project direction.

For further information on the projects described above and current proposals please contact Derek Morris on Tel: +44 (0)1727 822287, Fax: +44 (0)1727 826570, Email: derek@terrahun.demon.co.uk or write to M.I.R.O., Expert House, Sanford Street, Lichfield, Staffs, WS13 6QA, UK. M.I.R.O. also has a website; the address is <http://www.miro.co.uk>

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Hettler, J., Lehmann, B., 1995, **Environmental impact of large-scale mining in Papua New Guinea: mining residue disposal by the Ok Tedi copper-gold mine**. Berliner Geowissenschaftliche Abhandlungen A 176-II, 52 pages, 31 figures, 17 tables. Price: 38 DM, available by: lehmann@immr.tu-clausthal.de

Geological Survey of Canada Geology of Canadian Mineral Deposit Types edited by

O.R. Eckstrand, W.D. Sinclair and R.I. Thorpe, 1995

The volume contains 640 pages, including 16 pages of colour plates, and is available in either English or French. Copies can be ordered from the Geological Survey of Canada Bookstore in Ottawa (phone: +1 613-995-4342; fax: +1 613-943-0646). Price: \$70 (Canada), \$91 (Other Countries).

EPITHERMAL GOLD DEPOSITS: STYLES, CHARACTERISTICS, AND EXPLORATION

A WALL POSTER BY J.W. HEDENQUIST, E. IZAWA, A. ARRIBAS, JR., AND N.C. WHITE
SOCIETY OF RESOURCE GEOLOGY, SPECIAL PUBLICATION 1, 1996.

A brief summary of the two end-member styles of epithermal gold deposits, low sulfidation and high sulfidation. For students of economic geology, and explorers of epithermal ore deposits. Full color, with 40 diagrams, 21 photographs, 4 tables; BO in size (1.5 x 1.0 m). Poster accompanied by booklet with text and captions translated to Spanish, French, Japanese and Chinese; also available in B4 pamphlet-form, in color, for use in the field. Copies of poster or B4 pamphlet may be ordered from the address below; the cost is **US\$30** each, which includes translation booklet and airmail postage in a mailing tube; **US\$25** each for orders of 5 or more; inquire about cost for bulk orders and student discount. Payment may be made by VISA or MasterCard; please send your mailing address plus credit card name, card number and expiration date. Allow 6-8 weeks for processing.

The Society of Resource Geology, Nogizaka Bldg., 6-41, Akasaka 9-chome, Minato-ku, Tokyo 107, Japan.
Fax +81(3)3475-0824; E-mail <J90117@sinet.ad.jp>

UNIVERSITY OF LEOBEN, AUSTRIA

FULL PROFESSORSHIP POSITION

Montanuniversität Leoben -- University of Leoben Austria

The University of Leoben is seeking an outstanding scientist for a full professorship (Ordentlicher Universitätsprofessor/-professorin) in mineralogy and petrology in the Department of Geosciences as successor to Prof. Dr. Eugen F. Stumpfl. Candidates are expected to have demonstrated their ability to conduct independent and innovative research in the field of mineral resources as well as gained significant experience in industry at an international level.

The successful candidate will be responsible for research and curriculum in mineralogy and petrology within the department. He / She will teach classes to students of a wide range of subjects like applied geosciences; mining; petroleum engineering; ceramics, refractories, cement and glass; materials science; environmental technologies; surveying.

Most courses are taught in German. The candidate will be expected to teach in German within two years after appointment.

Am Institut für Geowissenschaften der Montanuniversität Leoben, Österreich, ist die Planstelle eines / einer

**Ordentlichen Universitätsprofessors/-professorin
für Mineralogie und Petrologie
(Nachfolge Prof. Dr. E. F. Stumpfl)**

in Form eines öffentlich-rechtlichen Dienstverhältnisses wiederzubetzen. Der Kandidat/die Kandidatin sollte ein Wissenschaftler bzw. eine Wissenschaftlerin von internationalem Rang sein, der/die das Fach Mineralogie-Petrologie im Rahmen des Institutes für Geowissenschaften in Forschung und Lehre vertritt. Zu betreuen sind die

Studienrichtungen: Angewandte Geowissenschaften; Bergwesen; Erdölwesen /International Study Program, Gesteins-hüttenwesen, Industrieller Umweltschutz, Entsorgungstechnik und Recycling; Markscheidewesen. Er/Sie soll auf dem Gebiet der mineralischen Rohstoffe ausgewiesen sein. Einschlägige Industrieerfahrung ist von Vorteil.

Die Abteilung für Mineralogie - Petrologie verfügt über die Standardausrüstung, die ein modernes Institut heute benötigt und ist weltweit an internationalen Forschungsprojekten beteiligt. Vom Bewerber bzw. von der Bewerberin wird erwartet, dass er/sie die enge Kooperation mit den anderen Abteilungen des Institutes (Geologie und Lagerstättenlehre; Prospektion und Angewandte Sedimentologie; Technische Ökosystemanalyse) und den anderen Instituten der Montanuniversität fortführt.

Die Habilitation oder eine gleichwertige wissenschaftliche Qualifikation wird vorausgesetzt.

