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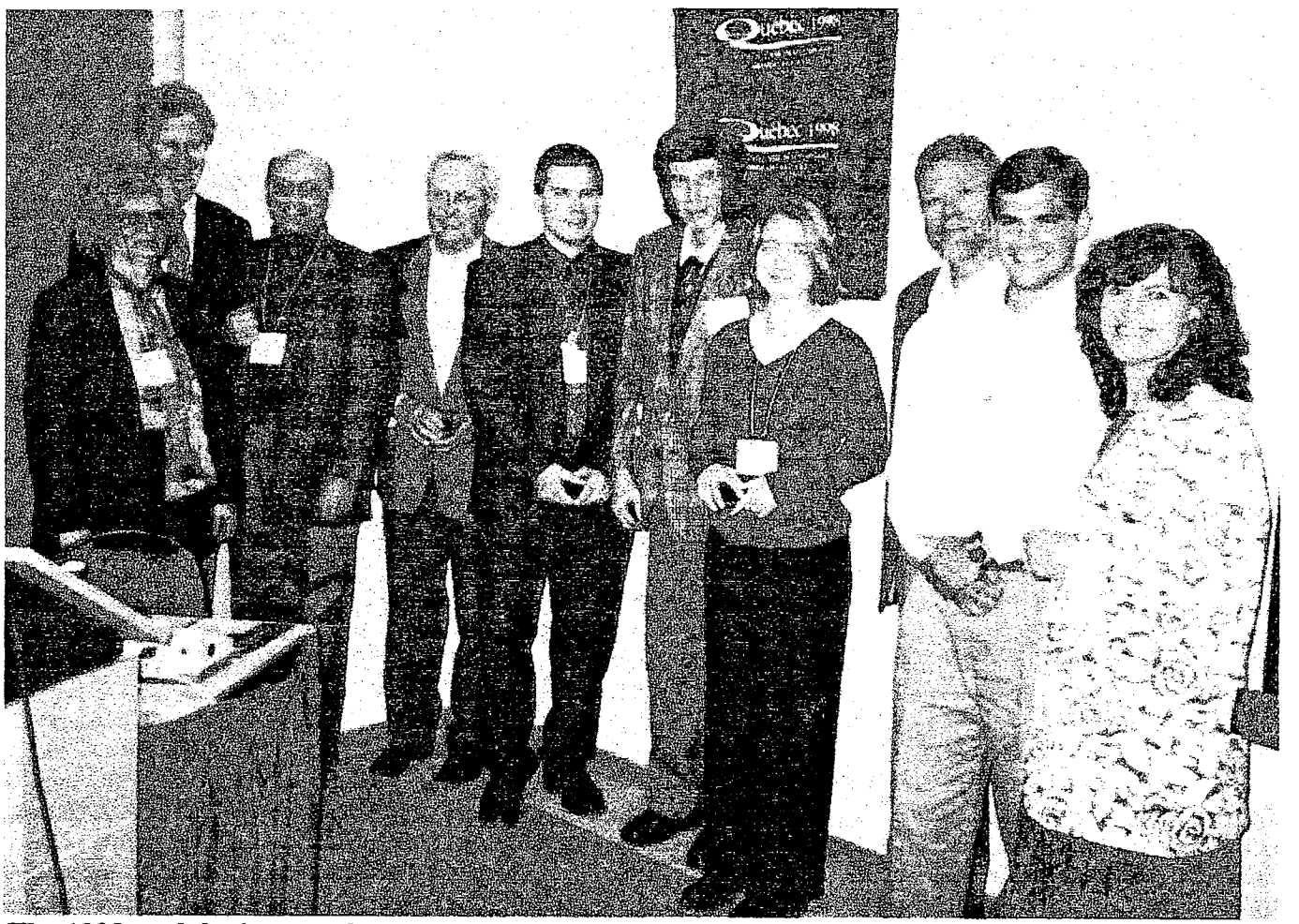
Newsletter of the Volcanology and Igneous Petrology Division
Geological Association of Canada

#46 November 1998

MEDAL WINNERS 1998



The 1998 medal winners, shown here at the annual meeting with the Division executive and Jerome H. Remick III, from the left Georgia Pe-Piper (vice chair), John Stix (councillor), Kelly Russell (chair), Jim Nicholls (Career Achievement), Ben Edwards (Gelinas gold), Jerry Remick, Vanessa Gale (Gelinas bronze), Ned Chown (sec-treas), Glyn Williams-Jones (Gelinas silver), and Cathie Hickson (past chair).

