ASH FALL
Newsletter of the Volcanology and Igneous Petrology Division
Geological Association of Canada

#49 **November, 1999**

Editorial Ramblings

Just back from a trip to France including an extended visit to the Auvergne, where it all began. In the late 18th century Nicolas Desmarest sent his famous letter to Werner contesting the widely held view that crystalline rocks were deposits of a primal ocean, concluding with "Venez à l'Auvergne et voir." Well Werner didn't, others did and as the Neptunian theories slipped into obscurity, volcanology and igneous petrology were born.

One of the latest buzz words, particularly amongst those of the geochemical persuasion is "robust numbers" which I take by the usage to mean solid confirmation for the theory about to be propounded. I suppose this is an extension of the strong and healthy, vigorous meaning of the word, but my candidate for a robust number (strongly built, muscular, sturdy) is eight. Weightier than almost all the others, solidly built, symmetrical, not top-heavy like seven and nine, its nearest competitors. Trouble is, when an LED display clears itself (you can verify this at a gas pump), it cranks out a row of eights.....Hmmm, did this scientist just misread the display on his instrument?

Technology certainly is a boon to slide and poster preparation, but beware the traps. Diagrams so complex they cannot possibly be understood, fonts, colours and gimmicks that look terrific on the computer monitor and cannot be seen past the first row. Print your conclusions, add red on the parts you want to emphasize, print it on a white background and Voila! no one knows what you said, the red is invisible. Gimmicks include those standard backgrounds for slides that are designed for sales meetings. One has what appears to be the reflection of a window in the middle which inevitably obscures the vital part of the presentation. I recently saw a poster presentation sprinkled with Canadian red maple leaves (and it was from a European source),- it looked like my front lawn. I am alarmed by the resurgence of presentations using overhead projectors, where the audience is treated to the speaker fumbling with his next acetate (and the separator sheet), then treating us to the keystone effect with about one third of the image truly in focus, and finally slapping down the acetates inclined to the right then to the left, leaving the audience with a collective Wimbledon neck.

Enough! Membership in the Division has passed 200, with 45 student members. I hope they will be active, and pass on their comments to their Councillor, Patricia Corcoran.

Origins of the Volcanology Division, GAC

The Volcanology Division of GAC was established in 1974 but its organizational roots sprang from the advisory committee structure of the National Research Council. This had been set up some years before to keep the government informed on scientific matters within the country and to interface with international science organizations such as the International Union of Geodesy and Geophysics (IUGG). Volcanology was a late adherent to the structure in Canada, presumably because we had few of what geophysicists regard as active volcanoes and internationally, volcanism was viewed as a mainly geophysical phenomenon because of its disruptive influences on seismic harmony. However, with a growing appreciation of its petrogenic aspects and its significance in Canada, a subcommittee on volcanology was established in 1965(?) under the Associate Committee on Geodesy and Geophysics of NRC. The first subcommittee was chaired by H.D.B.(Bruce) Wilson of the University of Manitoba. The responsibilities of subcommittees were to keep abreast of developments within their fields of interest and to report on these to the Associate Committee at annual or biannual meetings. The meetings were traditionally held in Ottawa but because of the more field oriented interests of the Volcanology Subcommittee, Bruce Wilson arranged to have one meeting each year outside of Ottawa where the subcommittee could also participate with local geologists in volcanology-related field trips. This activity helped to identify and to cultivated an extensive interest in volcanology within the geological community in Canada. Accordingly, in

1972 when, because of anticipated budgets cuts, NRC proposed to disband most of the committees in favour of having their functions assumed by independent societies, volcanology was thought to have sufficient support to warrant the formation of a society. Hence, the subcommittee appointed itself the organizing committee for a new volcanology society. It comprised the following members: W.R.A. (Bob) Baragar (chairman), F. (Fab) Aumento, H. (Bud) Baadsgaard, J. (Julian) Boldy, N. (Neale) Church, L.C. (Les) Coleman, J.J. (Jeff) Fawcett, H.J. (Hugh) Greenwood, B. (Bernie) Gunn, R.Y. (Bob) Lamarche, and G.R. (George) Stevens.

