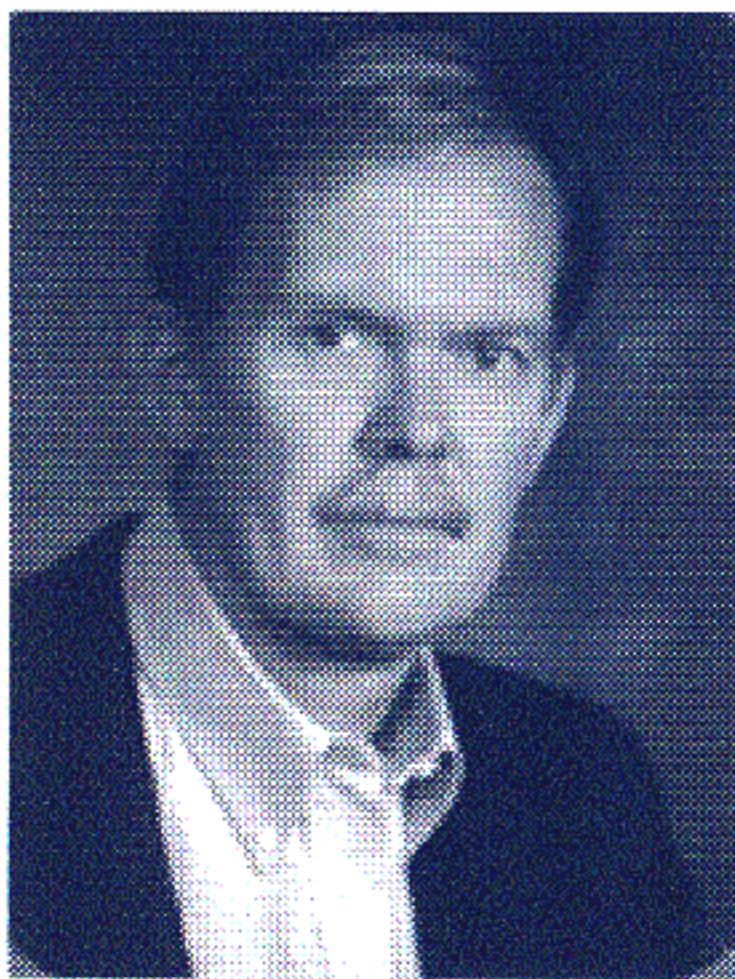


FROM THE PRESIDENT



Grant Heiken

The International Association of Volcanology and Chemistry of the Earth's Interior, in its 75th year, held its General Assembly in Puerto Vallarta, Mexico, January 19-24, 1997. It was a great meeting, with about 500 volcanologists attending. The Mexican organizing committee put together an excellent, well-balanced scientific program, many well-planned and executed pre-, mid-, and post-Assembly field trips, short courses and a steady dose of Mexican hospitality. The tropical setting caused considerable stress, with attendees balancing oral presentations and posters against the attractions of the beach. For most IAVCEI members it was a learning experience, being introduced to the riches of Mexico's volcanoes and volcanic terranes. Representing the members of IAVCEI, I want to thank the organizing committee for a job well done!

IAVCEI was originally organized in Rome in 1922 as the volcanology section of the International Union of Geodesy and Geophysics and emphasized the interdisciplinary nature of their field. The interdisciplinary nature of our profession was even more evident 75 years later in Puerto Vallarta, with sessions ranging from granites to volcanic eruptions and archeology.

The commissions, which are the heart and soul of our association, now number
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ICELANDIC ERUPTION

A subglacial eruption began under the Vatnajökull ice cap in Iceland in the late evening of September 30, 1996 and lasted for two weeks. It occurred under 500 m of ice, but melted through it within 30 hours producing a surface vent (Fig. 1). An eruption plume initially reached an elevation of 2-3 km above the glacier surface and ash was distributed over large part of Vatnajökull. Most of the eruptive products fragmented into tephra because of the contact with ice, and piled up at the glacier bed. Heat from the eruptive products melted more than 3 km³ of ice and the resulting meltwater accumulated in a subglacial lake, later the lake was drained in a catastrophic flood (jökulhlaup).