Executive Message

This spring marks the end of my second year as Chair of the Volcanology and Igneous Petrology (VIP) Division of the GAC. I am on the downhill leg of my three year term and it seems an appropriate time to share some thoughts concerning our organization. As an organization within the GAC our aim is to promote and encourage volcanological activities in Canada. Given that mandate, I want to use this text to summarize for you our current status,

to highlight where, in my mind, we are doing well and where we could do better.

Let us start by discussing the executive which includes: Georgia Pe-Piper as Vice-Chair, Ned Chown as Secretary/Treasurer, and Paul Metcalfe, Tom Pearce and John Stix as councillors for western, central and eastern Canada. Basically, these are the people who generate most of the ideas, do all of the arm-twisting and carry out the small tasks that make everything work. Without them and their efforts little would happen in the VIP division. I inherited from Cathy Hickson (Past-Chair) a well-organized and well-run division of the GAC. For the past two years it has been the efforts of my current executive committee that has maintained and expanded the level of our activities. Over the next 12 months several executives will come to the end of their terms. It is absolutely critical that we fill these positions with people of similar quality. ***I am therefore asking you, the members, to help us by volunteering yourself or nominating others to stand for these vacancies as they arise.***

Let us move now to a discussion of our specific activities. There are several areas in which we are on track. Georgia Pe-Piper has taken on the responsibility of finding topics and organizers for VIP-sponsored special sessions at our annual GAC-MAC meetings. At present she has commitments through to the year 2000 when the meeting will be in Calgary. She is always open for suggestions and can be contacted via the VIP home page.

One of the hallmarks of our division is our presentation of the Leopold Gelinas Medals for best theses in Volcanology or Igneous Petrology. We have awarded Gold and Silver medals for PhD and MSc. theses, respectively, since 1992; this year thanks to the generosity of Jerome Remick and the efforts of Georgia Pe-Piper we will unveil a Bronze medal for the best B.Sc. thesis in the subdisciplines of volcanology-igneous petrology. Again for this program to continue being successful we need to ensure that faculty continue to send in nominations for their best students. Nomination procedures are simple and can be found on the GAC National home page.

Our division also sponsors a Career Achievement Award in recognition of long-term, sustained scientific contributions to the fields of volcanology and igneous petrology. The award is made only when there is a suitable candidate nominated. Past recipients include: Bob Baragar, Jack Souther, Bill Mathews and Tom Pearce. If you know of worthy recipients, I urge you nominate that person (http://sparky2.esd.mun.ca/~gac/MEDALS/career.html). Nominations include an up-to-date CV and a short letter itemizing the significant contributions made by the person to our science. We keep the nominees' files active for 3 years. Help us reward Canadians who have had impact on our science.

Years ago, the GAC had an extensive record of organizing and running field trips to important volcanological destinations. Usually the trips were run in conjunction with the national meeting. Examples included: Mexico, Hawaii and the Canary Islands. Currently, we have no trips planned and we have not run any trips for probably over a decade. This is an area in which that we could definitely improve. Therefore, over the next year we plan to look into the logistics of organizing a volcanological field trip. Clearly, the success of such a trip depends on finding an appropriate destination and a charismatic, knowledgeable, patient leader/convener. Again, you can help by giving the executive feedback on this issue. All ideas on location, timing and potential leaders are welcome.

VIP On The WWW:

http://perseus.geology.ubc.ca/links/GAC_volc/.