Planning for the new society took place at the next two meetings of the old subcommittee; at Acadia University in May, 1972 and at Princeton and Campbell River, B.C. in May, 1973. An early decision made by the subcommittee was that, rather than a stand-alone society, volcanology should associate with a larger organization such as a division of either the Geological Association of Canada (GAC) or the Canadian Geophysical Union (CGU), which was then forming as the successor to the Associate Committee. Opinion favoured association with the GAC since in Canada most volcanological research is done by geologists rather than geophysicists. Subsequently a constitution was prepared and submitted to GAC, with a proposal for formation of a volcanology division. Approval was obtained at the 90th meeting of Council in Quebec City March 8, 1974 and the inaugural meeting of the Division was held at the GAC Annual Meeting in Quebec City May 22,1974. The slate proposed for the first executive was purposely drawn from outside the membership of the old subcommittee, to signal its newly-launched independence, except for the otherwise empty position of Past Chairman. As the last chairman of the old subcommittee Bob Baragar assumed the role of Past Chairman with the obligation of carrying forward the projects and reporting responsibilities that had been inherited from the subcommittee. The first executive was as follows:

Past Chairman: W.R.A. Baragar, G.S.C.

Chairman: A.M. Goodwin, Univ of Toronto

Vice Chairman: J.G. Souther, G.S.C.

Secretary-Treasurer: J.J. Fawcett, Univ of Toronto

Councillor West: L. Ayres, Univ of Manitoba

Councillor Central: L. Gélinas, École Polytechnique

Councillor East: D. Strong, Memorial Univ.

Councillor Geophys-Oceanography R. Chase, U.B.C

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Geological Association of Canada

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A symposium had been planned to mark the inauguration of the new division but it could not be prepared in time for the Quebec meeting and was held during the following Annual Meeting at Waterloo in 1975. The subject of the symposium "Volcanic Regimes in Canada" was selected with a view to touching the interests of as wide a range of the potential membership as possible and it was successful in both this respect and as a first major assemblage of volcanology papers in Canada. It was published as GAC Special Paper 16 in 1977 under the editorship of W.R.A. Baragar, L.C. Coleman, and J.M. Hall.

Since its inception the Volcanology Division has gradually expanded activities to include regular sponsorship of scientific sessions at annual meetings, field trips, a newsletter, and an awards program. These have all contributed towards nourishing volcanology research on our rich endowment of volcanic rocks in Canada. No longer is our relatively sparse inventory of smoking volcanoes regarded as the disadvantage that it was once thought to be.

TO ALL STUDENT MEMBERS

Our recent tally indicates that there are presently 45 student members in the Volcanology Division. Where are you? Students tend to move around quite a bit and although many of you listed your home and email addresses when you officially enrolled, it appears that several of you have moved since that time. We not only want to get each Ashfall into your hands and minds, we would also appreciate your input. What do you expect from the Division? Would

you like to be more involved in some aspect of the newsletter or our yearly meetings? Don't forget that each year at the GAC/MAC conference, there is a meeting/luncheon for all members (yes, this does mean free food!). The more members that contribute to the meeting, the stronger the division becomes. Because student members constitute approximately one-third of the Volcanology Division, imagine the amount of power you could yield just by showing up! More importantly--the big volcanology guns attend the meeting and if you're interested in graduate or post-doctoral studies, this is the place to mingle with the VIP's. Please get in touch with our secretary/ treasurer Ned Chown (madned@kingston.net) with home or email address changes. If you know of any other student members that haven't received an Ashfall, inform them to get in touch with Ned or me. Your input is a commodity and participating in the division functions could significantly enhance your future. Don't miss the opportunity.

Patricia Corcoran (student councillor) email: corcoran@is2.dal.ca

Patricia, a doctoral student at Dalhousie, is a graduate of Laurentian and Chicoutimi and works in the NWT. - Ed.

Awards

As it is time to call for nominations for our annual awards, (see page 7) it may be of interest to record the previous winners in each category.

