

Presidential Preamble

It is normally a slower time of year for geoscientists as we work to wrap up this year's projects and plan for next year's activities, but I personally am finding this year is busier than most. I even missed early bird GAC[®] Membership renewal – but I did renew! In the past few months I have had some out-of-the-ordinary travel. It was a pleasure to have gone to St. John's NL in the past quarter for our GAC[®] Council meeting. And I have set many tasks for myself that are to be completed over the holiday. In my last presidential ramble—I mean preamble—I tried to share the concept of sharing more with those around us what it is that we do and how we take our responsibilities as geo-types very seriously. One of the ways I thought that I could share a little bit more on is what we, your GAC[®] Council, actually do for the you and the Association as a whole. And, even though Council is composed of volunteers, we take our roles as Directors of the Corporation, as that is technically what we are, very seriously and strive to manage GAC[®] in the best manner possible to achieve GAC[®]'s goals.



In a recent pipeline television commercial a gentleman in a hardhat is shown saying something like "I don't only work in the community, I live here too" and most Councillors give of their time to GAC[®] for sort of a similar sentiment – we all wish to continue to reap the benefits that GAC[®] provides to geoscientist both here in Canada and around the world. And it does appear that there are fewer and fewer volunteers for positions such as GAC[®] Council (and or GAC-MAC Conferences) than ever and more and more work to sustain the Association than ever. Please do not take that as a complaint, it

is an honour to serve AND most of the time Councillors receive many thanks from the members of GAC[®]. That being said though Council does hear a lot of feedback, particularly regarding finances of the Association, from time to time. Often there are comments around transparency, how money is managed, how much or how little money GAC[®] makes, and other tidbits that can truly make you ask yourself why you stood for election to GAC[®] Council. But these comments usually come from people or groups who do not know much about GAC[®], let alone volunteer for roles such as Councillor. So I hope that I can share a little bit about what Council does to manage GAC[®] both financially and as a not-for-profit corporate entity by updating you a little more on GAC's current financial state.

So GAC[®] is a not-for-profit corporation, but not a charity, incorporated federally under Corporations Canada and originally under the *Canada Corporations Act, Part II* but we made the appropriate transition to the current *Canada Not-for-profit Corporations Act* as was required during 2014 (if you came to our Annual Business meeting you voted on the updated By-Laws). This means we do have a fairly strict set of rules and disclosure requirements such as registered By-Laws and the posting of annual Financial Statements, audited by a Public Accountant. These can all be found on the GAC[®] website and more information on the *Not-for-profit Corporations Act* can be found on Industry Canada's website under Corporations. To find GAC[®] specific items on the website (www.gac.ca), you may click the "Login" button and the Member Directory. Audited Financial Statements, By-Laws and various other documents are all readily available to under the "Members Only" tab after login. There is also a great link in this section to your individual member information and where you may provide updates to the Association and even print your own membership

GEOLOGICAL ASSOCIATION OF CANADA

The MISSION of the Geological Association of Canada is to facilitate the scientific well-being and professional development of its members, the learned discussion of geoscience in Canada, and the advancement, dissemination and wise use of geoscience in public, professional and academic life. The VISION of the GAC® is to be a multidisciplinary scientific society supportive of the entire scope of the geosciences in Canada. The GAC® aims to be a geoscience community that is knowledgeable, professionally competent and respected, whose input and advice is relevant, widely sought and utilized, and whose vital contribution to the economic prosperity and social well-being of the nation is widely acknowledged.

La MISSION de l'Association géologique du Canada est d'aider au développement scientifique et professionnel de ses membres, de favoriser les échanges géoscientifiques au Canada ainsi que de promouvoir et de diffuser l'utilisation éclairée des géosciences dans un contexte public, professionnel et académique. La VISION de l'AGC® est de faire connaître une communauté géoscientifique de grand savoir, dont les compétences professionnelles sont respectées, dont les suggestions et les avis sont pertinents, recherchés et utiles, et dont la contribution largement reconnue est considérée comme vitale pour la prospérité économique et le bien-être de la nation.

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GEOLOG (ISSN 0227-3713; 1712-3747) is the quarterly newsmagazine of the Geological Association of Canada, St. John's, Newfoundland and Labrador. *GEOLOG* is published for the benefit of GAC® members and its content reflects the diversity of the organization. News items and short articles on topics of potential interest to the membership including public geoscience awareness are encouraged. Also encouraged are communications promoting interaction among academic, industry and government sectors. *GEOLOG* accepts and publishes contributions in both of Canada's official languages. Opinions expressed herein are those of the writers and do not necessarily represent the official positions of the GAC®. *GEOLOG* is one of several forums provided by the GAC® for scientists worldwide.

SUBSCRIPTIONS: *GEOLOG* is one of the privileges of GAC® membership. To become a member, application forms are available by mail or fax from the Geological Association of Canada, or can be printed from the website.

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GEOLOG (ISSN 0227-3713; 1712-3747) est le bulletin trimestriel de l'Association Géologique du Canada, à St. Jean, Terre-Neuve-et-Labrador. *GEOLOG* s'adresse aux membres de l'AGC® et son contenu reflète le caractère polyvalent de cette organisation. Nous invitons la soumission de nouvelles et articles courts pouvant intéresser les membres, incluant les thèmes de sensibilisation du public aux sciences de la Terre. Les articles suscitant des échanges d'opinions et d'informations entre les secteurs académique, industriel et gouvernementaux sont également la bienvenue. *GEOLOG* accepte et publie les articles dans les deux langues officielles du Canada. Les idées sont celles des auteurs et ne représentent pas nécessairement la position officielle de l'AGC®. *GEOLOG* n'est qu'un des nombreux forums offerts par l'AGC® aux scientifiques à travers le monde.

ABONNEMENT: L'abonnement à *GEOLOG* est un des privilèges dont bénéficient les membres de l'AGC®. On peut se procurer un formulaire d'adhésion par courrier ou par fax en communiquant avec l'Association Géologique du Canada.

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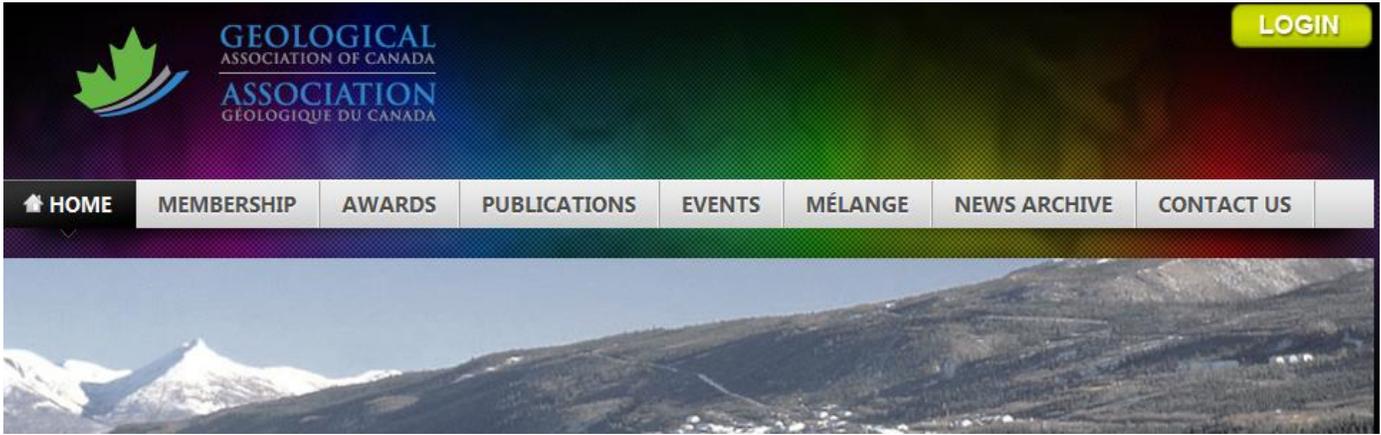
Apologies to any contributors that have been missed. This *GEOLOG* was produced with support from the Royal Alberta Museum. Your contributions for future editions are welcome / Désolé pour ceux qui auraient été involontairement oubliés. Cette copie de *GEOLOG* a été produite grâce à l'assistance du Royal Alberta Museum. Nous sollicitons vos contributions pour les publications à venir.