Please check it out and give us feedback. You have direct access to the executive via the internet- pass on your best ideas and help us keep the VIP division of the GAC alive and well! *J.K. Russell*

Minutes of the 1998 Annual Meeting

The 1998 Annual Meeting was held May 20 in room 205A of the Quebec Convention centre at 12:00 p.m. Present: J.K. Russell (chair), J. Nicholls, C. Pickett, P. Corcoran, W. Mueller, J. White, J. Remick, A.D. Fowler, G. Williams-Jones, W. Williams-Jones, J. Stix, L. Ayres, B. Edwards, P. Metcalfe, J. Dostal, V. Gale, G. Pe-Piper, S. Kieffer, C. Hickson, D. Piper, P.C. Thurston, E.H. Chown (secretary).

The meeting was called to order by Kelly Russell.

- The modified agenda was proposed by C. Hickson, seconded by P. Metcalfe, carried.
- The minutes of the 1997 annual meeting as presented in Ashfall 44, were adopted; proposed C. Hickson, seconded J. Remick, carried.
- The chairman's report (see opening paragraphs of this Ashfall) was presented
- The treasurer's report indicated the Division's finances to be healthy, but likely to be eroded this year with the re-striking of the Gelinas Medal dies, purchase of a ten year supply of Gelinas medals, and the cost of snacks for the annual meeting in an expensive venue such as the Quebec Convention Centre. No immediate increase in dues is envisaged, thanks to a healthy membership. The report was moved by C. Hickson, seconded by G. Pe-Piper, carried.
- Election of officers: The present executive was retained for a one-year term. Proposed J.

Nicholls, seconded S. Kieffer, carried unanimously.

- Vanessa Gale was added to the executive as student councilor. Proposed D. Piper, seconded W. Mueller, carried unanimously.
- Medal presentations: Jerome H. Remick III gave a brief history of the Gelinas medals, emphasizing the importance of recognizing work by the new members of our profession.
- The Bronze medal was presented to **Vanessa Gale** by vice-chair Georgia Pe-Piper
- The Silver medal was presented to **Glyn Williams-Jones** by secretary-treasurer E.H.Chown
- The Gold medal was presented to **Benjamin Edwards** by councilor John Stix.
- The Career Achievement Medal was presented to **J.W.Nicholls** by past chair C. Hickson.
- J.W. Nicholls gave a brief presentation on the wonderful challenges faced by the future generation of volcanologists and petrologists
- C. Hickson, representing G.A.C. Council, noted Council's concern on the greying of its membership, and brought to the Division Council's proposal that student members be allowed membership in two divisions at no extra fee. C. Hickson proposed, B. Edwards seconded, that the V.I.P. Division extend its membership to student members of G.A.C. who so requested. Carried.
- New Business: Special Sessions at future meetings: The Division is co-sponsoring with the M.A.C. a special session on Homogeneous and heterogeneous equilibria in magmas (in honour of Peter Roedder) at the 1999 Sudbury Meeting. A field trip "Application of modern volcanic architecture to Archean Problems, Long Valley, California" led by J. Stix and T. Hart is also sponsored by the division. At Calgary in 2000, Michael Higgins and Tony Fowler have proposed a session "How do Magmas crystallize", and S. Kieffer and C. Hickson will try to organize "Twenty years of Mount St. Helens". Nothing concrete is so far under preparation for St. John's 2001, although something related to ophiolites would be an obvious choice.

The meeting was adjourned, moved P. Metcalfe.

VANESSA GALE

Leopold Gelinas Bronze Medal

The first Gelinas Bronze Medal for the best B.Sc. (Honours) thesis in Volcanology or Igneous Petrology has been awarded to Vanessa Gale. This award has been made possible through the generosity of Jerry Remick.

Vanessa has been an undergraduate student at Dalhousie University, Halifax N.S. Her Honours thesis was supervised by Dr. J. Dostal from Saint Mary's University, Halifax has the title "Paleotectonic Setting of the Takla Group Volcano-Sedimentary Assemblage, Stikine Terrane, McConnell Creek Map Area, North Central British Columbia".