Career Achievement

1999: Peter Roeder
1998: James Nicholls
1997: no award
1996: Thomas Pearce
1995: Jack Souther
1994: William H. Matthews
1993: W.R.A.Baragar

Gélinas gold and silver medals

1999: David Morin; Alison Rust
1998: Ben Edwards; Glyn Williams-Jones
1997: Mark Shore; Martin Heiligman
1996: no award; no award
1995: Helene Gaonac'h; Steinunn Haauksdottir
1994: no award; Shelley Higman
1993: no award; Sabrina Trubia
1992: no award; Brigitte Dionne

in 1991 Gélinas prizes were awarded to
Barry Cameron and Angela Kolisnik

Gélinas Bronze Medal

1999: Pierre-Simon Ross
1998: Vanessa Gale

News

In June 1999 John Stix (Vice Chair) moved from the University of Montreal to McGill University. John is currently designing courses in volcanology and natural hazards for the Department of Earth & Planetary Sciences and the School of the Environment at McGill. He has ongoing and new projects on calderas, microgravity, gas petrology and remote sensing, and boron isotopes, among others.

He also would like to call attention to a new volcanology book, entitled "Encyclopedia of Volcanoes", of which he is an Associate Editor. This 1,417 page book, which has just been published by Academic Press, treats a wide array of topics in volcanology in considerable detail. One reviewer called the volume "the volcano book of the century". The Encyclopedia sells normally for $100 US, but Amazon is selling it at $70 US.

Also see his summary of volcanology in July 1999 Geotimes.

John Stix
Department of Earth & Planetary Sciences
McGill University
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Montreal, Quebec H3A 2A7

Volcano News

A few old regulars are still doing their thing, some follow up reports on active volcanoes.

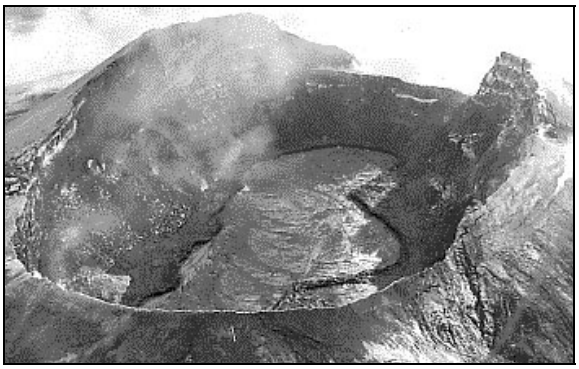
Kilauea

Courtesy Hawaiian Volcano Observatory

Overview

Lava never completely left the crater following the intrusion farther uprift on September 12. Most of the lava drained underground, but a small pad remained near the centre of the crater. It slowly rose, and by September 16 the lake was about 92 m below the east rim of the crater and 50-60 m in diameter. In the next week the lava rose to bout 63 m below the east rim and covered most of the crater floor. The lake has remained at this approximate level for the past month, episodically rising 10-15 m and occasionally overflowing onto the top of the adjacent terrace and resurfacing it.

A new collapse pit formed in the west gap of the crater during the intrusion and withdrawal of the lava lake. This pit is 30-50 m wide and 12-15 m deep. It was inactive until October 16, when spattering began from a vent on its floor. Some time between October 17 and the pit filled with lava and overflowed, producing a shelly pahoehoe flow 160 m long.



Aerial view of lava lake in Pu`u `O`o looking southwest. Shimmering hot crust on lava lake covers most of the crater floor on September 25. One small fountain plays along the southwest margin of the lake. The flat terrace surrounding the lake is about 50 m below the steaming cracks on the north rim of the crater (right), where most ground observations of the lake are made. The depth to the lake is measured from the near crater rim.

On September 23 lava reappeared on the ground surface south of Pu`u `O`o, the first time since the intrusion on the 12th. Small vents supplied lava in Puka Nui, from a new spatter cone just west of the minishield south-east of Pu`u `O`o, and from several skylights in the old lava tube farther south. The largest breakout was at about the 670-m elevation. The next day another breakout was occurring just downslope at about 625-m elevation. Over the next several days most surface activity was concentrated at these two breakouts and another at about 530 m, which sent a flow to the top of Pulama pali at about 460 m.

On October 1 a channelized `a`a flow from the 530-m breakout made it down the pali to about the 300-m elevation. Most of the flow crossed earlier episode 55 flows, but in places the flow entered forest, starting small fires and triggering methane explosions. On October 3 a pahoehoe and `a`a flow made it to the base of the pali at about the 90-m elevation. This flow had stopped moving by the next day.