Iceland is a large subaerial portion of the Mid-Atlantic Ridge and volcanic activity there is related to the divergence of the Eurasian and North American plates. Some of the most active volcanoes in Iceland reside beneath the Vatnajökull ice cap, which is Europe's largest ice cap (mean radius of about 50 km). The recent eruption occurred on a 7 km-long fissure which opened up midway between two of the main volcanic centres beneath Vatnajökull, the Bardarbunga and Grimsvötn volcanoes (Fig. 2). The greatest hazard imposed by the eruption was the possibility of a catastrophic flood, because of the large amount of meltwater. Scientists from a number of Icelandic institutions

Fig. 1. Eruption column a few hours after the eruption broke through the ice. Black ash explosions reach an altitude of about 500 m above the glacier surface, eruption plume of steam and finer ash extends to an elevation of 2-3 km. Photo credit FS.



collaborated on the monitoring of the eruption. Efforts included seismic monitoring, and monitoring of changes on the surface of the ice cap. There were precursors to the eruption in the form of unusual earthquake activity. In the morning of September 29 a magnitude 5 earthquake occurred in the Bardarbunga volcano. It was not unusual. Earthquakes of this magnitude do occur in Bardarbunga but usually they are not followed by significant aftershocks. However, this earthquake was followed by an intense earthquake swarm that had many characteristics associated with magmatic movements. Public warning of a possible eruption in NW-Vatnajökull was issued by the Iceland Civil Defence after consultation with scientists. It was then in the evening of October 1 that an eruption tremor was recorded on a seismograph in Grimsvötn and the eruption began. The tremor amplitude provided a good measure on the vigour of the eruption. It was most intense during the first few days and then decayed.

The eruption was subglacial for the first 30 hours. During an overflight

on October 2 new ice cauldrons were seen between Grimsvötn and Bardarbunga. These had formed in response to melting of the ice cap from below, by the eruption. Meltwater from the eruptive site flowed along a