The Upper Triassic Takla Group volcano-sedimentary assemblage of the Stikine Terrane consists of basaltic to andesitic effusive and pyroclastic rocks that are interlayered with clastic sediments. A coeval volcano-sedimentary assemblage, also named Takla, occurs in the adjacent Quesnel terrane. Vanessa showed in her thesis that trace element analysis indicates that rocks from both terranes are subalkaline and compositionally intermediate between tholeiitic and calc-alkaline, with minor light REE enrichment. Mantle normalized trace element patterns display a pronounced Nb depletion and large ion lithophile element enrichment that suggest magmatism was subduction-related. The location of the groups in two different terranes precludes a comagmatic relationship. Nevertheless, the chemical resemblance between the two groups does emphasizes larger scale similarities noted between the Stikine and Quesnel terranes.

The judges felt that Vanessa did a very fine job in applying a variety of petrological and geochemical techniques to unravel the origin of the Triassic volcanic rocks of the Takla Group in the Stikine and Quesnel terrains of the Cordillera. The thesis was very well written, well illustrated and it sets a high standard for future student candidates.

Vanessa is now doing an M.Sc at UBC. We congratulate her and wish her every success for the future. *G.Pe-Piper*

GLYN WILLIAMS-JONES

Leopold Gelinas Silver Medal

Glyn Williams-Jones MSc. thesis "The distribution and origin of Radon, CO_2, and SO_2 gases at Arenal Volcano, Costa Rica" was presented at the University of Montreal, under the supervision of John Stix.

The author examines the distribution of Radon and CO_2 in soil gases on Arenal, and shows that gas concentrations and isotopic values of $^{13}C/^{12}C$ increase on the lower flanks of the volcano. He interprets these trends in terms of structural control, the lower flanks of the edifice being more fractured and permeable than the upper flanks.

The author then compares the data with soil gas data from three subduction volcanoes in Costa Rica and Colombia, noting trends common to all three, and concludes that diffuse degassing is negligible on the upper flanks of volcanoes. This is a

novel result and contradicts work done on Mt. Etna showing large amounts of soil degassing. These results are of significant importance for estimates of CO_2 fluxes from volcanoes in understanding the global carbon cycle.

Finally the author attempts to correlate SO_2 flux, measured by COSPEC correlation spectroscopy, to the patterns of volcanic tremor within the volcano, measured by a portable seismometer. A negative correlation between explosive eruptions and seismic tremor was noted. A comparison between the amount of SO_2 measured by COSPEC and that estimated by petrologic criteria gave similar values, suggesting that Arenal behaves as an open system.

The jury felt this was a most impressive thesis, broad in scope, well-documented and well written. We wish him well in future endeavours (now at the Open University). *E.H.Chown*

BEN EDWARDS
Leopold Gelinas Gold Medal

The Ph.D. thesis of Ben Edwards, entitled: "Field, Kinetic and Thermodynamic Studies of Magmatic Assimilation in the Northern Cordilleran Volcanic Province, Northwestern British Columbia", represents a multi-tiered approach to address the difficult question of assimilation in magmatic systems. The thesis was presented at the University of British Columbia under the supervision of Kelly Russell. The thesis first reviews the distribution of Neogene volcanic centres in the northern portion of the Canadian cordillera. It concludes this chapter by proposing a new volcanic province: the Northern Cordilleran Volcanic Province (NCVP). Hoodoo Mountain volcano is a major centre within the NCVP, and this forms the focus of part 2 of the thesis. The author provides a detailed and thorough study of the Hoodoo Mountain volcanic complex, with systematic study of the geology, petrology, and geochemistry, and placing particular emphasis on the role of assimilation at Hoodoo Mountain. The final two chapters concern the development of a new computational model for simulating magmatic assimilation.