Die Montanuniversität strebt eine Erhöhung des Anteils von Frauen in Forschung und Lehre an und fordert qualifizierte Wissenschaftlerinnen nachdrücklich auf, sich zu bewerben.

Bewerbungen mit den üblichen Unterlagen und den fünf wichtigsten Veröffentlichungen als Beilage sind bis zum 9.Juni.1997 an den Rektor der Montanuniversität, Franz-Josef-Strasse 18, A-8700 Leoben, Österreich, zu richten. (E-mail: rektor@unileoben.ac.at)

Für Auskünfte steht Prof. Dr. Millahn / Telefon (+43-3842-402 360), / Fax (+43-3842-402 560) / E-mail: karl.millahn@unileoben.ac.at) als Vorsitzender der Berufungskommission zur Verfügung.

ANNOUNCEMENTS

EPISODES: INTERNATIONAL GEOSCIENCE NEWSMAGAZINE

Responsability for the publication of the Journal *Episodes*, the quarterly news and science journal of the International Union of Geological Sciences, has passed from the British Geological Survey to the Ministry of Geology and Mineral Resources of China in March 1997. The first issue to be produced in China

will be Vol. 20, No. 1. The contact address for editorial, subscription and advertising matters will be: The Editor, Episodes, PO Box 823, 26 Baiwanzhuang Rd, 100036 Beijing, China; phone +86 10 68327772 or 20827; fax: +86 10 683 28928; e-mail: episodes@public.east.cn.net

CONFERENCES AND SHORT COURSES

LES SEMINAIRES DE L'ECOLE DOCTORALE DES SCIENCES DE LA MER -
Université de Bretagne Occidentale - Faculté des Sciences et
Techniques, 6 av. Le Gorgeu, Brest, France

SGA-SPONSORED

2 -4 June 1997

Short course:

Modern Seafloor-Hydrothermalism and Metallogeny

An in-depth examination of hydrothermal processes and their deposits on the modern sea floor from a geological and geochemical point of view.

Presented and organized by:

-**Steven Scott**, Professor and Director, Marine Geology Research Laboratory, Dept. of Geology, University of Toronto, Canada and Professeur invité de l'Université Bretagne Occidentale

-**Thierry Juteau**, Professeur et Directeur de l'Ecole Doctorale des Sciences de la Mer, Dept. des Sciences de la Terre, UBO-UFR Sciences et Techniques, Brest, France

-**Yves Fouquet**, IFREMER, Centre de Brest, Plouzané, France
-and other invited instructors

Contact: Prof. Thierry Juteau or Prof. Steven Scott, Dépt. des Sciences de la Terre, UBO-UFR Sciences et Techniques, Université de Bretagne Occidentale, 6 avenue Le Gorgeu, B.P. 809, 29285 Brest Cedex, France
phone: +33 298 01 61 75; fax: +33 298 01 66 20
Internet: juteau@univ-brest.fr / scottsd@univ-brest.fr

IUGS/UNESCO DEPOSIT MODELING PROGRAM WORKSHOP;
PALEOZOIC GRANITE-RELATED AU, CU, MO, W, REE DEPOSITS AND
EPITHERMAL GOLD DEPOSITS IN KAZAKHSTAN AND KYRGYZSTAN
Almaty, Kazakh Republic

SGA-COSPONSORED

31 August-15 September 1997

Sponsored by: IUGS/UNESCO Deposit Modeling Program.
Cosponsored by: Ministry of Geology and Underground Resources of Kazakhstan, KAZNEDRA (Kazakh Research Institute of Mineral Resources), Institute of Geology, Academy of Sciences of the Kyrgyz Republic, Hungarian Geological Survey, Geological Institute of Hungary, Bundesanstalt für Geowissenschaften und Rohstoffe, Germany, US Geological Survey, Geological Survey of Canada, IGCP Project 373-Correlation, Anatomy and Magmatic-Hydrothermal Evolution of Ore-bearing Igneous systems in Eurasia, SGA (Society for Geology Applied to Mineral Deposits), IAGOD (International Association on the Genesis of Ore Deposits).

Goals of the Workshop

To formulate mineral deposit models applicable to the geologic setting of the Paleozoic orogenic terrains of Central Asia and in other parts of the world. Deposits from other continents will be used as deposit model analogs. Formulation of deposit models will emphasize mineralogy, form, texture, stratigraphy, fluid inclusion data, isotope data, geochemistry and other signatures; tonnage and grade models that indicate relative value of the deposit type.

Programme

31 August (Sunday): arrival in Almaty
1-2 September: conference on "Metallogeny and Tectonic Setting of Paleozoic Terrains with special reference to Central Asia"
3-11 September: field-trip (transport by bus): "Paleozoic granite-related Au, Cu, Mo, W, REE deposits and epithermal gold deposits in Kazakhstan and Kyrgyzstan" (Maximum number of participants: 40)
12-13 September: Business Meeting of the Deposit Modeling Workshop in Hotel White Ship, Issyk-Kul
14 September: return to Almaty
15 September (Monday): departure in Almaty

Fees

Registration fee: 50 USD
Excursion fee (including the Business Meeting): 800-1000 USD
Hotel accomodation in Almaty: 70-150 USD/day

Participants from Central European Countries and from the New Independent States are given opportunity to apply for reduction or for being freed from paying fees. Please, apply on the registration form under "other message".