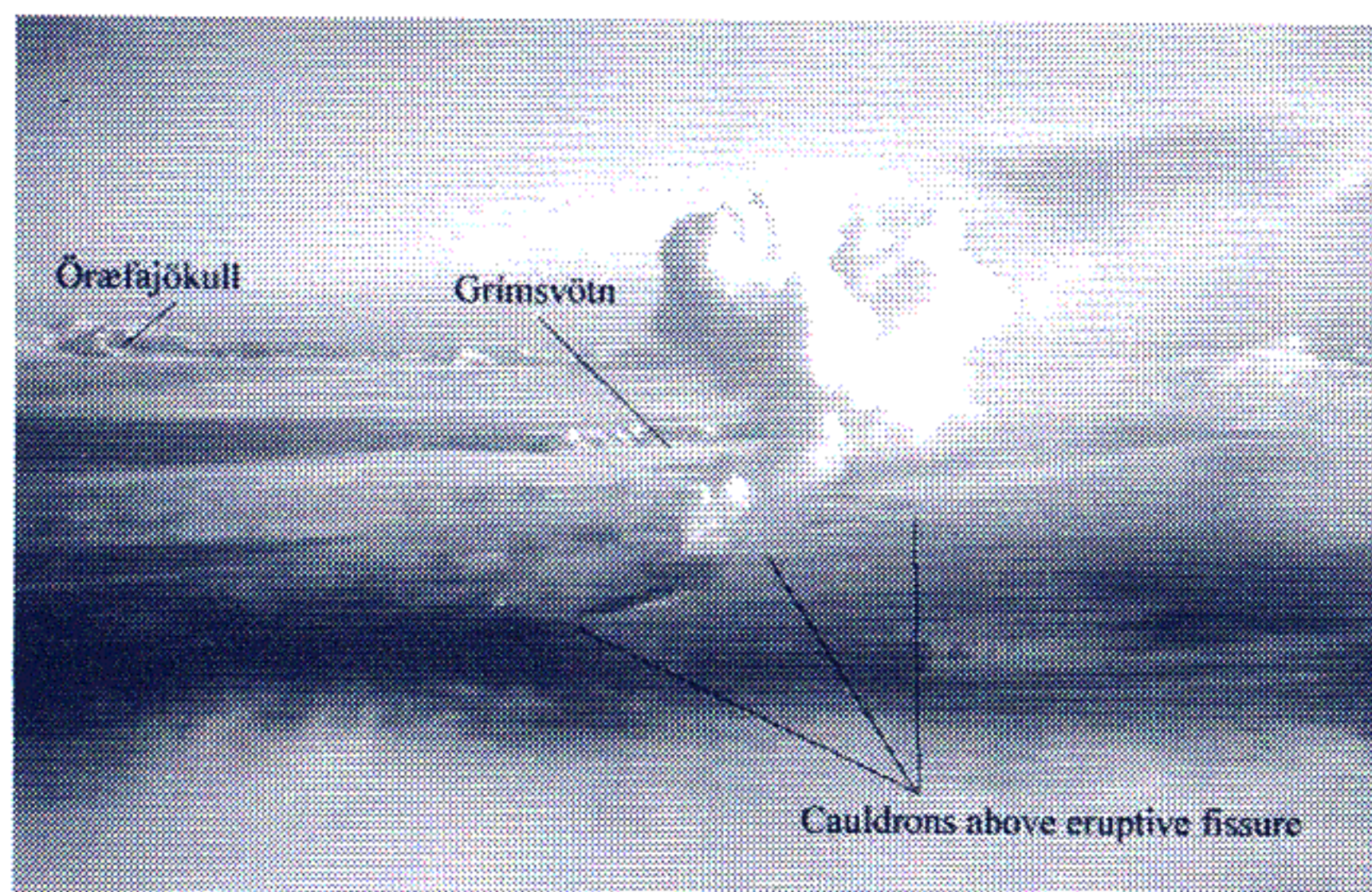


Fig. 2. Bardarbunga and Grimsvötn are two of the main volcanoes beneath the ice cap. Both have calderas. Mid-way between them is the eruptive fissure. Before the eruption this part of the ice cap was flat. Photo credit FS.

subglacial channel towards Grimsvötn. This was evidenced by a shallow linear depression that had formed on the surface of the ice cap from the eruptive site to Grimsvötn. There the meltwater accumulated in the subglacial Grimsvötn caldera lake. When weather permitted, the eruptive site and changes on the surface of the ice cap were monitored daily from the air. The volume of the ice cauldrons above the eruptive fissure (Fig. 3) could be measured, as well as the lake level of the Grimsvötn lake. A radar altimeter and a Global Positioning System (GPS) navigation unit onboard an aeroplane were used to map the size and depth of the ice cauldrons, as a function of