Firstly, Edwards has used all the available experiments on mineral dissolution rates in silicate melts to make an empirical predictive model for mineral dissolution in natural systems. This kinetic model is then coupled to thermodynamic equations for magmatic phase equilibria to produce a calculated model that simulates magmatic assimilation processes. One of the important innovations of this model is that the assimilation paths are time-dependent. In this regard, the thesis is therefore a milestone in our understanding of magmatic assimilation, and the author's model of assimilation is a significant improvement on current models. This Ph.D. thesis is an important contribution to Canadian petrology and volcanology. *J. Stix*

JAMES NICHOLLS
Volcanology and Igneous Petrology Division Career Achievement Medal Recipient

It is with great pleasure that the Volcanology and Igneous Petrology Division awards this Years Career Achievement Medal to Dr. James Nicholls, Professor in the Department of Geology and Geophysics, University of Calgary. Several years ago the Volcanology and Igneous Petrology Division added "Igneous Petrology" to its name to better reflect the research interests of our membership. Additionally, this award was implemented as a fitting tribute to researchers in Canada who have led the way in the fields of volcanology and igneous petrology. Today, the Division is bestowing the Career Achievement Award on Igneous Petrologist James Nicholls.

Jim Nicholls ranks in the forefront of Petrologists not only in Canada, but on a world-wide basis. He has chosen as his field the difficult area of petrological problem-solving using mathematics and thermodynamics and in this he has been extremely successful. His work has been consistently innovative and has involved investigations in Hawaii on Kilauea volcano where he studied lava liquid lines of descent, Craters of the moon lava field where fraction and contamination were the focus of study, and of course here in Canada, in British Columbia on a variety of Quaternary-aged volcanic centres.

In all of this, Jim's most outstanding research has been the application of advanced mathematical techniques to theoretical problems not previously solved. A partial list of his work gives a glimpse into this rare achievement: singular points on fractionation curves in silicate systems, the mathematics of fluid flow and magma transport, principles of thermodynamic modelling of igneous processes, Pearce Element ratios and the Chayes Closure problem, and Bayesian methods and hypothesis testing. The rigour of the science practised by Jim Nicholls, his colleagues and students is a model of how science should be done.

It gives me great pleasure to present Jim with the Volcanology and Igneous Petrology Division's Career Achievement Medal. *C. Hickson*

Volcano News from Montreal

Despite the general decline in Montreal geosciences during the past several years, best exemplified by the disappearance of the Univ. Montreal and Concordia geology departments, the discipline of volcanology continues to flourish and

grow. With the addition of Helene Gaonac'h at UQAM, who specializes in remote sensing applications to volcanology, there is a critical mass of volcanologists in the Montreal region. The focus of our research group is the study of active volcanoes worldwide, with the overall goal being a better understanding of magmatic systems, how volcanoes work, and improved methods of forecasting eruptions.

Some items of note. This December at the Fall AGU meeting in San Francisco, I am co-organizing a special session with Dave Hill of the USGS, entitled "Restless Calderas". The goal is to gather researchers from diverse disciplines, try to integrate different datasets, and better understand why some calderas are currently so restless (e.g., Rabaul, Campi Flegrei, Long Valley). Cathie Hickson of the GSC and I are writing and editing a GSC monograph on theory and applications of the COSPEC, an ultraviolet spectrometer used to measure sulfur dioxide fluxes from volcanoes. This volume will be translated into French and Spanish and will thus be useful to many volcano observatories in the French and Spanish speaking parts of the world. I am also co-editing an 800-page reference work, called "Encyclopedia of Volcanoes", which will be published by Academic Press in 1999. The Encyclopedia is aimed at a level for the general public, but I will be using my copy frequently to educate myself.

So we press forward, despite the times. We encourage students with an interest in pursuing graduate work in active volcanism to contact either Helene (helene@volcan.geotop.uqam.ca) or myself (stix@ere.umontreal.ca). *John Stix*

The Petrified Forest of Lesbos, Greece

Georgia Pe-Piper
Department of Geology, Saint Mary's University, Halifax, N.S., B3H 3C3
gpiper@shark.stmarys.ca

In July 1998 I attended a predominantly geological conference on the volcanic island of Lesbos, Greece, on "Protected areas management". Lesbos, which was visited by a VIP Division field trip in 1993, is the site of a spectacular Miocene silicified forest that has been designated by UNESCO as a Protected Area and by the Greek government as a Natural Monument.