On October 5, flows resumed from the 655-m breakout site, which on September 23-30 had gradually built a perched pond (a low, shield-like structure with a small pond on its top) about 15 m (50 feet) high. Surface flows from this perched pond continued for the next several days, never moving more than a few hundred meters before stagnating. This continued activity built the perched-pond structure to a height of 36 m above its downslope base; the flat top of the structure is 175 m in diameter.

A new breakout site, at 640-m elevation, was first recognized on October 12, between the old 655-m and 625-m breakouts. The flows moved short distances downslope and burned brush and small trees in bordering kipuka. Finally, on October 17, a 100-m-wide `a`a flow from the 530-m breakout point made it about halfway down Pulama pali before stagnating at the 365-m elevation.

The next flow to descend the pali began in late afternoon of October 22. By 0530 the next morning, the flow had reached about the 335-m elevation on the pali and was burning bordering vegetation. The pahoehoe flow was continuing in late morning, the time that is being written.

During this period the lava tube active before September 12 has been empty below the lowest breakout point. That means that no lava was travelling underground to the coast. The tube drained just after the intrusion, and its roof began to cool. Rocks shrink and break when they cool, so the roof fell apart in places, forming dams along the tube. When lava re-entered the tube, the dams blocked its flow in places--the points of surface breakouts. Apparently the dam at about 530-m elevation persists, so that the tube cannot carry lava beyond that point.

Lava discharge has decreased. Measurements of lava flux during this period have been difficult. However, estimates are consistently about 150,000-200,000 cubic meters per day, only about half that before the September 12 intrusion. This decline probably results from some change within Kilauea itself, not in the magma supply rate from the mantle. The summit of Kilauea is now as inflated as before the intrusion, but the surface output is down. This implies that more underground storage has been created in the east rift zone, possibly owing to widening of the zone during the intrusion.

Etna

12 November 1999 update. After another episode of vigorous lava fountaining and overflows on the W flank on the evening of 3 November, activity at the Bocca Nuova appears to have diminished considerably, and it seems that also the effusive activity near the Southeast Crater cone has almost ceased. However, since 4 November bad weather conditions have permitted only rare glimpses of the summit area of Etna; the first substantial snow falls have occurred on the mountain, and access to the summit area has become difficult. In spite of the poor weather conditions Giuseppe Scarpinati visited the summit area on 6 November and observed very minor lava emission and a sluggish lava flow at the effusive vents at the ESE base of the Southeast Crater cone; it seems that there was little activity elsewhere in the summit area on that day. The following days were characterized by low levels of activity any time the summit area was visible, and there was no incandescence at night, neither near the Southeast Crater nor at the Bocca Nuova. On the morning of 12

November, there was renewed ash emission from the Bocca Nuova before clouds again prevented any further observation.

The current interval of relative quiet does not necessarily imply that the spectacular activity initiated several weeks ago has completely ceased. During the 1964 summit eruptions, which were very similar to the recent activity, eruptive episodes separated by quiet intervals of days to weeks occurred over a period of 5 months. This means that the Bocca Nuova may well resume its activity within the next days to weeks.

Etna seen from NW (near the village of Maletto) on the afternoon of 25 October 1999, with a large lava flow running down its W flank. The course of the flow is marked by a white gas plume. At the time the photo was taken, the flow front had nearly reached the forest limit.

Based on the observations of the past six days, it appears that the activity has settled into a more regular pattern. The opening of the new vent below the W rim of the Bocca Nuova is probably due to the intrusion of lava under the extrusive pinnacle of 25 October, and not to the opening of a new fracture towards the W flank. It is assumed that this activity will continue for weeks.

Tungurahua

Ecuador

1.467°S, 78.442°W; summit elev. 5,023 m

Tungurahua is a steep-sided stratovolcano that towers 3 km above its northern base. Historical eruptions have originated from the summit crater and have included strong explosions and sometimes lava flows, lahars, and pyroclastic flows that reached populated areas at the volcano's base. The volcano's complex historical record includes sudden, violent eruptions.