Contributions for next issue

Please send items for next issue of *GEOLOG* by e-mail to Alwynne.Beaudoin@gov.ab.ca on or before **March 1 2016**.

GeoFact: Jan 26 1700: Probable date for the Cascadia Earthquake, which had an estimated magnitude around 9.0. This 'quake affected large areas along the Pacific coast of North America and caused tsunamis along the east coast of Japan.

GeoFact: Feb 19 1600: Explosive eruption of the volcano Huaynaputina in southern Peru, estimated to have been the largest eruption in South America in historic times. The eruption is correlated with short-term global climate effects in the following years, including poor harvests and crop failures in the northern hemisphere.



card if you so choose. Handy GAC® information such as our Business Plan, our Mission and Vision are readily available *without* login under the “MÉLANGE” section of the main web page.

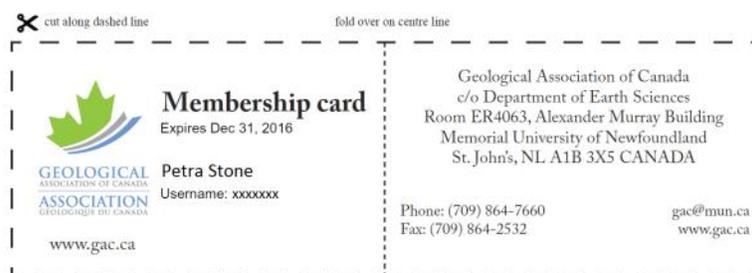
In addition to the requirements from Corporations Canada, as I have written about previously in *Geolog* while Vice-President, GAC® has and maintains a ‘Manual of Operations’ (affectionately called the “MoO”) that documents and explains all By-Laws, roles and responsibilities of Council members, Sections and Divisions, and the funds and endowments that sustain the Association. This is a great guide for Councillors on the background for how GAC® runs. Most people that volunteer for such things are familiar with the *Canada Not-for-profit Corporations Act*, Corporations Canada or having to produce Audited Financial Statements in their regular lives.

So you are likely reading this and saying “Okay Vicki, that all sounds great but what does it mean as for as money goes?” Well, the short answer is GAC® is not an organization that is envisaged to make a lot of money – we do not generate ‘profit’ *per se*, but we do have modest revenue that is rolled-back into supporting things like the seed-funds for the annual GAC-MAC Conferences, supporting our 6 Sections and 13 Divisions as needed, providing student support and awards, funding our prestigious National Awards, sponsoring various conferences, attending various conferences, providing the lecture tours, supporting the publications of *Geoscience Canada* and all of the books, field trip guides, short course notes and

various other publications produced for nearly the last 70 years, and finally the staff at headquarters who work to make all these things happen. We operate based on primarily funds that are invested (wisely we always hope) using guidelines in the MoO – we are just working to update these investment guidelines (as prescribed in the MoO). Quickly though, GAC® has the following funds of money – some with very specific prescribed uses based on their original endowments: 1) the General Trust Fund; 2) the Logan Student Trust Fund; 3) the Howard Street Robinson Trust Fund; 4) the Yves O. Fortier Trust Fund; 5) the Jérôme H. Remick III Trust Fund; and 6) W.W. Hutchison Medal Endowment Fund; oops – almost forgot one – our newest 7) the Eric Mountjoy Fund. As you might guess from the names of the various funds, many are specifically for our medals and awards and also some are earmarked specifically for the support of student activities. Several of the funds are bequests from estates/families that continue to support the Mission and Vision of GAC® and these have strict guidelines we must and do adhere to.

In addition to the above funds GAC® has revenue from the annual GAC-MAC Conference, Membership dues, Corporate Sponsors and grants from one other source - the Canadian Geological Foundation (CGF) that administers several funds under a mandate and entity separate from GAC®. The CGF was primarily created by GAC® (in 1968) and was established as a charitable organization “dedicated to the furtherance of

geoscience in Canada” and administers monies in the Jérôme H. Remick III Endowment Trust Fund (N.B. this is different from the Remick fund already mentioned), the W.W.



Hutchison Medal Endowment Fund and the GAC® Endowment Trust Fund. Should you wish to make a donation to GAC® and receive a tax-receipt you would do so through CGF. However, GAC® does not use/access these funds freely – we must apply to CGF to access any money from these funds, with an application providing a project description and how specifically the money will be used to further geoscience; “grants” to GAC® from CGF are not always approved by the CGF Board as they provide many other grants to other association and societies as well.

Sooooooooo, to finally sum up, how is GAC® doing? We manage to generate a little bit of revenue each year that gets rolled back into our funds and activities by managing annual budgets very tightly (including having had to let headquarters staff go and relying further on volunteered time), using our funds, grants and endowments very specifically, attempting to generate new funds through sponsorships and new offerings (publications, conferences, new benefits to membership like our affiliated societies), and by continuing to provide GAC-MAC conferences, being present at PDAC, GSC, Roundup, etc. and providing a stable platform for geoscience knowledge in Canada. With that said, the cyclic nature of commodities, various financial crises and each of us as individuals watching our own personal spending more closely, it is harder than ever to keep up with costs of publishing, conferences and maintaining services, but as a Council with the help of our very busy headquarters staff we are doing it.

We are always happy to have suggestions from membership on how to generate (additional) funds and already share details (on the GAC® website) of what we do with the funds we do have. Every dollar Council approves to spend is done so with a lot of thought and with the goal to maximize value to your membership. I hope this has given some background on the nature of how GAC® operates and I and the rest of Council welcome questions as to how Council administers the Association on your behalf.

Wishing you the happiest of holidays or at least a break longer enough to read an extra article or two from *Geoscience Canada* (and of course every page of *GEOLOG!*).

All the best,
Vicki Yehl
GAC® President

Vice President’s Report The Autumn Meeting of GAC Council

On a weekend in late October, GAC® Council convened at Memorial University’s Department of Earth Sciences for our fall meeting. This was an opportunity for us to brainstorm, collaborate, and plan, but also to enjoy some of that famous Newfoundland hospitality and a bit of the St. John’s autumn’s “soft” weather. In addition to Headquarters staff and the local members of Council, several other members joined the meetings by video conference, and a few of us from far away flew in for the meetings; travel on personal Aeroplan miles is important to the functioning of national organizations like GAC®!