The Petrified Forest Natural Monument consists of two horizons of pyroclastic flows, each 10-20 m thick, within which are preserved upright and fallen silicified trunks of ancestors of today's pine and sequoia trees. Similar silicified trees, with poorer preservation, as well as numerous leaf impressions, are found elsewhere in pyroclastic deposits on Lesbos over an area of some 15 000 ha. In the Petrified Forest Natural Monument, flow directions in the pumice flows are indicated by damage to the eastern side of tree trunks and trees falling to the west. A museum will be opened soon in Sigri, under the direction of Dr N.C. Zouros, to display much of the less robust material from the Petrified Forest. Further information on the Petrified Forest can be found on the Internet at http://www.aegean.gr/Petrified_Forest

The pyroclastic rocks of the Petrified Forest are part of the Skoutaros Formation phase of growth of stratovolcanoes in central Lesbos, dated at about 18 Ma. The Petrified Forest is on the western flanks of the stratovolcanoes, where the stratigraphic sequence comprises principally pumice flows, mud flows and stream conglomerates, with minor airfall pyroclastic deposits. Eastwards, both pyroclastic and sedimentary rocks become coarser grained and interbedded lavas are more common. Many of the pyroclastic rocks appear derived from a caldera near Vatoussa.

At a higher stratigraphic level, at about 17.5 Ma, five or six major welded ignimbrite flows were erupted from the stratovolcanoes, probably from a caldera now largely filled with younger lavas, south of Sykaminea. The presence of both mafic and felsic glass and feldspars in the ignimbrites suggests that eruption may have been triggered by injection of mafic magma into a rhyolitic magma chamber. At about the same time, feeder dykes for several flank eruptions cut the main pyroclastic sequence. These dykes show complex shearing and mixing of an andesitic and a dacitic phase. They were followed by eruptions of andesite and dacite lavas in the central stratovolcano chain. The final phases of eruption, about 16.5 Ma, comprise minor basalt cones on the eastern flanks and much larger feeder dyke complexes on the western flanks.

For the general tourist, the Petrified Forest of Lesbos has spectacular silicified trees and is located in a mountainous area of unspoilt natural beauty. In addition, the dissected Miocene stratovolcanoes of Lesbos provide a simple view of the internal architecture and plumbing of what was a large volcanic complex. For the specialist, there are many scientific challenges: the petrogenetic origin of the shoshonitic magmas, the dispersal patterns of the pyroclastic flows, the role of magma mixing at various depths within the volcanoes, and the volcanogenic evolution.