Passport and Visa

Participants are advised to inquire about visa at Kazakh and Kyrgyz Embassies of their respective countries. If official invitation is needed from KAZNEDRA (Kazakh Research Institute of Mineral Resources) to obtain visa, please let the organizers know in time.

Second Circular will be mailed in the first half of June to those who responded to the first circular.

Contact address: Prof. G. Gaál, Hungarian Geological Survey, Geological Institute of Hungary, H-1442 Budapest, POB 106, Hungary; fax: +36 1 251 0703 or Prof. G. Bekzhanov, NPO "Kaznedra", Bogenbay batyra 115, 480091 Almaty, Kazakh Republic; fax: +17 327 261 82 18.

INTERNATIONAL CONFERENCE ON "PALEOGEOGRAPHICAL AND GEODYNAMICAL CONDITIONS OF VOLCANIC-SEDIMENTARY ORE FORMATION"
Miass, Russia

10-15 September 1997

Organized by the Commission on volcanic-sedimentary ore genesis (COVSOG) of the Russian Academy of Sciences (RAN) in common with the Russian section of IAGOD, The Urals branch of RAN and All Russian Geological Research Institutes (VSEGEI).

Main topics:

1. Typical structure and textures of ores and containing rocks for genetic interpretation of structures of volcanic-sedimentary ore fields.
2. Paleogeographic reconstructions of reviers containing volcanic-sedimentary ores of different epochs.
3. Peculiarities of paleogeography and geodynamic of formation of different types of volcanic-sedimentary ore deposits.
4. Connection of sedimentogenesis and biogenesis with composition of ore-bearing fluids in volcanic-sedimentary ore formation.
5. Comparison of characteristics of modern and ancient volcanic-sedimentary ore-forming systems.
6. Evolution of paleogeographical and geodynamical conditions of volcanic-sedimentary ore formation.

Post-Conference field trip (3-4 days)

A field excursion to the famous Il'mensky mineralogical reserve, to massive sulfide deposits, Fe-Mn, Cu-Mo, and other ore fields of the South Urals.

Language

The official languages of the Conference will be English, German, and Russian.

Abstracts

Abstracts are required for oral and poster presentations and will be published and issued before the Conference.

Registration fees

The registration fee is 150 US\$ for SGA and IAGOD members and 200 US\$ for non members.

Important dates

May 15, 1997	deadline for abstracts
July 15, 1997	deadline for registration fees and field trip payment transfer

Contact address

Prof. V.E. Popov, Sredny 74 VSEGEI, 199026 St. Petersburg, Russia; Fax: +7 812 213 5738; e-mail: vsg@sovam.com (subject: for V.E. Popov) or Dr. V.V. Zaikov, Mineralogical Institute UoRan, 456301 Miass Cheliabinskaia oblast, Russia; e-mail: zaikov@imin.uran.ac.ru

GAC-MAC 98, SPECIAL SESSION ON ORE DEPOSITS IN MAFIC AND ULTRAMAFIC ROCKS,
Quebec City, Canada.

18-20 May 1998

Ore deposits in mafic and ultramafic rocks. - Sarah-Jane Barnes
Université du Quebec à Chicoutimi.

Quebec has a wide array of resources associated with mafic and ultramafic rocks both in the form of sulphides and oxides: Ni, Cu, Pt-group elements, Cr, Ti, P and Nb. This session will concentrate on the descriptions of these types of ores, petrogenesis of the ores and their host rocks and methods of exploration using examples from around the world including Quebec. Invited speakers include Tony Naldrett (University of Toronto) who will speak on the Ni-Cu deposit, Voisey's Bay, Ron Emsile (Geological Survey of Canada) who will speak on the origin of Anorthosites, Tyson Birkett (SOQUEM) who will speak on the new P deposits of the Sept Isle intrusion. We welcome both oral and poster submissions.

⇒⇒⇒FORTHCOMING EVENTS⇒⇒⇒

★ marks a new entry

1997

★ May 19-21

GEOLOGICAL ASSOCIATION OF CANADA / MINEALOGICAL ASSOCIATION OF CANADA JOINT ANNUAL MEETING, Ottawa, Canada. Contact address: Geological Survey of Canada, Room 757, 601 Booth Street, Ottawa, Ontario, Canada K1A 0E8; phone: +1 613 947 7649; fax: +1 613 947 7650; internet: OTTAWA97@emr.ca

★ May 31-June 6

4TH INTERNATIONAL CONFERENCE ON "ACID ROCK DRAINAGE", Vancouver, British Columbia, Canada - Contact address: Peggy Shepard - Venue West Conference Services, 645 - The Landing, 375 Rue Water, Vancouver, B.C. Canada V6B 5C6; phone: +1 604 681 5226; fax: +1 604 681 2503; e-mail: congress@venuewest.com; Internet: http://www.emr.ca/mets/mend

June 1-5

GEOANALYSIS 97 (3RD INTERNATIONAL CONFERENCE ON THE ANALYSIS OF GEOLOGICAL AND ENVIRONMENTAL MATERIALS; Vail, Colorado, USA - Organized by the USGS. Contact address: Belinda Arbogast, USGS, Federal Center, Box 25046, MS 973, Denver, CO 80225; fax: +1 303 236 3200; e-mail: geo97@helios.cr.usgs.gov