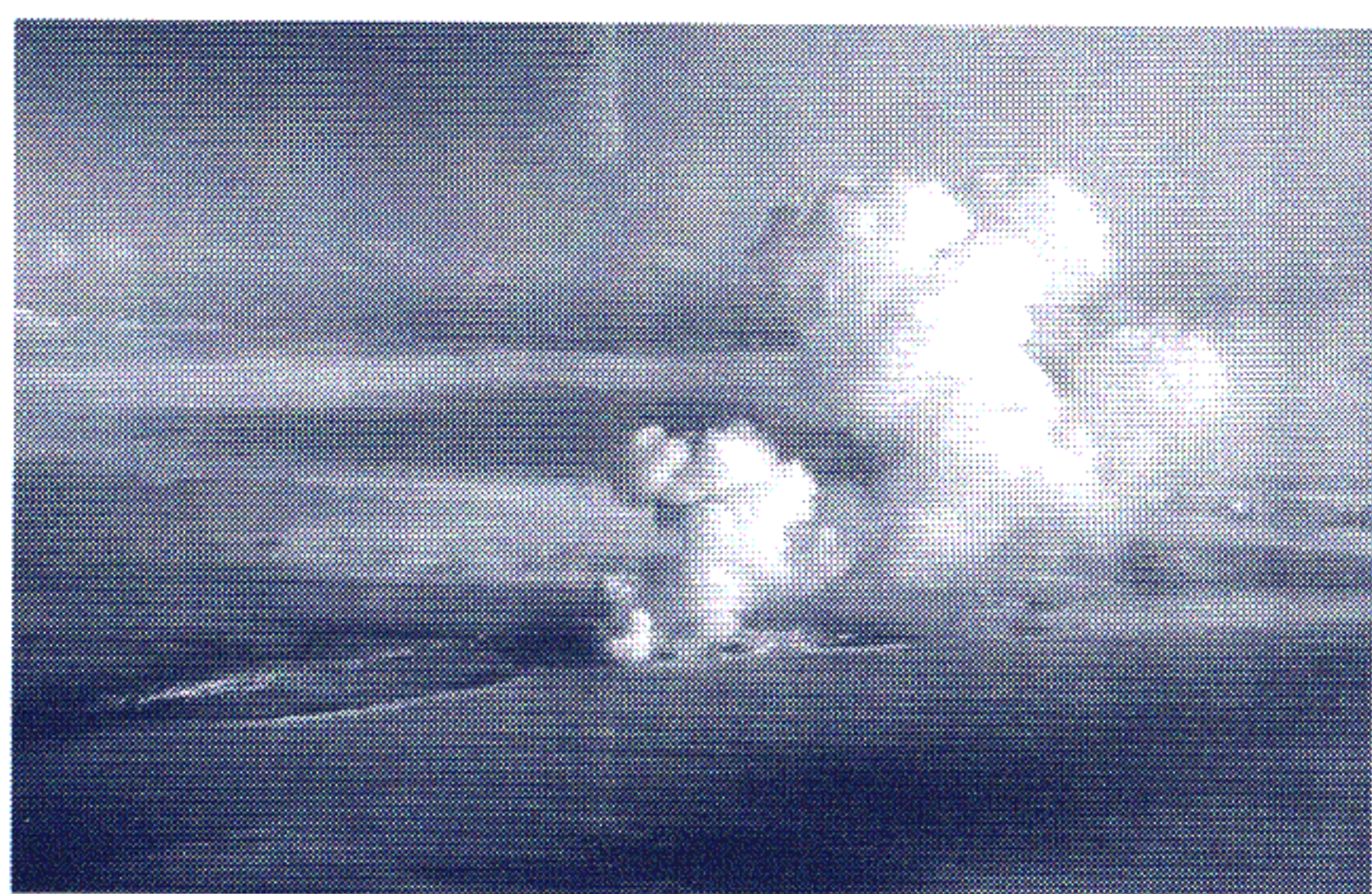


Fig. 3. The eruptive site on 3 October during low eruptive activity. Steam plume emanates from the open crater; newly developed ice cauldrons lie above the eruptive fissure. By this third day of the eruption, more than 1 km³ of ice had melted. Photo credit FS.

time. The level of the Grimsvötn caldera lake was measured by monitoring changes in the elevation of the ice shelf covering the lake. Initially the lake level rose by more than 10 metres per day, and the changes could be estimated with the help of oblique air photographs. Later the elevation of the ice shelf was measured by GPS geodesy, by installing a GPS receiver on it. The eruption ended on October 13, but meltwater continued to flow from the eruptive site, towards Grimsvötn. It was not until November 4, that the expected jökulhlaup occurred. It lasted only 3 days, with peak discharge rate of about 45000 m³/s. It caused extensive damage to road and

communication systems along alluvial plains on the south coast in Iceland. Based on the volume of ice melted, and the known heat content of the erupted lava, the volume of the erupted material is estimated to be more than 0.3 km³ DRE (Dry Rock Equivalent). This is the fourth largest eruption in Iceland during this century.

Freysteinn Sigmundsson

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**CONGRATULATIONS
 DICK FISHER**
 on being awarded the prestigious
Thorarinsson Medal for 1997.

The Thorarinsson Medal is awarded every four years by IAVCEI for outstanding contributions to the general field of volcanology. It comes with a prize of US\$2000.

>>Continued from page 1:

twelve; two of these commissions (Volcano Seismology and Physical and Chemical Properties of Materials of the Earth's Interior) are jointly run with our sister organization, the International Association of Seismology and Physics of the Earth's Interior (IASPEI). New IAVCEI subcommittees were formed at this assembly and include: 'Eruption Warning Systems', 'Operational Procedures', and 'Crisis Protocols'. This activity within the commissions and subcommittees is a clear indicator of a lively, growing association, driven by you, the members. With the introduction of personal membership to encourage more participation by individuals, we will have a postal vote for election of the 1999 - 2002 Executive Committee.

Dick Fisher was the popular and worthy recipient of the prestigious Thorarinsson Medal at the Opening Ceremony.