Arriving in time for a nice walk around downtown St. John’s on Friday evening, I was ready for the full agenda of Saturday and Sunday morning. In my previous stint on Council over a decade ago I was always impressed by the businesslike approach to meetings, and current President Vicki Yehl is no exception to this. The Councillors came prepared to work, and Vicki kept us to task as we moved briskly and clearly through that agenda.

It is important for you, the members, to know that we are always “working on it.” GAC® advances on a broad front, and each Council meeting has a somewhat different focus. At this particular meeting in St. John’s we spent a lot of our time discussing future conferences, including GAC-MAC 2016 in Whitehorse, GAC-MAC 2017 in Kingston, and GAC-MAC 2018 in Vancouver. Next year’s conference is, of course, something that we always consider in detail at the fall Council meeting: GAC-MAC is our biggest event, one of the main components of the GAC® brand, and it is Council’s job to ensure that the details are in place to ensure a successful meeting. So we review any issues associated with budgets, the scientific program, short courses, field trips, and the other conference components.

Even though it is still more than two years out, the Vancouver meeting is also the subject of a lot of discussion at the moment. We are one of the partners in what will be a very large international conference, *Resources for Future Generations*, which is under the

IUGS umbrella. These big meetings are exciting and can have many benefits, but their greater complexity means that there is a lot of “legwork” for several people on Council.

Given GAC®’s broad mandate, there are many portfolios to be handled, and Councillors do a lot of the work in collaboration with our dedicated Headquarters staff. In addition to the planning for that Vancouver meeting, there has been a lot of negotiation with outside organizations for other reasons. In particular, we now have agreements with organizations like the Geological Society of America and the Geological Society of London. This means that GAC® members can get the same fees as GSA members for GSA meetings and for *Geology*, and you receive discounts at the Geological Society of London online bookstore! So we have become a “point of entry” for important international geoscience knowledge. Now that these agreements are in place, our challenge as Council is in getting the benefits information across to members and potential members. We aren’t still the same old staid GAC®; the products we offer are remarkably strong, for a very modest membership cost, but we are still working on how we can really communicate this.

As we overhaul our benefits, we have also been looking very seriously at governance. There is much more to come on this once the details are sorted out, but please be assured that we are well aware of the various issues on governance and finances, and are working hard to find the best possible solution.

We wrapped up at lunchtime on Sunday, finishing with some splendid home-baked fruit pies prepared by the generous husband of Finance and Administration Manager Karen Johnston-Fowler. The meetings over, we had a bit of free time on Sunday afternoon in that beautiful part of the country. Some of the St. John’s people were able to go home and enjoy the small remainder of a weekend they had otherwise spent on GAC® issues, but Secretary-Treasurer James Conliffe generously ferried Past President Brian Pratt and me to a couple of excellent Cambrian trilobite localities in Conception Bay South. There is so much wonderful geology in Canada, and so much yet to be learned. Visiting such sites reminds us why we work to keep the GAC® relevant and forward thinking.

Graham Young
GAC® Vice President



Past President Brian Pratt and Secretary-Treasurer James Conliffe, examining Cambrian strata along the Manuels River, Conception Bay South

Reading on the Rocks

Full-Rip 9.0: The Next Big Earthquake in the Pacific Northwest

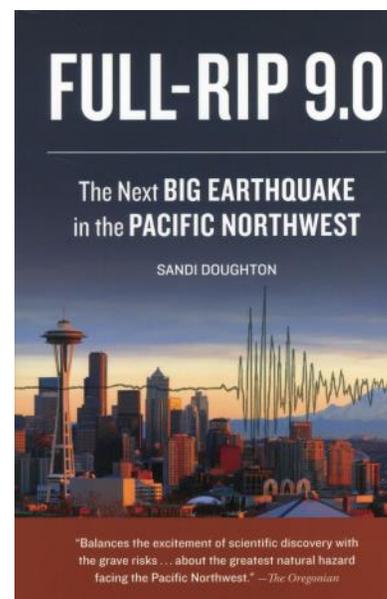
by Sandi Doughton. 2013. Sasquatch Books, Seattle, Washington, USA. ISBN: 978-1-570618550. \$9.99 USD

This is the first book review I have done since grade 10 English and it was a delight. *Full-Rip 9.0: The Next Big Earthquake in the Pacific Northwest* by Sandi Doughton, a respected science reporter with *The Seattle Times*, takes you by the hand and leads you through the evolution of the understanding of earthquake science in the Pacific Northwest. It was published in 2013 by Sasquatch Books in Seattle. The majority of the book describes work in Washington and Oregon and so provides a comprehensive introduction for non-seismologists who might be less familiar with the arc of seismic research in the US Pacific Northwest.

The author's approach to the subject is enthusiastic and engaging. She presents the science using evocative and descriptive metaphors, such as "mountain ranges like the Himalayas are the crumpled fenders of a head on collision between plates" (p. 6), that many Earth science teachers will find helpful in their lectures. The language is decidedly unscientific (i.e., it is not sterile, bloodless and lifeless), for example "...a full-rip 9, from Cascadia" (p. 52); and "It was a doozy" (p. 54). Using an historical framework, beginning with the oral history of First Nations living on the Pacific margin, Doughton brings the reader up to date with the latest insights from recent (2012) ocean floor, GPS and LIDAR surveys. Doughton reminds the reader of how, in the early 1980s, the Cascadia Subduction Zone was thought to be earthquake-free, an anomaly in the subduction zones of the circum-Pacific "Ring of Fire".

Much of the energy from the book comes from the author's characterization of several key (mostly American) researchers. She helps us to understand what motivated them to embark on their field of research, and shares with us the both the tedium of their work and the excitement of discovery – their a-ha moments. Brian Atwater's first discovery of down-dropped peat layers near Neah Bay in 1986 (p. 21) "What have we here?" One ah-ha moment I witnessed

at the Geological Survey of Canada in Sidney BC was the day in 2002 that a subtle GPS signal ferreted out of geodynamic data by Herb Dragert was matched with a synchronous seismic signal by Garry Rogers (p.221) – "...Rogers recalled "it was a very exciting afternoon, the kind that makes the hair stand up on the back of your neck.""



Now for the quibbles – on the location map Parksville is mislabelled as Nanaimo, and there is a bonus dot with no label at Nanaimo on Vancouver Island; John Adams gives an opinion on p. 18 but we don't find out who he is until p. 61; we are introduced to two Atwaters (Tanya and Brian – are they related?) and then references are made to "Atwater" unspecified later in the text; there is the awkward use of both metric and imperial measures, sometimes on the same page. Greenschist is called a mineral (p.130) (it's not), and on p. 152 it states that seismograms provide "only earthquake size and location" but they also provide an estimate of first motions (is it a strike-slip or a thrust fault) and frequency content (shaking periodicity). These are minor flaws and really only prove to you that I read the book – they do not really detract from the overall pleasure of having done so.

The illustrations are well done and nicely credited in an appendix. There are several sections where the author provides a synopsis of research done on earthquakes that predate modern instrument records. The search of Japanese historical records of the tsunami generated by the 1700 Cascadia megathrust earthquake was fascinating. The controversy over the location of a magnitude ~6.8 earthquake that rocked central Washington in 1872 using archived newspaper and first person accounts was told with the drama of a mystery

novel, complete with an eye-witness who was a notorious rogue and escaped criminal.