09/99 (BGVN 24:09) Elevated seismicity and SO2 fluxes led to an eruption on 5 October

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In mid-September, increasing seismic activity was recorded at the volcano, continuing into the first week of October. As a result of this increased activity, instrumentation for a new deformation network was installed on the W-side of the volcano and 10 new seismic stations were installed on the N-side and at other locations on the volcano. In late September, an inclinometer was installed adjacent to the seismically active area and a Yellow alert was declared, which continued as of 5 October.

Increased seismicity started on 14 September in conjunction with increased gas emissions, with plumes rising up to 3 km above the volcano. On 1 October, a column of vapor and gas rose to a height of 1 km. COSPEC measurements on 2 and 4 October indicated elevated SO2 fluxes of ~4,300 and ~9,500 tons/day, respectively. Then on the morning of 5 October three explosions at 0721, 0738, and 0743 threw blocks of rock and ash around the crater. The largest in this sequence, at 0738, yielded a reduced displacement of 25 cm2 and explosion hypocenters 4-5 km under the crater. During the night of the 4th, seismicity had reduced considerably and the activity that followed appeared to have produced a seal, leading to the subsequent explosions.

One particularly vulnerable town, Baños, was evacuated during the current crisis. A more complete report on Tungurahua's recent eruption will appear in next month's Bulletin.

Information Contact: Instituto Geofisico, Escuela Politécnica Nacional, Apartado 17-01-2759, Quito, Ecuador (URL: http://www.cybw.net/volcan/).

Guagua Pichincha

north-central Ecuador

0.171°S, 78.598°W; summit elev. 4,784 m

Guagua Pichincha and the older Pleistocene Rucu Pichincha stratovolcanoes rise immediately W of Quito at the W end of the 25-km-long volcanic complex. The horseshoe-shaped summit crater, ~2 km in diameter and 600 m deep, was breached to the W during a late-Pleistocene slope failure ~50,000 years ago. Subsequent late-Pleistocene and Holocene eruptions from the central vent consisted of explosive activity with pyroclastic flows accompanied by periodic lava dome growth and destruction. Many minor eruptions have occurred since the Spanish era. The central lava dome was probably emplaced during the volcano's largest historical eruption, in 1660, that dropped 30 cm of ash on Quito and generated W-flank pyroclastic flows. The volcano has no permanent ice cap.

08/99 (BGVN 24:08) Phreatic explosions, seismic increases, and elevated hazard status

09/99 (BGVN 24:09) Magmatic outbursts; unprecedented seismicity; explosions up 2-fold

A small phreatic explosion that probably occurred in mid-August deposited fine tephra as much as 1 km SE of three new vents (3-8 m in diameter) in the summit crater. The new vents formed just E of a lava dome, about [625] m in diameter. Aerial observers reported increased fumarolic activity in the summit

crater about 20 August. Plume heights of as much as several hundred meters were reported in mid-August and a group that climbed the volcano 11-13 September observed a 200-300-m-high plume, but vapor emission had declined to only 2-3 times its normal level by early October. Temperatures of summit crater fumaroles in early October were 88-90°C, comparable to those recorded in 1976.

Seismographs at Quito and at Cotopaxi volcano (60 km to the SSE) recorded a series of earthquakes, some of which were large enough to be felt. However, the volcano is in a tectonically active zone and none of these events were large enough to be detected by the WWSSN. Earthquakes on 12 August at 0804 and 21 August at 0718 had intensities of MM III-IV in Quito. Smaller events recorded on 25 August at 0651 and 26 August at 1311, both apparently centered about 40 km S of the volcano, were not felt, but residents of Quito noticed an event on 28 August at 1822 that probably had a nearby epicenter. Seismographs installed on the N, E, and S flanks 25-27 September had recorded no local seismicity as of 7 October. Dry-tilt stations were emplaced beginning 28 September at sites 11.25 km NNE, 9 km E, and 7.25 km SSW of the central dome.

Information Contacts: M. Hall, Instituto Geofísico de la Escuela Politécnica Nacional; J.C. Sabroux, CNRS, Gif-sur-Yvette, France; National Earthquake Information Center, USGS.

Villarrica

Villarrica is one of the most active volcanoes in Chile with over 60 recorded eruptions since 1558. Seismic activity is normally dominated by continuous tremor associated with background degassing. Eruptive activity is characterized by Strombolian-type explosive activity (in the crater lake) and effusive lava flows.