The new IAVCEI video, 'Reducing Volcanic Risk', produced by Steve Brantley, made its debut at Puerto Vallarta and was a huge success. The new video and the IAVCEI video 'Understanding Volcanic Hazards' can be ordered from NWIA (see margin of this page for details). The *Bulletin of Volcanology* continues as our technical publication and is now edited by Don Swanson. Hazel Rymer is editor of the new *IAVCEI News*, which will grow if you actively participate and contribute to this, our official newspaper.

Information on the next IAVCEI General Assembly, to be held July 11-17, 1998 in Cape Town, South Africa, is provided in this issue of *IAVCEI News*. I hope that all of you will be able to attend and make our next General Assembly as exciting and productive as the one hosted by Mexico.

Grant Heiken

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IAVCEI International Volcanological Congress

'Magmatic Diversity: Volcanoes and their Roots'

11-17 July 1998 : Cape Town, South Africa

The Congress will be held on the campus of the University of Cape Town in the period 11-17 July 1998. Poster and oral presentations will be organised into symposia that support the interests of the various commissions of IAVCEI and which highlight appropriate and relevant aspects of the igneous and volcanic geology of southern Africa. A number of complementary pre- and post-congress field trips will also be on offer.

To receive an electronic or hard copy of the announcement circular (WordPerfect 6.1) contact J. S. Marsh, Department of Geology, Rhodes University, Grahamstown 6140, South Africa by mail, fax (+27-461-29715) or e-mail (jsm@rock.ru.ac.za).

To receive the registration circular (scheduled August 1997) with full details regarding accommodation, symposia, field trips, and registration send your name and address to:

Secretariat IAVCEI 1998, Department of Geological Sciences, University of Cape Town, Rondebosch, 7700, South Africa. Fax: +27-21-650-3783.
E-mail: ivc98@geology.uct.ac.za

For further information, check our web site

<http://www.uct.ac.za/depts/geosci/ivc98>

COMMISSION ON EXPLOSIVE VOLCANISM

After 4 years of service, commission leaders Armin Freundt and Mauro Rosi were replaced by Greg Valentine and Michael Ort, who were elected at the commission membership meeting on Thursday, January 23rd during the IAVCEI General Assembly in Puerto Vallarta, Mexico. Any queries and suggestions concerning CEV should be directed to the addresses at the end of this note.

As the 'old' leaders of the commission, we (AF & MR) wish to express our thanks to all who have supported our work. We hope to have successfully served the purposes of CEV, which are to foster modern, process-oriented studies of pyroclastic rocks, to encourage communication between scientists from the various branches of research directed to such studies, to provide input into other areas such as volcanic hazards and atmospheric impacts, and to promote interest in explosive volcanism and its products. Our special emphasis has been on two problems:

(1) We wanted to encourage scientific exchange between volcanologists focused on field interpretation of pyroclastic deposits and volcanologists focused on experimental and theoretical modelling of explosive volcanic processes. A

significant number of 'modellers' have now become members of the CEV and have participated in CEV activities (see below).

(2) We also felt a special need to integrate volcanologists from Eastern European countries and Russia into our community, and the number of members from these countries has been steadily rising. Unfortunately, the field workshop on andesitic stratovolcanoes in the Carpathians of Romania last year found almost no response from 'western' scientists even though it offered very interesting geology. Future efforts must therefore also be directed to raise the interest of CEV members in interaction with volcanologists in eastern countries, not only in Kamchatka!

Recent workshops initiated by CEV:

- Aug. 15- Sept. 1, 1996, joint CEV-CVS field workshop on andesitic stratovolcanoes in the Carpathian Mountains, Romania, led by Alex Szakacs and Ioan Seghedi.
- Sept. 8-15, 1996, field workshop on Santorini in conjunction with the Arthur Holmes conference of the Geological Society of London; led by Tim Druitt, Steve Sparks and G. Vougioukalakis.
- Sept. 17-23, 1996, joint CEV-CMVD workshop on Vesuvius Decade Volcano, Italy; led by M. Rosi, R. Santacroce, A. Sbrana, R. Cioni and L. Civetta.