★ June 1-6

1ST JOINT CONVENTION CSPG-SEPM, Calgary, Alberta. Contact address: 1997 Convention Office, CSPG, 505, 206-7th Avenue S.W., Calgary, Alberta, T2P 0W7, Canada, phone +1 403 264 5610; fax +1 403 264 5898; e-mail: cspg@cspg.org, Web Site: www.cspg.org/cspgemp

★ June 2-4

SGA-SPONSORED

SHORT COURSE ON MODERN SEAFLOOR-HYDROTHERMALISM AND METALLOGENY, Brest, France - Contact address: Prof. Thierry Juteau ou Prof. Steven Scott, Dépt. des Sciences de la Terre, UBO-UFJ Sciences et Techniques, Université de Bretagne Occidentale, 6 avenue Le Gorgeu, B.P. 809, 29285 Brest Cedex, France; phone: +33 298 01 61 75; fax: +33 298 01 66 20; e-mail juteau@univ-brest.fr / scottsd@univ-brest.fr (p. 15)

★ June 2-6

7TH ANNUAL V.M. GOLDSCHMIDT CONFERENCE, Tucson, Arizona, USA - Sponsored by Lunar and Planetary Institute, The University of Arizona, National Aeronautics and Space Administration. Contact address: Dr. Michael J. Drake, Department of Planetary Sciences, Lunar and Planetary Laboratory, The University of Arizona, Tucson AZ 85721; phone: +1 520 621 6962; fax: +1 520 621 4933; e-mail: goldconf@lpl.arizona.edu

June 15-18

SOUTH AMERICAN SYMPOSIUM ON ISOTOPE GEOLOGY, São Paulo, Brazil - Contact address: M. Basei or W. Teixeira - Instituto de Geociências, USP, Rua do Lago, 562, CEP-05508-900, São Paulo, SP, Brazil; phone: +55 11 8183994; fax: +55 11 8183993; e-mail: BASEIMAS@USP.BR

★ July 1-4

14TH MEETING, EUROPEAN CURRENT RESEARCH ON FLUID INCLUSIONS (ECROFI), Nancy, France - Contact address: XIV ECROFI, CREGU, BP 23, 54501 - Vandoeuvre-lès-Nancy Cedex, France; phone: +33 03 83 44 19 00; fax: +33 03 83 44 00 29

★ July 10-13

IGCP PROJECT 364, CORRELATION OF SEQUENCES IN THE GREATER ANTILLES CRETACEOUS VOLCANIC ARCS, Field Workshop, Dominican Republic - Contact address: Grenville Draper, Florida International University, Geology Department, Miami, Florida 33199; e-mail: draper@servax.fiu.edu

August 4-8

VIII CHILEAN GEOLOGICAL CONGRESS, Antofagasta, Chile - Correspondence: Comité Organizador, VIII Congreso Geológico Chileno, Departamento de Ciencias Geológicas, Universidad Católica del Norte, Antofagasta, Av. Angamos 0610, Casilla 1280; phone: +56 55 241148 (205/368); fax: +56 55 248198; e-mail: dgeologi@socompa.cecun.unc.cl

August 6-8

SGA-SPONSORED

IX PERUVIAN GEOLOGICAL CONGRESS, Lima, Peru - Contact address: Comité Organizador del IX Congreso Peruano de Geología, c/o Sociedad Geológica del Peru, Arnaldo Marquez 2277, Lima 11; phone: 511 46 33 947; fax: 511 26 12 362. MVT Short Course sponsored by SGA on the 5th of August.

★ August 10-15

GORDON RESEARCH CONFERENCE ON INORGANIC GEOCHEMISTRY: ORE DEPOSITS, New Hampton, New Hampshire - Contact address: Dr. Mark Reed, Dept. of Geological Sciences, University of Oregon, Eugene, OR 97403-1272; phone: +1 541 346 5587; fax: +1 541 347 4692; e-mail: mhreed@oregon.uoregon.edu

August 11-13

SGA-SPONSORED

4TH BIENNIAL SGA MEETING (Research and Exploration - Where do they meet?), Turku Finland. - Congress Office/SGA Meeting 1997, University of Turku, Lemminkäisenkatu 14-18 B, FIN-20520 Turku, Finland; phone: +358 21 333 6342; fax: +358 21 333 6410 (after 1 October 1996: +358 2); e-mail: cescon@utu.fi (see pages 2 and 20)

★ August 15-31

3RD ANNUAL MEETING OF IGCP PROJECT 354, "ECONOMIC SUPERACCUMULATION OF METALS IN THE LITOSPHERE", Puerto Ordaz, Venezuela - Contact address: Dr. Simon E. Rodriguez, Venezuelan IGCP National Committee, Direccion de Geologia, Ministerio de Energia y Minas, Torre Oeste, Piso 5, Parque Central, Caracas 1010, Venezuela; fax: +58 2 937 446

★ August 17-22

36TH IUPAC CONGRESS: FRONTIERS IN CHEMISTRY, NEW PERSPECTIVES FOR THE 2000's, Geneva, Switzerland - Organized by the New Swiss Chemical Society. Contact address: Prof. Jacques Weber, Section of Chemistry, University of Geneva, 30, Quai Ernest-Ansermet, CH-1211 Geneva 4, Switzerland; phone: +41 22 702 6530; fax: +41 22 702 6518; e-mail: weber@sc2a.unige.ch; Internet home page: http://www.unige.ch/sciences/chimie/IUPAC/IUPAC.html

WISH TO ADVERTISE FORTHCOMING EVENTS?