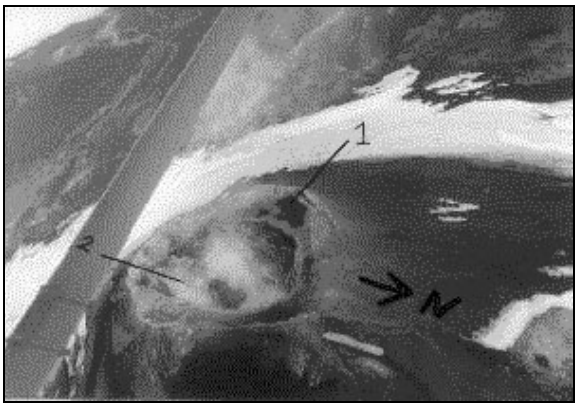
Since 22 August, seismic activity at Villarrica has increased from background levels, shown by an increase in the amplitude of harmonic tremor signals registered at station CVVI, located 19 km from the crater. Periods of high-amplitude tremor lasting 2-30 hours occurred, alternating with background-level tremor (banded tremor). Elevated levels of harmonic tremor lasting for hours-days preceded the last eruption in 1984. OVDAS has therefore recommended to local authorities a move to Level 2 alert scheme adapted for Villarrica. If the harmonic tremor increases further in amplitude or high levels are maintained for longer periods, recommendations will be made to move to Level 3 (Amber). An energetic long-period event on 15 September, the culmination of this period of high-amplitude tremor, is considered to have been associated with a small explosive event in the crater and ash emission.

The level of seismicity rapidly decreased after 15 September to unusually low levels. Magma level in the crater lake however, is inferred to have been high on 25 September from nighttime observations of glow. Observations by local residents suggest that during the early morning of 26 September a second explosion occurred, depositing new ash. This event was not registered by CVVI so is considered to have been less energetic than the first.

On 1 October, OVDAS scientists on a helicopter flight observed that the level of the magma lake was unusually low (~200 m below the crater rim). The incandescent lava was only visible through a small opening (20-30 m) in a solid crust. Ashfall deposits extended ~5 km ESE from the crater. The deposits clearly exhibited two components, that of the Strombolian fountain (proximally) and that of the upper ash plume. A further increase in tremor amplitude and frequency was observed on 3 October. Observations of new ash and projectiles on the crater rim on the 4th suggested that this tremor episode also culminated in a small explosive event.

A new type of seismic signal, apparently strong hybrid earthquakes, was also registered at the VNVI seismic station (4 km from the crater). They have been increasing in number since 1 October (typically 2-3/day) and are not associated with any visible activity. These events do not comprise the normal background activity.

Information Contact: Observatorio Volcanologico de Los Andes del Sur (OVDAS), Casilla 23D, Temuco, Chile (Email: ovdassis@chilesat.net; URL: http://www.dgf. uchile.cl/salsa/ovdas/ovdas.html).



Aerial photo of Villarrica's summit taken 2 March, 1997, looking WSW. Visible features include the fumarolic vents at the ash-covered icefields (1) and the collapsed S terrace (2). Photo Monika Steinmetz.

2 November 1999 update. During the past six days (since 27 October), the activity of the Bocca Nuova has continued at relatively high levels, although there have been no further episodes of paroxysmal activity since that day. Different from the previous week, the activity has been virtually continuous, and has concentrated essentially at the northernmost vent in the Bocca Nuova, where a large pyroclastic cone is rapidly building. Lava continues to flow in surges over the W rim of the crater to run down the W flank on top of earlier flows without reaching the extension of the longest flows produced between 17 and 27 October. On 31 October, the activity at the hornitos on the ESE base of the Southeast Crater cone intensified and continued spectacularly through the evening of 1 November.

The activity between 25 and 27 October consisted of at least two major episodes of intense explosive activity at the Bocca Nuova, resulting in major overflows of lava onto the W flank of the volcano. The longest flows ran down along the S side of a row of small scoria cones formed during an eruption in 1843 and covered the Forestale Road to the S of Monte Nunziata over a width of about 100 m before extending about 200 m further downslope and consuming pine and birch trees. This flow reached its full extension (more than 5 km from the Bocca Nuova) during the night of 27-28 October and then stopped; by 29 October it was stagnant and gas was issuing from various places along the flow margins near the interrupted Forestale Road.