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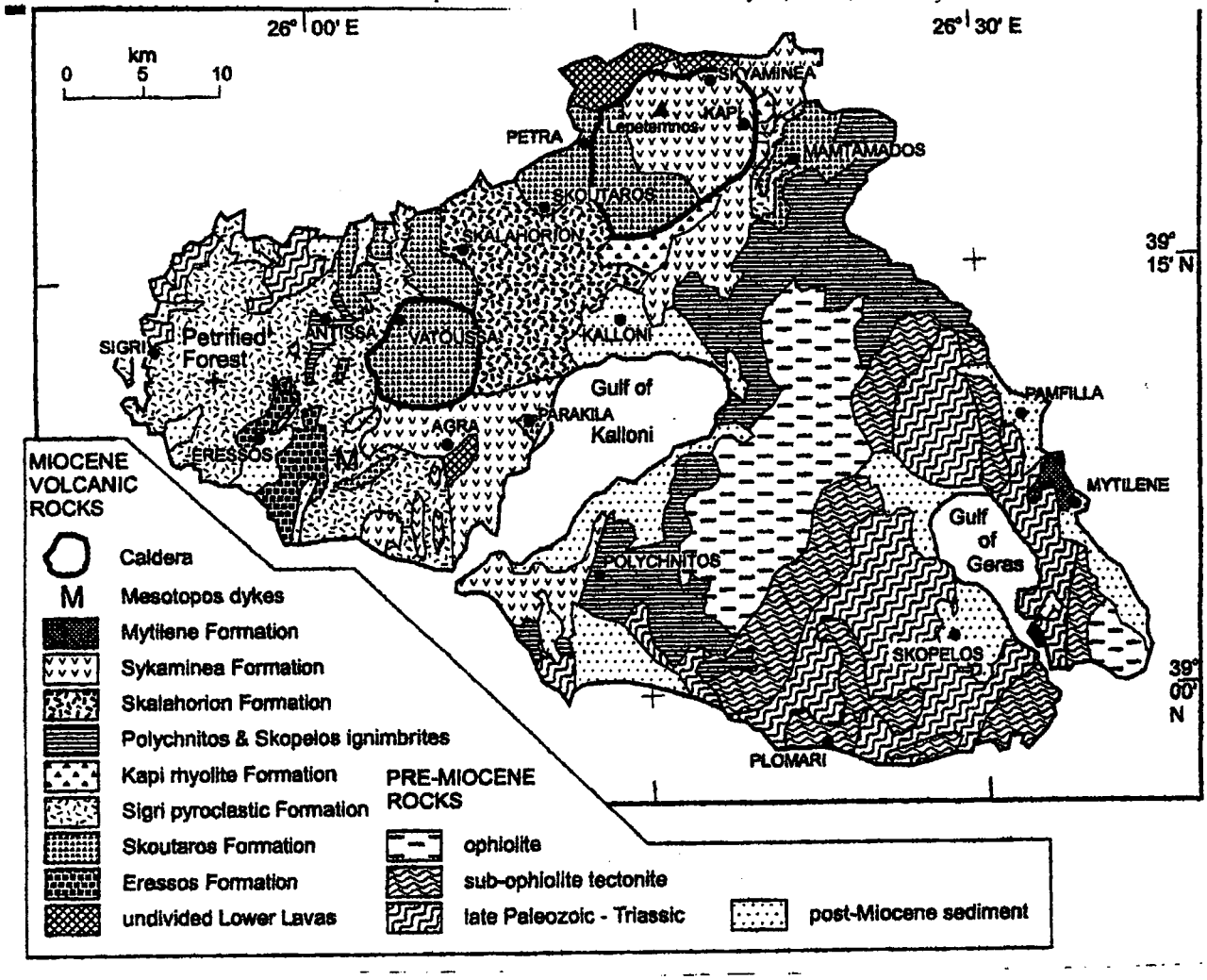

Editor's note

Summer unavailability of various people, has resulted in severe publication delays to Ashfall 46, originally slated for August. With any luck Ashfall 47 won't take so long. There are a few things different in this issue. A couple of members of the executive have sent me items of current interest to our community, including field descriptions of areas generally of the beaten track. I would like to see more of this, and not only submitted by the executive. I'd prefer electronic submissions, but paper copy will do. Our membership stands at 132, including at least five student members under the new regime. As always there is a time lag between you paying dues and Headquarters advising me of your standing. I am sending this out to all members on my list, this year and last. If there is an asterisk beside your name on the envelope, it means I have not been informed of your intention to renew. If you have already done so, I will hear about it eventually.

Volcanology and Igneous Petrology Division
Geological Association of Canada

- *Chair*: J.K.Russell U.B.C Vancouver
  russell@perseus.geology.ubc.ca
- *Vice Chair*: G. Pe-Piper St. Mary's U. Halifax
  gpiper@shark.stmarys.ca
- *Sec'ty Treas.*: E.H. Chown U. Quebec Chicoutimi
  madned@kingston.net
- *Past Chair*: C. Hickson GSC Vancouver
  chickson@gsc.emr.ca

Councilors:

- *West*: P. Metcalfe, Vancouver
  pmetcalfe@gsc.NRCon.gc.ca
- *Central*: T. Pearce, Queen's Kingston
  pearcet@QUCDN.queensu.ca
- *East*: J. Stix U. Montreal, Montreal
  stix@ere.umontreal.ca

Web site:
[http://perseus.geology.ubc.ca /~russell /GAC_volc/]

Corresponding Address
90 Dickens Drive
Kingston Ontario
K7M 2M8