Send your announcements to:

SGA News, Département de Minéralogie, Université de Genève, Rue des Maraichers 13, CH-1211 Genève 4, SWITZERLAND
fax: +41 22 320 57 32
e-mail: SGANEWS@sc2a.unige.ch

(See page 2 for details concerning the format of the documents to be sent)

★ August 30-September 5

LARGE METEORITE IMPACTS AND PLANETARY EVOLUTION, Sudbury, Ontario - Organized by Ontario Geological Survey. Contact address: Dr. B. O. Dressler, Lunar and Planetary Institute, 3600 Bay Area Blvd., Houston, Texas 77058 1113; phone: +1 713 486 2112; fax: +1 713 486 2162

★ August 31-September 15

SGA-COSPONSORED

IUGS/UNESCO DEPOSIT MODELING PROGRAM WORKSHOP; PALEOZOIC GRANITE-RELATED AU, CU, MO, W, REE DEPOSITS AND EPITHERMAL GOLD DEPOSITS IN KAZAKHSTAN AND KYRGYZSTAN, Almaty, Kazakh Republic. Sponsored by: IUGS/UNESCO Deposit Modeling Program. Contact address: Prof. G. Gaál, Hungarian Geological Survey, Geological Institute of Hungary, H-1442 Budapest, POB 106, Hungary; fax: +36 1 251 0703 or

Prof. G. Bekzhanov, NPO "Kaznedra", Bogenbay batyra 115, 480091 Almaty, Kazakh Republic; fax: +17 327 261 82 18 (p. 16)

September 1-5

10TH MEETING OF THE AEGS (ASSOCIATION OF EUROPEAN GEOLOGICAL SOCIETIES): CHALLENGES TO CHEMICAL GEOLOGY '97, Carlsbad, Czech Republic - Organized by the AEGS, Czech Geological Society and Czech Geological Survey. Contact address: Dr. Martin Novak, Czech Geological Survey, Geologicka 6, 152 00 Prague 5, Czech Republic; fax: +42 2-5818748; e-mail: maegs@cgu.cz; World-wide-web page: <http://www.cgu.cz/maegs.htm>

★September 2-4

18TH REGIONAL EUROPEAN MEETING OF SEDIMENTOLOGY, Heidelberg, Germany - A special session will be devoted to ore genesis and fluid movement during basin evolution. Contact address: CIS Heidelberg, Alte Bergheimer Str. 6, D-69115 Heidelberg, Germany; phone: +49 6221 166097; fax: +49 6221 18109; e-mail: CISHD@aol.com; Internet home page: <http://ix.urz.uni-heidelberg.de/~dc8>

★September 10-15

INTERNATIONAL CONFERENCE ON "PALEOGEOGRAPHICAL AND GEODYNAMICAL CONDITIONS OF VOLCANIC-SEDIMENTARY ORE FORMATION", Miass, Russia - Contact address: Prof. V.E. Popov, Sredny 74 VSEGEI, 199026 St. Petersburg, Russia; Fax: +7 812 213 5738; e-mail: vsg@sovam.com (subject: for V.E. Popov) or Dr. V.V. Zaikov, Mineralogical Institute UoRan, 456301 Miass Cheliabinskaya oblast, Russia; e-mail: zaikov@imin.uran.ru (see also page 16)

★October 5-10

4TH INTERNATIONAL SYMPOSIUM ON ENVIRONMENTAL GEOCHEMISTRY, Vail, Colorado - Organized by the USGS. Contact address: Dr. R.C. Severson or Dr. L.P. Gough, USGS, Federal Center, Box 25046, Denver, Colorado 80225; phone: +1 303 236 5514 or 5513; fax: +1 303 236 3200

★October 19-23

1ST INTERNATIONAL SYMPOSIUM ON MARINE HYDROTHERMAL VENT BIOLOGY, Funchal, Madeira, Portugal - Contact address: The InterRidge Office, Department of Geological Sciences, University of Durham, South Road, Durham DH1 3LE, UK; phone: +44 191 374 2532; fax: +44 191 374 2510; e-mail: intridge@durham.ac.uk

★October 14-18

17TH WORLD MINING CONGRESS AND 22ND CONVENTION, Acapulco, Mexico - Organized by SEG in association with the Association of Mining Engineers, Metallurgists and Geologists of Mexico. Contact address: Tawn Albinson, Citlaltepeli N. 4 Apt. 9, Colonia Condesa, C.P. 06100 Mexico, D.F.; phone: +52 5 584 9887; fax: +52 5 574 5716

★October 19-25

6TH BRAZILIAN CONGRESS OF GEOCHEMISTRY, Salvador / Bahia, Brazil - Contact address: Instituto de Geociências da UFBA, Rua Barão de Geremoabo s/n - Campus Univesitário de Ondina, Salvador-Bahia; CEP 40.170-290; fax: +55 71 336 6779; e-mail: posgema@ufba.br