The book covers nicely the challenge of devising meaningful seismic hazard maps, used to establish building codes which dictate design criteria for structures capable of withstanding (i.e., not collapsing in) anticipated earthquakes. The concepts of ground shaking, building resonance and energy released are explained simply, along with the short-comings of the model-dependant methods used to calculate seismic hazard. The correlation (or lack-thereof) between seismic hazard and observed building damage from recent earthquakes in Japan, Chile and New Zealand illustrate the challenge of finding the balance between under-building (cost-effective) and over-building (safe).

The chapters on preparedness again profit from stories, many of them first person accounts, about both devastation and successes experienced in recent global earthquakes. The work of Patrick Corcoran in the vulnerable seaside communities of the Oregon coast is used to highlight initiatives that will save lives in the event of the tsunami following a large Cascadia Subduction earthquake. He is quoted as saying "This isn't a geological problem anymore....What we have now is a learning problem." I was also struck by lessons taught to Japanese students "to take the lead, to be the one who runs first" to higher ground after an earthquake – not to wait for others to move first (p. 159). After the magnitude 9 earthquake in Japan in March 2011 middle school children put this learning into practice and were followed to high ground by high school students who had initially sought refuge on the top floor of a building that was destroyed by the tsunami which followed. A powerful example of lives saved as a result of prescient preparation.

The author's approach to the subject is fresh and engaging. This is a good book well written and would be enjoyed by both geoscientists and laypeople. Certainly anyone with an interest in plate tectonics and the earthquake setting of the Pacific Northwest – say your mother living in Victoria.

Reviewed by P. Jane Wynne

P. Jane Wynne is a geologist, living in Sidney BC, retired from the Geological Survey of Canada. Her last decade with the survey was spent working in the "Increasing Personal Preparation for GeoHazards" project of the Public Safety Geoscience Program.

Beyond the Black Stump

By Nevil Shute. 1966.
Ballantine Books, New York
(1971 reprint). 254 pages.

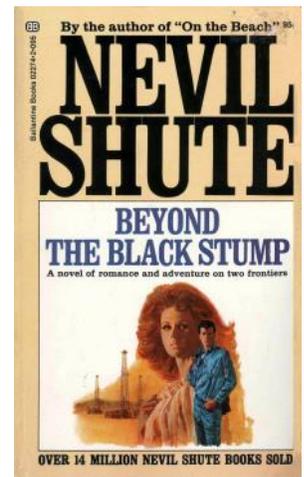
It's the early 1950s. Stanton Laird is a young geologist, who has just spent three years in Arabia drilling for oil. Summoned back to head office in New York, he is offered a plum assignment: to go to western Australia and head up his own exploration team in a new area. He's told the region is remote and the test drilling work will be difficult. Having been brought up in Oregon, spending much of his youth on horseback, hunting in the mountains, Stanton is unperturbed. He thinks he knows remote.

Yet he's unprepared for the isolation and harsh terrain of "the Lunatic", the outback region in the Hamersley Range of western Australia where the exploration site is located. It's "beyond the back stump" or at the back of beyond. The stations, as sheep ranches are called, are huge and widely separated. Even getting to the site is challenging. "Stanton drove the truck carefully across country, threading his way around the occasional boulders and around the thickest clumps of spinifex, too busy to take much note of the geological formations they were driving over". Camp set up and the crew organized, Stanton gets busy trying to unravel the geology. He's one of Shute's typical lead characters, practical and quietly competent. "Gradually, on paper and in his mind, he began to build up a picture of the run of the strata deep down in the earth beneath their feet".

The Americans' camp and its technology is fascinating to Mollie Regan, one of the extensive and numerous Regan clan, owners of the million acre Laragh Station where the camp is located. To her, the Americans are exotic and glamorous. On his side, Stanton is shocked when he finds out that Mollie has many Aboriginal half-brothers and sisters. Their incompatible worldviews provide much of the tension in the tale.

Here's where Shute's book shows its age. Of its time, the language used to describe Aboriginal people is, by today's standards, inappropriate and grating, and can't be overlooked. It mars an otherwise gentle and grounded story of a geologist coming to terms with his life and finding a future, while searching for oil.