1998 IVC - Send for your registration circular now!

CEV also initiated a symposium on Explosive Volcanism during the IAVCEI General Assembly in Puerto Vallarta, Mexico. Preceding this meeting, a CEV short course on 'The Physics of Explosive Volcanism' was held on January 17-19. At least 36 people (the number kept rising during the course) from 12 countries and with a wide range in professional experience and interests participated in the following six lectures:

- 1 Magmatic degassing and fragmentation, by Don Dingwell
- 2 Eruption column physics, by Greg Valentine
- 3 Eruption columns: particle transport and fallout, by Mauro Rosi
- 4 Phreatomagmatic explosions, by Bernd Zimanowski
- 5 Pyroclastic flow transport mechanisms, by Armin Freundt and Marcus Bursik
- 6 Pyroclastic surges and compressible two-phase flow, by Ken Wohletz

The commission presently has 255 members from 31 countries.

As new leaders of CEV, Valentine and Ort will continue with the mission that is laid out above. We are discussing symposia for at least two upcoming conferences (1998 IAVCEI Congress in South Africa, and 1999 IUGG General Assembly in UK). If any IAVCEI members have suggestions for CEV-sponsored symposia or workshops, please contact MO or GV. We would particularly like to pursue symposia that can be sponsored jointly with one of the other Commissions, in order to promote multidisciplinary work.

An important role for CEV is the CEV newsletter that we will distribute at least two times per year. In addition to publicizing upcoming conferences, symposia, and workshops, we hope to provide summaries of these events after they occur. The CEV newsletter is also an excellent forum to discuss briefly and informally your explosive volcanism research. If you are interested in submitting a short (1/2 to 1 page, single spaced) article on your work or on an idea or topic of debate, please contact MO or GV. It is these contributions that make the newsletter interesting, and more than just a bulletin board. As this is not peer-reviewed, it could be a good place to test new ideas, and seek comment. Debate is welcome.

You can also access the CEV homepage via the IAVCEI homepage. We will post current newsletters and other items of interest on the CEV homepage. Note that if you submit material for the newsletter, we will immediately post it on the homepage, so that the information will be available in a more timely way than waiting for the hard copy newsletter.

Armin Freundt and Mauro Rosi

New Commission Leaders:

- Greg A. Valentine, Los Alamos National Laboratory
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E-mail: gav@vega.lanl.gov
http://ees-www.lanl.gov/EES5/mag_planet.html
- Michael Ort, Northern Arizona University
E-mail: michael.ort@nau.edu

A MESSAGE FROM THE SECRETARIAT

The IAVCEI Secretariat has been set up to assist the Secretary General, Wally Johnson, in running the affairs of IAVCEI, in particular the administration of memberships. I set up the office in February starting with the re-organisation of membership lists. In the process of completing outstanding applications and smoothing out problems I have already been able to get to know quite a few members! The backlog of applications and renewals from the General Assembly in Puerto Vallarta, Mexico, is over so there will hopefully be less delays in dealing with your requests. Thank you to all those members who have already renewed their memberships for 1997. In future, renewals forms will be mailed towards the end of the calendar year, probably with the last *IAVCEI News* of the year.

The IAVCEI Executive Committee agreed to publish the *IAVCEI News* in Canberra following advice that this would save considerable money and also result in greater flexibility. This meant a steep learning curve for me as I was to desktop design the *IAVCEI News* using PageMaker; a completely new venture for me and of course within a vanishingly small time frame. I hope you like the format. I must apologise to those keen authors who submitted articles that have not been included as space is limited this time. Thank you and be assured the articles will be used in a later issue this year.

I am enjoying the work for IAVCEI and am seeking ways to improve the service that the Secretariat offers you, so I will be very grateful for your comments and suggestions. Keep in mind that I know nothing about volcanology as I am a physicist. I previously tutored and lectured physics to first year university students at the Australian Defence Force Academy for ten years. That was before funds were cut and I joined the Australian Geological Survey Organisation. After a little time monitoring the Earth's magnetic field I was caught up in yet more funding cuts. Now I work part time for AGSO and IAVCEI which explains why my e-mail address is still with AGSO.

The next issue of *IAVCEI News* will be much larger as it will mark IAVCEI's 75th anniversary. Please think of submitting short articles, announcements, solo photographs with captions, letters or anything else suitable for our commemorative issue which is scheduled for the middle of the year.

Caroline Giddings IAVCEI Secretariat

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