★October 20-24

SEG ANNUAL MEETING WITH GEOLOGICAL SOCIETY OF AMERICA, Salt Lake City, Utah - Contact address: Robert W. Schafer, Kinross Gold, 40 King Street West, 57th Floor-Scotia Plaza, Toronto, Ontario, Canada M5H 3Y2; phone: +1 416 365 7883; fax: +1 416 363 6622

November 6 - 9

SEG MEETING, Salt Lake City, Utah, USA, in cooperation with Geological Society of America - Contact address: John M. Bartley (GSA)/Erich U. Petersen (SEG, GSA), Dept. of Geology & Geophysics, 717 W.C. Browning Building, Salt Lake City, Utah, 84112 1183; phone: +1 801 581 6553; fax: +1 801 581 7065

★November 6 - 9

EXPLORATION METHODS '98 - PATHWAYS TO DISCOVERY, Vancouver, British Columbia, Canada - Organized by British Columbia & Yukon Chamber of Mines and Society of Economic Geologists (SEG). Contact address: British Columbia & Yukon

Chamber of Mines; phone: +1 604 689 5271; fax: +1 604 681 2363; e-mail: Pathways98@bc-mining-house.com; Internet home page: <http://www.eos.ubc.ca/pathways98>

1998

★March 30-April 3

9TH INTERNATIONAL SYMPOSIUM ON WATER-ROCK INTERACTION, Taupo, New Zealand - Contact address: Dr. B.W. Robinson, Wairakei Research Center, Institute of Geological and Nuclear Sciences, P.B. 2000, Taupo, New Zealand; phone: +64 7 374 8211; fax: +64 7 374 8199; e-mail: wri9@cns.cri.nz

★April 13-17

SGA-COSPONSORED

7TH INTERNATIONAL KIMBERLITE CONFERENCE, Cape Town, South Africa - Pre- and post-conference field trips: 6-12 and 19-24 April. Contact address: James Gurney, 7IKC, Dept. of Geological Sciences, University of Cape Town, PB, Rondebosch 7700, South Africa; fax: +27 21 650 3783; e-mail: 7IKC@GEOLOGY.UCT.AC.ZA; internet: <http://www.uct.ac.za/depts/geolsci/7IKC/>

★April 14-18

GEOSCIENCE 98, Keele University, Staffordshire, U.K. - Contact address: The Conference Dept., The Geological Society, Burlington House, Piccadilly, London, W1V 0JU; phone: +44 171 434 9944; fax: +44 171 439 8975; e-mail: conf@geolsoc.cityscape.co.uk

★May 15-17

MINERALOGICAL ASSOCIATION OF CANADA SHORT COURSE, "MINERALIZED PORPHYRY-SKARN SYSTEMS", Quebec, Canada - Contact address: David Lentz, New Brunswick Geological Surveys, PO Box 50, 495 Riverside Drive, Bathurst, N.B., Canada E2A 3Z1; phone: +1 506 547 2070; fax: +1 506 547 7694; e-mail: dlentz@gov.nb.ca

★May 18-20

GAC-MAC 98, Special Session on Ore Deposits in Mafic and Ultramafic Rocks, Quebec City, Canada.- Sarah-Jane Barnes, Université du Québec à Chicoutimi (p. 16)

June 29-July 2

SGA-COSPONSORED

8TH IAGOD/CODMUR INTERNATIONAL PLATINUM SYMPOSIUM WITH THE THEME "PLATINUM - GENESIS TO BENEFICIATION", Rustenburg, South Africa - Excursions to the Great Dyke, Zimbabwe, Bushveld Complex, South Africa. Contact address: Mrs Elmarie Walker, Conference Co-ordinator, South African Institute of Mining and Metallurgy, PO Box 61127, Marshalltown 2107, South Africa; phone: +27 11 834 1273/7; fax: +27 11 838 5923; e-mail: saimm@africa.com

August 10-14

SGA-COSPONSORED

IMA '98 (17TH GENERAL MEETING OF THE INTERNATIONAL MINERALOGICAL ASSOCIATION), Toronto, Canada - Contact address: Dr. Eva Schandl, Secretary to Organising Committee, Dept. of Geology, University of Toronto, Earth Sciences Centre, 22 Russell Street, Toronto ON, M5S 3B1 Canada; phone: +1 416 978 7084; fax: +1 416 978 3938; e-mail: ima@quartz.geology.utoronto.ca. First circular with response form are available on the IMA98 web site at: <http://www.geology.utoronto.ca/IMA98> (see page 16 for details). Within IMA '98 a symposium, cosponsored by SGA, will be held in honor to Tony Naldrett on the theme "Mineral Deposits Associated with Mafic and Ultramafic Rocks", Toronto, 10-15 August 1998. (Organizer: Prof. C. Michael Leshner, Department of Geology, 202 Bevill Research Building, University of Alabama, Tuscaloosa, Alabama 35487-0338 USA.