Alwynne B. Beaudoin
Edmonton, Alberta

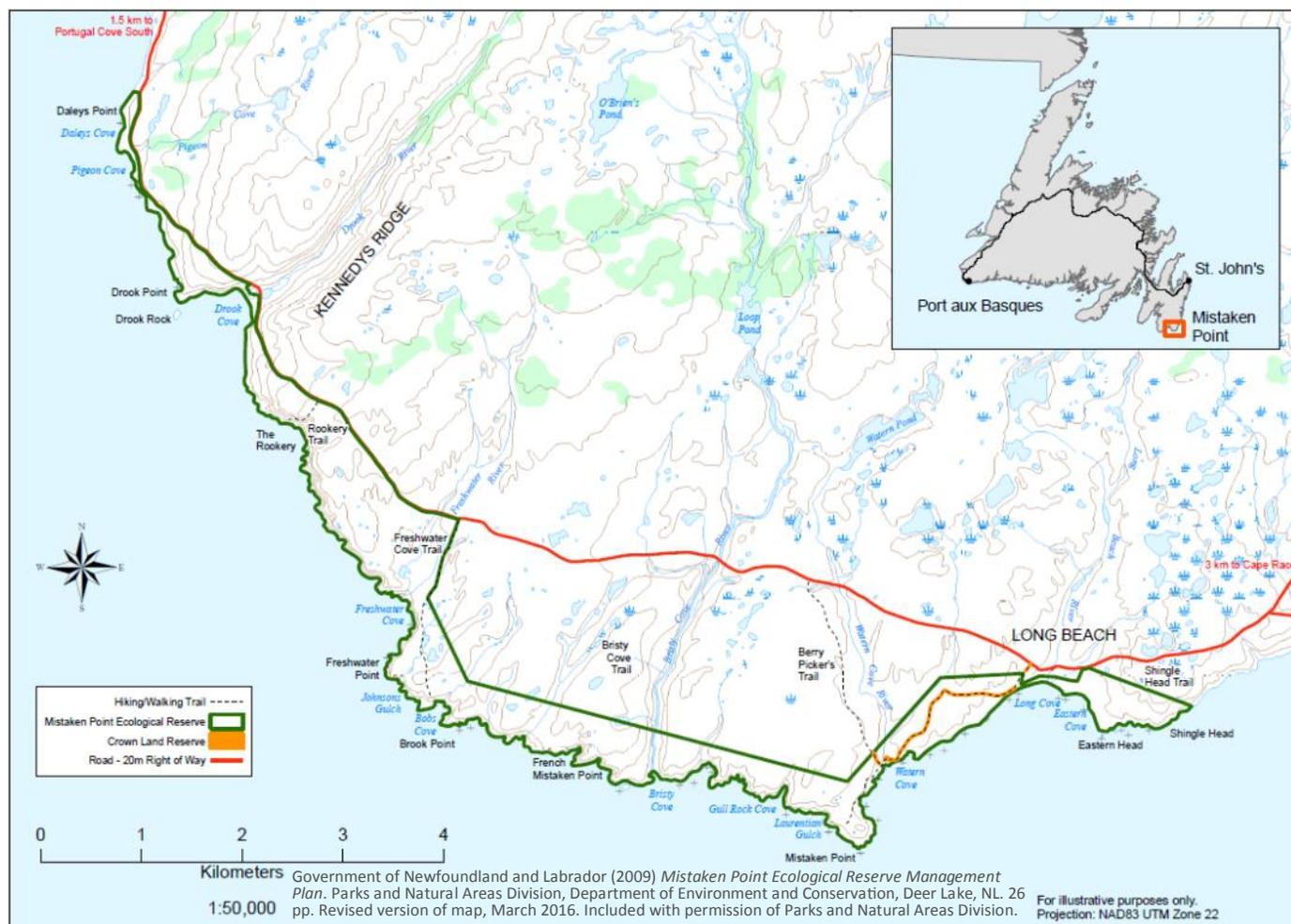


Events and Happenings

GAC® NL Fieldtrip: The Ediacaran fossils of the Avalon Peninsula

In September, the GAC® Newfoundland and Labrador Section's held its annual fall fieldtrip, with this year's fieldtrip focussing on the Ediacaran Fossils of the Avalon Peninsula, including the internationally-renowned Precambrian fossil sites of the Mistaken Point area. The trip was led by Dr Alex Liu of Bristol University, one of the world's foremost experts on Ediacaran palaeobiology, and was attended by 28 participants representing academia, government and heritage association (including 17 graduate and undergraduate students).

This fieldtrip included visits to Ediacaran fossils sites in the Spaniards Bay area, close to St John's as well as an overnight trip to the Mistaken Point Ecological Reserve, based out of Trepassey on the Avalon Peninsula's "Irish Loop". Ediacaran biotas consist of enigmatic organisms that lived during the Ediacaran period (635 to 541 Ma) and represent some of the oldest macroscopic organisms in the geological record. Eastern Newfoundland, particularly the Avalon and Bonavista peninsulas, is home to the some of the world's most impressive Ediacaran fossil assemblages, and in the Mistaken Point Ecological Reserve thousands of these fossils occur through hundreds of metres of stratigraphic section. Efforts to protect this site and provide global recognition for its paleontological riches have led to the province of Newfoundland and Labrador submitting a bid for UNESCO World Heritage Site status; a decision on this application is due in 2016.



It's been about 13 years since we ran a trip to Mistaken Point, with Guy Narbonne of Queen's University, and although the fossils haven't changed, as far as we can tell, some other things have. The sites there, and other places, are now more regulated in terms of access - an innovation designed to improve protection as part of the UNESCO bid. In the old days you could prance around on the fossil surfaces in heavy boots, but now it's socks only, or little blue booties that resemble baby shoes. If the outcrops are wet - as they were this year - this leads to damp cold feet very quickly! This did prove useful in restricting the time that some people spent on the outcrops. There's also been a lot more work on Ediacaran fossils in 13 years, by the Queen's Group and also by researchers at Memorial University and at the University of Oxford in the UK. Some of the previously unnamed fossils that were christened "spindles", "christmas trees" and "pizza disks" now have fancy official names like *Fractofusus* and *Frondophyllas*. There are many more species, some with names that are specific to Newfoundland, such as *Beothukis* (the Beothuks were the original inhabitants of the island). There's also a lot of work on assessing the ancient ecosystems that these sites define, and speculating on things like reproductive mechanisms and feeding strategies. Some things once thought to be discrete organisms, like the "pizza disks" are now interpreted as the festering, rotted remains of other organisms - in the Ediacaran environment, there were no scavengers to take care of the mess. Ugh. Perhaps the most

interesting developments have been the recognition of possible trace fossils suggesting the first instances of locomotion in the fossil record and the description of a rather fearsome-looking organism that seems to have the first evidence of muscle tissue. This one got the name *Haootia quadriformis*, from an ancient Beothuk word for "demon". The field trip was pretty instructive for those of us who have long been interested in these beautiful and elusive survivors of a bygone age, but also very useful for students, who learned all sorts of things about the many questions surrounding the evolution of complex life forms, including the links to the Snowball Earth, which finally thawed just before they appeared.

On the first day of the trip, we visited the Snowball Earth outcrops near Harbour Main, in Conception Bay. In the northeast wind, we thought the Snowball Earth was coming back, and were longing for hot coffee by lunchtime. Up around Spaniard's Bay, we visited sites that featured in Guy Narbonne's 2004 paper in *Science*, which showed the amazing 3D preservation of tiny organisms. Alex introduced us to the magic of silly putty, which can be used to reveal detailed features as casts and moulds.

On the next day, we headed for the "Garden of Ediacara", best experienced at Mistaken Point. In St. John's, this was a glorious weekend, with clear skies, warm temperatures and the aroma of barbecues on



Day 2: Dr Alex Liu (R) leading a group of blue-bootied and cold-footed geologists at Mistaken Point.

All photos in this article were taken by Stefanie Lode



Fractofusus, aka a Spindle, Mistaken Point

the gentle southwesterly wind. But if you know anything about Newfoundland climates, you probably know that the southern Avalon Peninsula is one of the foggiest places in the world, especially with a gentle southwesterly wind. Heading south along the road, we soon hit a damp grey wall, and we didn't get out of it until late on the following day. But even on this foggy, chilly day, the "D" and "E" surfaces are simply an amazing sight, and we also were able to visit other sites, including the famous pizza disks and frond-like organisms that represent the oldest complex organisms known on the planet. Mistaken Point is a sort of primordial Pompeii - the entire ecosystem was frozen in place when the organisms were killed by volcanic ash blanketing them. There was a lot to distract us from the clammy mist and wet cold feet!

Our overnight stop was in Trepassey, at the only Motel, now being managed by the children of the former owners. They've done a lot of work on the premises, including the installation of a new and attractive bar and restaurant area - an essential for any field trip. This was in the time of the open food fishery, so the cod was amazingly fresh and flaky; gourmet cuisine appears to have finally arrived in Trepassey and hopefully it's around to stay. Some of the party spent a more extended evening at the local arena where a lively



Fractofusus, aka a Spindle, Mistaken Point



The large circular fossil is an anchoring "holdfast" for a large frond, Mistaken Point

dance was being held in honour of a visiting delegation from Ireland. As this is one of the most Irish areas of the province, it was not always easy to tell visitors from locals on the basis of accents - although the lost souls wandering around in the pea soup fog at the end of the evening were probably from the Emerald Isle, and experiencing a few problems in relocating houses of their hosts.

Day three saw us back around Mistaken Point, but visiting newly-discovered sites and areas that are not on the regular tours. There are actually hundreds of fossil-bearing surfaces in the ecological reserve. We visited some of the possible trace fossils that hint at the development of locomotion, and speculated about their origins - and debated if they really were made by living things. We went out to Cape Race, the graveyard of the North Atlantic. Normally the jagged offshore rocks here are a fearsome sight but - well, I think we mentioned the weather already. The foghorn was pretty impressive, especially at close range. Later on, we headed northward to Ferryland and - to our delight - burst out of the fog into a warm summer day. Sweltering in the unaccustomed heat and our residual raingear, we looked at zillions (well, thousands maybe) of round impressions of the very first putative



Aspidella terranovica, Ferryland



Lighthouse at Ferryland, dimly seen through the fog.