Vigorous lava jetting from the Bocca Nuova was observed at about 0600 h (local time=GMT+2) by Giovanni Sturiale (Dipartimento di Scienze Geologiche of the University of Catania); this activity had declined to discrete Strombolian bursts accompanied by loud rumbling sounds when Sturiale, Boris Behncke, Tom Pfeiffer (University of Aarhus, Denmark, and author of a splendid web page about Santorini volcano) and another person climbed to the summit area at about 1030 h. When they arrived at the S base of the main summit cone (which hosts the Bocca Nuova and the Voragine), occasional bursts of incandescent bombs from the NW vent in the Bocca Nuova; at 1130 h the SE vents in the same crater suddenly reactivated and began to produce forceful ejections of dark gray ash and blocks. The ejecta from these vents were apparently derived from older material filling the vents; there were no incandescent fragments among the ejecta. Passing underneath the SW-directed plume, from which there was a continuous shower of lapilli up to 0.5 cm in diameter, Behncke, Sturiale and their companions reached the S margin of the new lava flow-field below the W rim of the Bocca Nuova at about 1200 h. Vigorous Strombolian activity was occurring at the NW vent where the top of the new pyroclastic cone was seen projecting a few tens of meters above the Bocca Nuova rim; forceful ash emission continued at the SE vents. A modest lava flow was running through a well-defined channel immediately N of the peculiar extrusive pinnacle formed on 25 October on the W rim of the crater, and extended to about 2500 m elevation on the W flank of Etna. At about 1245 h the activity from the NW vent increased notably, with strong blasts inclined to the NW, and less frequent bursts from another vent immediately adjacent to the S or SE. One hour later, Behncke and another member of the team descended the steep W flank of the volcano to examine the lava flows emplaced in that area during the previous two weeks

Between 1730 and 1800, the two members of the team who had remained near the Bocca Nuova observed a gradual increase of the activity at the NW vent in the crater, with some bursts reaching heights of 500 m above the vent. While the active lava flow on the W flank was advancing only very slowly, a new, more voluminous surge of lava began to spill down along the same path at about 1800; this flow extended a few hundred meters below the earlier one. A second, much smaller and much slower flow was observed on the upper WNW flank where incandescent blocks detached almost continuously from the flow front and rolled hundreds of meters down the steep slope.

Vigorous pulsating lava jetting from the NW vent of the Bocca Nuova was continuing when observations ended at about 2230.

On 30 October, Tom Pfeiffer revisited the summit area and reported that relatively mild Strombolian activity continued throughout the day, although there was a distinct increase towards the afternoon. Pfeiffer climbed to the E rim of the Voragine from where he enjoyed a fairly good view of this crater and of part of the adjacent Bocca Nuova. The entire area of the Voragine including the E rim was covered with bombs, probably ejected during the previous two weeks from the Bocca Nuova, and the Voragine itself "had ceased to exist": the large 4 September 1999 crater in the W part of the crater was filled to within about 40 m of its rim. The active cone at the NW vent in the Bocca Nuova was seen to stand very close to the location of the former "diaframma" of which no trace was visible. Pfeiffer observed continued emission of blocks and ash from the SE vents in the Bocca Nuova, forming a plume that was driven to the SW.

On the evening of 31 October, Giuseppe Scarpinati (Italian member of the French Association Volcanologique Européenne - LAVE) observed from his home in the town of Acireale (about 18 km SE of Etna) that vigorous lava spattering had resumed at the site of the effusive activity on the ESE base of the Southeast Crater cone, and lava emission from that site had increased. The next day, this kind of activity continued, attracting thousands of tourists

who ascended the volcano with the cable-car from the Rifugio Sapienza on the S flank of Etna. Scarpinati visited the area of effusive activity on 1 November and described the activity as very spectacular, with voluminous lava flows running towards the Valle del Bove, and spattering from a group of hornitos.