August

SGA-COSPONSORED

10TH QUADRIENNIAL IAGOD SYMPOSIUM, Broken Hill, Australia.- Prof. I. Plimer, Dept. of Geology, University of Melbourne, Parkville, Vic 3052, Australia; phone: +61 3 344 6520; fax: +61 3 344 7761; e-mail: ian_plimer@muwayf.unimelb.edu.au (see page 9 of SGA News N. 1)

October 26 - 29

SEG MEETING, Toronto, Canada, in cooperation with Geological Society of America.

SOCIETY FOR GEOLOGY APPLIED TO MINERAL DEPOSITS

SGA Membership Application Form

I would like to become a member of the Society for Geology Applied to Mineral Deposits (SGA) and to receive my personal copy of *Mineralium Deposita*. Current fees are: i) Regular Member 98.00 DM, ii) Junior Member* (up to 4 years after last academic degree, Ms. Sc., Ph.D.) and Senior Member* (after retirement) 68.00 DM, iii) Student Member* (max. 4 years, up to Ph. D., 38.00 DM, iv) Corporate Member 294.00 DM. They include the annual subscription to *Mineralium Deposita* (corporate members, three copies). Do not send money now: you will be invoiced. Payment through major credit cards is possible.

*Certificate required

Surname/Corporation

First name

Title

Mailing address

.....

.....

Phone: Fax

E-mail

Date of birth..... Nationality.....

Degrees obtained from Universities or Colleges

.....

Present position

.....

Membership of other scientific societies

.....

Are you a member of the Society of Economic Geologists? (If yes, no sponsors are necessary) ☐ Yes ☐ No

☐ Regular Member

☐ Junior Member (up to 4 years after last academic degree, M. Sc., Ph.D.)*

Date of degree.....

☐ Senior Member (after retirement)*

☐ Student Member (max. 4 years, up to Ph. D.)*

☐ Corporate Member

*Certificate required

Signature

Place and date

Two SGA Sponsors*

Name, place, date, signature

SPONSOR 1

SPONSOR 2

*If you have difficulty in finding sponsors, send this form to the Executive Secretary and your application will still be considered.

Send the Membership Application Form to:
Dr. Maurice Pagel
 SGA Executive Secretary
 CREGU, B.P. 23,
 F-5401 Vandoeuvre-lès-Nancy Cedex, France
 Tel.: +33 383 44 19 00
 Fax: +33 383 44 00 29
 e-mail: pagel@cregu.cnrs-nancy.fr

Join the SGA now...



The Society of Geology Applied to Mineral Deposits was established in 1965 by an international group of economic geologists. Its Journal *Mineralium Deposita* is recognized as a premier international mineral deposits journal.

GOALS

- The promotion of science of mineral deposit geology
- Personal contact of its members in order to exchange knowledge and experience
- Organization of scientific meetings, field trips, workshops. For these events, SGA members have reduced registration fees and in certain cases may apply for travel grants
- Cooperation with other scientific societies, especially with SEG and IAGOD
- Publication of *Mineralium Deposita* and scientific volumes

MEMBERSHIP

Membership in SGA is open to all persons interested in economic geology, mineral resources, industrial minerals and environmental aspects related to mineral deposits. SGA is an international society with global membership in over 50 countries. Members have reduced registration fees in SGA-sponsored events and in certain cases are eligible for travel grants. Subsidies for publication of color plates in *MINERALIUM DEPOSITA* also may be applied. Current membership fees are listed on the left-side column of this page.

MINERALIUM DEPOSITA

Editors: David Rickard (Cardiff, UK) and Richard Goldfaber (Denver, Co, USA).

Mineralium Deposita publishes papers on all aspects of the geology of mineral deposits. It includes new observations on metallic and non metallic minerals and mineral deposits, mineral deposit descriptions, experimental and applied inorganic, organic and isotope geochemistry as well as genetic and environmental aspects of mineral deposits. *Mineralium Deposita* is published bimonthly. Fast publication: *Mineralium Deposita* publishes *Mineral Deposit Letters* within 3 months and regular papers normally within 4 months after manuscript acceptance and usually 6-9 months after manuscript submission.

...and receive

***MINERALIUM DEPOSITA* & *SGA NEWS*!!!**

**Additional information in the SGA homepage
on Internet:**

<http://www.immr.tu-clausthal.de/sga.html>

4th BIENNIAL SGA MEETING



RESEARCH AND EXPLORATION - WHERE DO THEY MEET?



TURKU, Finland - 11-13 August 1997

The Society for Geology Applied to Mineral Deposits (SGA), established in 1965, is an international association of economic geologists. The Society promotes the science of mineral deposit geology, edits the Journal, *Mineralium Deposita*, and organizes biennial scientific meetings in Europe, world-wide field trips and workshops.

The 4th Biennial SGA Meeting will be held in Turku, Finland, August 11-13, 1997, at the Rantasipi Congress Hotel, Pispalantie 7, FIN-20540 Turku, Finland. The official language will be English.

Under the general theme "Research and exploration - where do they meet?" the organizers would like to bring together economic geology scholars and professional exploration geologists to discuss current issues on ore geology and exploration in order to bridge the gap between the basic and applied sciences. Prospective participants are kindly invited to offer papers for oral and poster presentations. The venue of the meeting is the Rantasipi Congress Hotel in Turku, the oldest city and former capital of Finland. Turku is centrally located in northern Europe; with three universities, the town has a long academic tradition. You can get to Turku by several daily nonstop flights from Stockholm, Helsinki and Hamburg, by four daily ferry connections from Stockholm, by train or bus from Helsinki and by a direct bus connection from Helsinki airport. Present exploration activity is high in Finland and Sweden and both countries can boast world-class mineral deposits and numerous historical and present-day mining camps. Eight pre- and post-meeting field trips will be organized. The participants will visit classic mining districts and new deposit types in Finland, Sweden and northwestern Russia.