Precambrian fossil to be described, known as *Aspidella terranovica*. This dreary little blob-like thing has an interesting history, as it was demoted to a pseudofossil for over a century, before being reinstated by Guy Narbonne and colleagues. It is now thought to be the “holdfast” that kept Ediacaran organisms attached to their substrate, probably preserved in a preferential manner because it was below the sediment surface. You might think that once you’ve seen one of these, you’ve seen them all, but apparently they show a range of morphological features suggesting that they might belong to more than one kind of organism. The same critters can be seen in outcrops scattered around downtown St. John’s, although one of the best sites has now been “beautified” by an impenetrable wooden fence.

From Ferryland we went home, with a bit of time left to enjoy a fine summer evening. The fog did eventually lift a couple of days later, for the official visit by the UNESCO delegation. That’s probably the best time for

some rare days of sunshine to illuminate these remarkable places. Let’s hope that these more important visitors were suitably impressed.

NOTE: Although access to the sites is now controlled, visitors can still take a hike to see the fossil surfaces that make this place famous. Hikes only take place in summer. There are daily tours between mid-May and early October, which can be booked through the excellent interpretation centre at Portugal Cove South, about two hours’ drive south of St. John’s.

This fieldtrip was made possible by a grant from the Geological Education Trust of Newfoundland and Labrador (GET-NL), subsidies for student participation from the Department of Earth Science, Memorial University of Newfoundland, and logistical support from the Geological Survey of Newfoundland and Labrador.



Day 3: Fieldtrip participants gingerly make their way down to the shoreline to view Ediacaran fossils at Ferryland.

CANQUA 2015 Conference Report

The Canadian Quaternary Association (CANQUA) held its 17th Biennial meeting in St. John's NL from August 16-19. Three days of talks and posters were attended by over 100 registrants and were accompanied by an afternoon of field trips as well as a kitchen party and a banquet at the Johnson Geo Centre on Wednesday evening. The conference kicked off with a student day on Sunday that included an informal workshop and networking sessions on career options in the Quaternary field. Mid-conference field trips focused on coastal dynamics in Southern Conception Bay led by Norm Catto, Memorial University, and an afternoon spent hiking on the East Coast Trail led by Carissa Brown. Conference plenary sessions featured talks by Roger Hooke, Michael Lewis and Nicole Couture. Special sessions in honour of Robert (Bob) Gilbert and Ian Brookes were also held.

The banquet at the Geo Centre was well attended and in true Newfoundland style there were lots of fun and games. John Gosse was the MC (of sorts) and started things off by educating all the come-from-away's on the finer points of the Newfoundland "tongue". The high-light of the evening was the award ceremony. The 2015 Johnson medal was awarded to C. F. M. "Mike" Lewis. The W. A. Johnston Award is the highest honour given by the Canadian Quaternary Association and recognizes outstanding professional achievement in Quaternary Science. W. A. Johnston was an innovator in Quaternary studies in Canada who, in his years with the Geological Survey of Canada, developed many of the concepts of regional Quaternary studies used today. Mike Lewis is well known in the Quaternary community for his half century of prolific and seminal geological research on Canada's continental shelves, in the Laurentian Great Lakes, and on other large and small lakes in Canada. His contributions are widely recognized as innovative and paradigm-shifting, creating new insight into the Quaternary record of the Great Lakes basin among his other contributions of a more applied nature.

The Aleksis Dreimanis Doctoral Scholarship was awarded to Jonathan Cripps (Simon Fraser University). This award is granted to a candidate who represents academic research excellence in Quaternary studies. The Guy Lortie Award for out-standing poster was



Mike Lewis with the CANQUA award

awarded to Maureen McHenry (Ulster University, Coleraine, UK) for her poster on Paleo-Ice Sheet reconstructions of the former Newfoundland Ice Sheet. Honourable Mention went to Shawn Scott (University of Waterloo, ON) for his poster on Quaternary stratigraphy and till provenance in the Eastern Athabasca Basin. The David Proudfoot Award for outstanding talk was awarded to Audrey Remillard (Université du Québec à Rimouski, Rimouski, QC) for her talk on the glacial history and sea level changes on the Magdalen Islands during the Late Pleistocene. Honourable Mention went to Jessie Holst Vincent (University of New Brunswick, Fredericton, NB) for her talk entitled "Recent Slow-Down in Global Warming has a Parallel in the Rapid Warming into the Present Interglacial".

It was a great conference that was well organized and attended, and as always displayed the breadth of Quaternary research taking place both nationally and internationally. Special thanks should go to the co-chairs of the conference Trevor Bell and Martin Batterson.

Ian Spooner
Acadia University, Wolfville, Nova Scotia

On the Road Part 1

Travel Blog: Howard Street Robinson Lecture Tour, Western Leg, Nov 2015

I have had the pleasure of being the Howard Street Robinson Medal winner of the Geological Association of Canada for 2015-2016. As part of the medal I am giving a lecture tour across Canada and just recently undertook the western leg of the tour where I gave 12 lectures in Whitehorse, Vancouver, Kelowna, Saskatoon, Regina, and Winnipeg. I will be undertaking additional legs in 2016. I gave three different presentations during this leg of the tour, including: 1) Seafloor Hydrothermal Systems: What are they? Their significance. Resources on sea and land, and life on the early Earth, which was a general talk aimed at a non-expert audience (seafloor vent talk); 2) Semi-permeable interface model for subseafloor replacement-style volcanogenic massive sulphide (VMS) deposits, which was based on my recent paper in *Economic Geology* (replacement talk); and 3) Zn-rich volcanogenic massive sulphide (VMS) deposits, which is based on another recent paper of mine in an *Irish Association of Economic Geology Special Publication* (Zn-rich VMS talk).

It was a great trip and outlined below are the locations and places I gave various talks and thanks to my hosts for their hospitality and the invites.

Stop 1 – Whitehorse – I gave two talks in Whitehorse, including the seafloor vents talk at Yukon College on



SS Klondike near the Yukon River, Whitehorse, taken early morning

November 13, and the replacement talk in the Yukon Geoscience Forum on November 17. It was great to hang out with many old Yukon friends and colleagues and talk Yukon geology again. A special thanks goes out to Joel Cubley from Yukon College for the invite to present at the college, and for Mo Colpron for hosting me while in Whitehorse.



Stroll along the seawall, Vancouver

Stop 2 – Vancouver – My first talk in Vancouver was on November 18 and jointly sponsored by the Geological Association of Canada Cordilleran Section and the Mineral Deposit Research Centre at UBC and was on Zn-rich VMS. There was a fantastic crowd of old friends, colleagues from industry, and some former students. The question session was excellent with some really insightful questions. Thanks to Thomas Bissig for his hospitality and hosting me while in Vancouver.