Later on 1 November, Giada and Boris Behncke and a group of four more persons climbed to the SW side of the Bocca Nuova where vigorous Strombolian activity continued from the NW vent, and occasional weak Strombolian bursts occurred from a second vent further to the S. The most striking change since the previous visit three days earlier was the presence of a new eruptive vent on the W flank of the Bocca Nuova, below the extrusive pinnacle of 25 October. This vent, the first to open outside the Bocca Nuova in the current eruptive period, produced mild spattering and emitted lava in at least three branches. The southernmost of these branches ran along the S margin of the new lava field W of the main summit cone, cutting another section (about 10 m) of the summit dirt road, and descended little further. Lava was emitted in surges, with new lava lobes overrunning each other repeatedly. The explosive activity at the NW vent in the Bocca Nuova produced jets up to 300 m high, but about 90 per cent of the ejected bombs fell back into the crater, contributing to further growth of the large pyroclastic cone around the vent. A dense fall of ash and lapilli (with maximum diameters of several millimeters) occurred to the SW of the Bocca Nuova.

CALL FOR NOMINATIONS

1999 AWARDS OF THE VOLCANOLOGY AND IGNEOUS PETROLOGY DIVISION

Career Achievement Award

A medal for Career Achievement is awarded by the Division Volcanology and Igneous Petrology of the Geological Association of Canada in recognition of career achievements in the field of volcanology and/or igneous petrology. Candidates are judged on their lifetime scientific contribution. The award is made only when a suitable candidate is found who is judged to have made major contributions to basic knowledge or clear and significant breakthroughs in volcanology or igneous petrology.

***Nomination Procedure*:** Nominations for this award are due by the end of February, and should be sent to the Secretary-treasurer or any member of the executive, Division of Volcanology and Igneous Petrology. The nomination should include the nominee's curriculum vitae and a clear statement from the nominator describing the candidates significant contribution to the field. Each candidate will be considered three consecutive years.

Leopold Gelinas Awards

The Volcanology and Igneous Petrology Division of the Geological Association of Canada annually presents three medals for the most outstanding theses, written by Canadian or submitted to Canadian universities, which have contents that are at least 50% volcanological or igneous petrology related. A gold (plated) medal is awarded for the best Ph.D. thesis a silver medal is awarded for the best M.Sc. thesis, and a bronze medal is awarded for the best senior thesis. Nominated theses are evaluated on the basis of originality, validity of concepts, organization and presentation of data, understanding of volcanology, and/or igneous petrology, and depth of research. Awards will not be made if the panel of judges considers that there are no worthy nominations.

***Nomination Procedure**:* Nominations for the gold and silver awards are due by the end of February, the bronze award no later than April 15, and should be sent to the Secretary-treasurer or any member of the executive, Division of Volcanology and Igneous Petrology. The nomination must include a copy of the thesis (to be returned), a letter of nomination which must include a clear statement from the nominator describing the contribution the thesis makes to the field of volcanology and/or igneous petrology.

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(please post)

Special session sponsored by the Volcanological and Igneous Petrology Division

at GeoCanada 2000 (GAC, MAC Annual Meeting)

Calgary Alberta, Canada May 29-June 2, 2000, on:

'How magmas solidify'

Conveners: Michael D. Higgins (Université du Québec à Chicoutimi),
Tony D. Fowler (University of Ottawa)

This session is designed to bring together specialists to present research results on the cooling and crystallisation of igneous rocks. Recent work demonstrates that numerous interacting physico-chemical processes lead to the solidification of melts. These processes leave patterns in the form of textures, structures, and geochemical distributions within the rocks. The purpose of this session is to bring together scientists working on the solidification and crystallisation of melts from a variety of experimental, theoretical, and observations avenues (i.e. Crystal Size Distributions, Ostwald Ripening, Self Organization, Far From Equilibrium Processes, Thermodynamics, Fluid Dynamics) to attain a better understanding of cooling-crystallisation dynamics.

Crystallisation, solution, and deformation are important in the solidification of magmas in plutonic and volcanic realms. These processes can be explored by field studies, petrology, and experimental techniques. We would particularly like to see quantitative studies of textural development in volcanic and plutonic rocks.

Abstract deadline: the 7th of January 2000.

For more details contact: Tony Fowler mailto:afowler@uottawa.ca or

Michael Higgins mailto:mhiggins@uqac.uquebec.ca

or visit the conference web site: http://www.geoCanada2000.com/