Topics of the sessions

1) Black schists and associated mineral deposits; 2) Gold and precious metal deposits; 3) Submarine hydrothermal processes and mineralizations; 4) Mineral deposits in mafic-ultramafic rocks; 5) Silicic magmatism and ore formation; 6) Mineral deposits in sedimentary environment; 7) Deposits of industrial minerals; 8) Diamond deposits and exploration; 9) Metamorphism and ore deposits (IAGOD/WGOM); 10) Mineral deposit modelling in exploration; 11) Environmental aspects of mineral deposits; 12) Open session

Co-Sponsors

Geological Survey of Finland (GSF), Geological Society of Finland (GSoc.F), Geological Society of Sweden (GSoc.S), Society of Economic Geologists (SEG), the City of Turku, University of Turku (UT), The Academy of Finland, Outokumpu Metals and Resources (OMR), Ashton Mining Ltd., etc.

Organizing Committee

Dr. H. Papunen, Chairman, UT; Dr. R. Salminen, Secretary General, GSF; Dr. P. Nurmi, Field Trip Coordinator, GSF; Dr. K. Sundblad, Field Trip Coordinator, GSoc.S; Ms. S. Autio, Abstract Committee, GSF; Dr. O. Eklund, Social Programme Committee, UT; Mr. M. Isohanni, OMR; Dr. M. Mäkelä, GSF; Dr. Z. Johan, SGA; Dr. A. Arribas, SEG; Ms. M.-L. Porsanger, Congress Office, UT

Field trips (see also page 12)

Both pre- (A) and post-meeting (B) field trips will be organized

A1. Metallogeny of Archean greenstone belts in eastern Finland and northwestern Russia including visits to gold, base metal, phosphorus and diamond deposits (5 days) FIM 3500 (1US\$ ~ 4.6 FIM): cancelled

A2. Base metal deposits in the Skellefte area, Sweden and western Finland FIM 3000 (fully booked)

A3(=B3) cancelled

A4. Black schists and associated mineral deposits in Finland (2 days) FIM 1500

B1. Deposits of Lapland including Kemi chromitite, Aitik Cu-Au, Kiruna Fe, Saattopora Au, Pahtavaara Au and Keivitsa Ni-Cu-PGE deposits (5 days) FIM 3000

B2. Ore deposits of the Bergslagen area, Sweden (4 days) FIM3500: cancelled

B3. =Gold and base metal deposits in southwestern Finland (2 days) FIM 900

B4. Ore deposits of the Kola Peninsula, northwestern Russia (5 days) FIM 5500

Short-courses on Sunday 10 August (see also page 18)

1. The use of wallrock alteration and primary geochemical dispersion in mesothermal gold exploration. Organizers: Dr. Pasi Eilu, Dr. Edward J. Mikucki and Prof. David I. Groves (University of Western Australia)

2. Application of Geochronology and isotope Geochemistry to Ore Deposits - Organizers: A. Cheillet (Nancy) and R. Moritz (Geneva)

Social programme

The participants will be offered a varied social programme including an Ice-breaking Party and the Congress Banquet. During the meeting a City tour in Turku and a cruise to archipelago and to visit the Baltic Sea Natural Park will be organized for accompanying persons

Fees

Registration fee for SGA/SEG Members FIM 1100; non members FIM 1500; students FIM 900. A number of travel grants are foreseen, mainly for junior and student SGA members with accepted contributions.

Second Circular

The Second Circular distributed in October 1996 to pre-registrants contains detailed information about the conference and excursions and includes forms of extended abstracts. You can receive the Second Circular by sending the attached pre-registration form to the Congress Office. Please inform also if you intend to offer an abstract because the abstracts forms will be sent only to those giving a paper.

Important dates

January 31, 1997
February 15, 1997
April 15, 1997
May 15, 1997

Submission of extended abstracts

Acceptance of abstracts

Return of camera-ready abstracts

Final registration and payment of fees for registration and field trips

Correspondence

Congress Office/SGA Meeting 1997, University of Turku, Lemminkäisenkatu 14-18 B, FIN-20520 Turku, Finland; Tel. +358-2-333 6342; Fax +358-2-333 6410; e-mail: cescon@utu.fi; http://www.utu.fi/ml/geologia/sga.htm



4th BIENNIAL SGA MEETING: SUBSCRIPTION FORM (Please type or use BLOCK letters)

Name

Mailing address

.....Country

Tel Fax

E-mail

I am

- ☐ SGA Member
☐ SGA Junior Member
☐ SGA Student Member
☐ Student

I intend to attend the Meeting

- ☐ to submit a paper
☐ to present a poster
☐ to take part in field trips no.
☐ to attend the Gold workshop
☐ to attend the Isotope workshop

I am interested in sessions

Preliminary title of the paper / poster

Date..... Signature

Mail to the above address