I also gave two talks at UBC and SFU on November 20. I gave the replacement talk at UBC (my alma mater!) in the morning and it was hosted by the local SEG Student Chapter. There was a great question and answer session after the talk with a lots of great questions on bacteria, VMS genesis, and the nature of replacement processes. Special thanks to Rachel Kim and the SEG Student Chapter for hosting me. I gave a second talk on Zn-rich VMS at SFU in the afternoon. There were excellent questions on the role of magmatic fluids in VMS, boiling, ocean chemistry, and tectonics. It was really great to catch up with colleagues there I hadn't



Flying out over Okanagan Lake

seen in a while and to chat with students. Special thanks to Dan Marshall for hosting me while there.

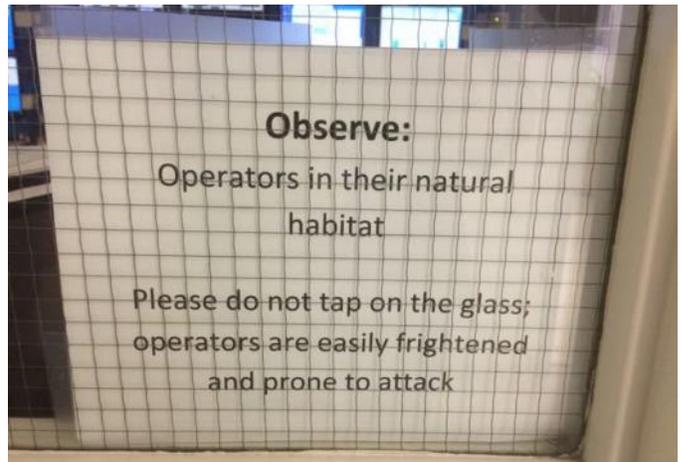
Stop 3 – Kelowna – I spent a great day on November 19 at UBC Okanagan and gave the seafloor vents talk. It was my first time to the campus and I had a great day checking out the department and facilities, catching up with faculty, and chatting with students. Even had a chance to look at some great textures in young volcanic rocks! I'd like to thank the faculty and students that took time out to hang out with me while there, the questions after the talk (many that I couldn't answer but it gave me some ideas about things I need to read about!), and particularly Ed Hornibrook and Janet Heisler for the excellent visit and their hospitality (I'll wear my UBC hat with pride!).

Stop 4 – Saskatoon – Had the pleasure of visiting colleagues at Saskatoon to give two talks on November 23. I gave the Zn-rich VMS talk at the CIM Geological Society Saskatoon Branch and thank Shayne Rozdilsky for arranging this. Great turnout with a lot of interesting questions and great to see colleagues from the local industry, including one of my former students! I gave a second talk on replacement-type VMS at the University of Saskatchewan to a student-rich audience, which was followed up by a great question period with some excellent questions on metal zoning in replacement systems, sulphur isotopes, processes for replacement, etc..

I was also lucky to have a fantastic tour of the Canadian Light Source synchrotron with Joyce McBeth (and fellow UBCer from the late 90s!). Pretty amazing place and got some great insight into what the synchrotron



Canadian Light Source synchrotron



Be very wary of synchrotron operators in their natural habitat!

can be used for, and what kind of research could be done in economic geology using said instrument. I'd like to also thank Camille Partin and Kevin Ansdell for their hospitality and hosting me while there.

Stop 5 – Regina – I gave two talks in Regina on November 24. The first talk was on Zn-rich VMS to the Saskatchewan Geological Society. The talk was in arguably the coolest venue on the tour (the Artful Dodger Cafe) with great turnout and great questions. I also ran into a friend from my first field season in 1993! The second talk was in the afternoon on replacement-type VMS at the University of Regina. The talk had a great audience with a lot of discussions and questions on bacterial colonies in VMS, framboids, Precambrian replacement-type deposits, and faunal colonies around hydrothermal vents. I thank Tsilavo Raharimahefa and Guoxiang Chi for their help and hosting me at the University of Regina, and Jason Cosford, Bernadette Knox, Kate MacLachlan, Ryan Morelli, and Murray Rogers from the Saskatchewan Geological Society (and Saskatchewan Geological Survey and APEGS) for organizing the SGS talk and their hospitality while in Regina.

Stop 6 – Winnipeg – I gave two talks in Winnipeg. The first talk was on replacement-type VMS at the Manitoba Geological Survey on November 25. This talk



Solitary tree on a lonely, snowy prairie *en route* to Regina (or awakening the spirit of Sinclair Ross)

had a great question session with survey staff (and former survey staff) on sulphur isotopes, metamorphism and its influence on textures and isotopes, preservation of textures in ancient rocks, and heat budgets and architecture of basins hosting VMS deposits. The second talk on November 26 was at the University of Manitoba and co-hosted by the GAC® Winnipeg Section, and was on Zn-rich VMS deposits. There was quite a diverse audience of faculty, students, survey, and industry. Some great questions after the talk on preservation vs. process in deposit distribution, carbonate alteration in VMS, and even on the Buchans deposits in Newfoundland. I'd like to thank Alfredo Camacho and Mostafa Fayek for their hospitality at U of M, Christian Böhm at the Manitoba Geological Survey, and a special thanks to Scott Anderson for hosting me during the entire trip!

The preparation and execution of a tour like this requires a lot of work on multiple fronts (as illustrated by the local hosts above). I would like to give special thanks to Alwynne Beaudoin, GAC® Lecture Tour Coordinator for doing so much behind the scenes for the tour; James Conliffe, GAC® Secretary/Treasurer, who did a lot of the promotion and social media shout outs for the tour; and Karen Johnston-Fowler at GAC® headquarters who has helped immensely with the logistical and financial aspects of the tour.

Stay tuned for updates on the next leg!

Steve Piercey
Department of Earth Sciences, Memorial University
Posted on: stevepiercey.wordpress.com
November 15 2015

Brian O'Brien named CIM-NL Geoscientist of the Year



Brian O'Brien (L) receiving the CIM-NL Geoscientist of the Year Award from Praveen Jha (R), President, CIM Newfoundland Branch, at the CIM-NL Annual Awards Dinner, November 7 2015

Our final award for the evening is for the CIM Newfoundland Branch 2015 Geoscientist of the Year. This year the award goes to Dr. Brian O'Brien, a Project Geologist with the Geological Survey of Newfoundland and Labrador. Brian O'Brien is an outstanding geologist who has contributed greatly to our understanding of the stratigraphy, structure and tectonics of the Appalachians in Newfoundland. He is one of the rare breed generalists that is grounded in the field, but uses all geoscience data in his practice of geoscience. Brian is trained as a structural geologist, but his depth of understanding of other geological disciplines is exemplary. Brian's maps and tectonic syntheses of many economically significant terrains in Central Newfoundland have documented the regional importance of structure, creating key interpretations that have been critical for successful exploration for gold and base metals, and also the reduction of exploration risk. In addition to his own work, he has mentored many graduate students at Memorial University and has trained summer field assistants during his research projects with the Geological Survey of NL. These students have received a first class education in how to read the rocks, think in three dimensions, and see how the local observations fit into the regional scale. Please join me in congratulating Brian O'Brien, this year's CIM Newfoundland Branch Geoscientist of the Year.

Praveen Jha
President CIM Newfoundland Branch, citation given at
the CIM-NL Annual Awards Dinner, November 7 2015

Announcements

Annual CGF Invitation for Grant Applications

The **Canadian Geological Foundation** invites all interested parties to submit grant proposals for the next round of grants selection. The Foundation is dedicated to assist in the development of geological sciences in Canada. Grants are made to support activities of national interest and broad significance, with emphasis on those of long-term importance. Grants are made on the basis of written applications giving a summary and detailed budget of the proposed project. The Foundation disburses more than \$175,000 annually. Note that grants are paid upon completion of the project.

Application forms and detailed instructions are available on the CGF website at www.canadiangeologicalfoundation.org. Please submit applications electronically as a PDF file to the Secretary by March 31, 2016. Incomplete applications will not be returned for correction and any material in the application in excess of the five page limit will not be circulated for review.

Queries about the Canadian Geological Foundation should be addressed to the Secretary:

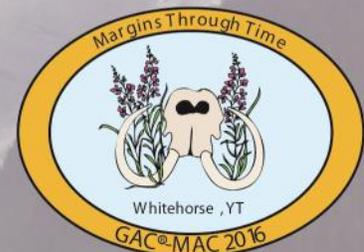
Jane Wynne
B 9561 Canora Road, Sidney, BC, V8L 1P4
Tel: 250-656-6681
Email: jane.wynne@shaw.ca

Whitehorse 2016 GAC-MAC Joint Annual Meeting

Nestled in the heart of the northern Cordillera, Yukon's capital Whitehorse is surrounded by diverse geology spanning the Proterozoic to present. Join us for a multi-disciplinary technical program ranging from crustal neotectonics to low-pressure metamorphism and Beringian surficial geology. Field trips will include the geology of Beringia and the Klondike gold fields, a transect of Yukon accretionary terranes, and economic geology-focused trips in southeast Alaska, the Keno Hill silver district, and the Anvil Range Pb-Zn district.

Yukon sits on the margin of Laurentia and the margin of Beringia, making our geology second to none. Come join us on the margin of society for some unforgettable geology and our famous Yukon hospitality.

GAC-MAC 2016
Whitehorse, Yukon
June 1-3, 2016
www.whitehorse2016.ca
From Laurentia to Beringia: Margins through time



Howard Street Robinson Fund

The Robinson Fund was established in 1977 by the Geological Association of Canada, using a bequest from the estate of Howard Street Robinson. The fund is dedicated to the furtherance of scientific study of Precambrian Geology and Metal Mining by:

- sponsoring an annual Distinguished Lecturer Tour whose focus alternates between Precambrian research and economic geology (lecturer alternately chosen by the GAC®'s Precambrian and Mineral Deposits divisions)
- supporting Special Projects including publications, symposia and conferences.

Proposals for special projects on Precambrian Geology or Metal Mining should be submitted to the Robinson Fund Committee. Projects should be sponsored or organized through the GAC® or one of its Divisions or Sections. Proposals that have a wide appeal or degree of accessibility to the GAC® membership are preferred.

For further information and proposal submissions, please contact: Patrick Mercier-Langevin, Chairman, Robinson Fund, c/o Geological Survey of Canada, 490 rue de la Couronne, Québec (Québec) G1K 9A9, Tel: 418 654-3101, E-mail: pmercier@nrcan.gc.ca

The Last Word

You may notice that this latest issue of *GEOLOG* is lamentably late in arriving on your desk. I started formatting the issue in early December with snow on the ground and carols in the shops. Then work-life got in the way. I'm finishing it up as the last of the snow melts and magpies are disputing desirable nesting sites in the trees

around my home. The hiatus has given me new insights to work-time and geological time. One seems to last forever but goes by fast, and the other goes by slowly and lasts only an instant. I'll leave it to you to decide which is which! In the meantime, please consider contributing to the spring issue of *GEOLOG*. With luck, it'll be out before fall! Alwynne B. Beaudoin, *GEOLOG* Editor

Information for Contributors

Contributions should be submitted by e-mail to Alwynne.Beaudoin@gov.ab.ca, with *GEOLOG* in the subject line. Contributions are welcome in either of Canada's two official languages. MS Word (.doc or .docx) is the preferred format for contribution but generic word processing (.rtf or .txt) files are also fine. Please do not submit PDF files. Up to four hi-res images may be submitted per contribution: preferred format is .jpg, RGB colour, with a minimum 300 dpi resolution at 5" x 3" size. Please ensure that images are cropped and colour-corrected, and provide a caption for each image, and an image credit line if needed. Contributors are responsible for securing permission to publish for any third-party images or images of living recognizable people. Diagrams (vector graphics) may also be submitted. Preferred format for graphics is Adobe Illustrator (.ai); make sure that the file is saved with "save text as lines" option enabled to ensure no font substitutions. Additional information on other file formats can be obtained from the Editor. Please do not embed images or graphics in your text document; images or graphics should be submitted as separate files. In your text, use a call-out in parentheses to indicate the approximate placement of each image and graphic. If files are larger than 10 mb, please contact the Editor for alternate delivery arrangements. Your contribution will be copy-edited to ensure consistent spelling and orthography and to correct any obvious typos or errors. Contributions may also be edited for clarity and length. If the Editor has questions about specific information in the text, she will contact contributors for clarification. Contribution deadlines are March 1, June 1, September 1 and December 1.

Consignes aux auteurs

Les contributions d'auteur doivent être soumises par courriel à Alwynne.Beaudoin@gov.ab.ca, en indiquant *GEOLOG* à la rubrique Objet. Les articles seront acceptés dans l'une des deux langues officielles du Canada. Les fichiers de format MS Word (.doc ou .docx) sont préférables, mais les formats génériques (.rtf ou .txt) sont aussi acceptables. Veuillez ne pas soumettre de fichiers au format PDF. Par article, jusqu'à quatre images haute résolution peuvent être soumises; format préféré est .jpg, couleurs RVB, avec un minimum de 300 PPP en taille 5 po x 3 po. Veuillez vous assurer que les images sont recadrées et leurs couleurs corrigées, qu'elles sont accompagnées d'une légende ainsi que des informations de référence le cas échéant. Il est de la responsabilité des auteurs d'obtenir la permission de publier toute image de tiers ou de personne reconnaissable. Des diagrammes (graphiques vectoriels) peuvent également être soumis. Le format préféré pour les diagrammes est celui d'Adobe Illustrator (.ai); assurez-vous que le fichier est sauvegardé avec l'option « Sauvegarder le texte comme ligne » activée pour éviter toute substitution de police de caractère. On peut obtenir des informations sur d'autres formats de fichiers en communiquant avec l'éditrice. S'il vous plaît ne pas incorporer d'images ou de graphiques dans votre texte; ces images ou graphiques doivent être soumis sous forme de fichiers distincts. Dans votre texte, veuillez utiliser des notes numérotées entre parenthèses pour indiquer l'emplacement approximatif de chaque image et graphique. Dans le cas de fichiers dépassant 10 Mo, veuillez contacter l'éditrice pour convenir des modalités de téléchargement. Vos articles seront révisés afin d'en assurer la cohérence orthographique et corriger les fautes de frappe ou erreurs évidentes. Les articles pourront aussi être corrigés pour plus de clarté et éviter des longueurs. Dans les cas où l'éditrice aurait besoin d'informations particulières concernant le texte, elle communiquera avec les auteurs. Les dates limites pour soumettre des articles sont le 1 mars, le 1 juin, le 1 septembre et le 1 décembre.