

THE BRODIE CLUB



Established 1921

Website: <http://thebrodieclub.eeb.utoronto.ca>

THE 1,116th MEETING OF THE BRODIE CLUB

The 1,116th meeting of the Brodie Club was held on Tuesday, 15 January, 2019 in Room 432 of the Ramsay Wright Laboratories of the University of Toronto.

Chair: Ricky Dunn

Secretary: George Bryant

The meeting was called to order at 7:36 pm and was attended by 46; 32 members and 14 guests.

Roll Call:

Present: E. Addison, R. Addison, Bacher, Bertin, Bryant, Coady, Currie, Daniels, Dengler, Dunn, Eadie, A. Falls, B. Falls, Hutchinson, Hussell, Iron, H. Juhola, Kortright, Lindsay, Machin, McAndrews, Moldowan, Obbard, Peter, Pittaway, Rapley, Reading, Riley, Seymour, Stones, Thomas, Tomlinson.

Guests: Amanda Guercio (guest of Peter), Jim Eckenwalder and Ron Dengler (Dengler), Ron Jenkins and Peggy Haist (Bertin), Katie Ziebarth, Clara Thaysen and Rachael Giles (Moldowan), Gavin Miller (Juhola), Mary-Lou Jorgenson-Bacher (Bacher), Arley Chisholm (Seymour), Kathrine Falls (A. and B. Falls), Sharon Hick (McAndrews), Rachel Gottesman (Kortright)

Regrets: We lost our list, and rather than putting trust in memory, we are assuming that all members not present regretted missing this meeting!

Minutes: There were no errors or omissions to the minutes. Minutes approved.

Committee Reports:

Membership: The Brodie Club greeted two new members, Rae Hutchinson and Domenic Stones, who were welcomed with a round of applause. The resignation of John Carley was noted for the official club records.

Program: Ed Addison reviewed the excellent line-up of speakers for the next several meetings. Michael Oldham in February on Ontario vascular plants, Gail Fraser in March on the controversial Double-crested Cormorant, Chris Wilson in April on genetics, and member Marc Johnson in May on evolutionary theory.

Announcements:

Glenn Coady announced that well known Toronto birder, Harry Kerr, will soon become a centenarian. Glenn brought a card for well-wishers to sign, and hopes to deliver it personally to Kerr in Ottawa.

Rose Addison passed around a brochure on the Huron Fringe Birding Festival, for late May, at MacGregor Point Provincial Park, Port Elgin. The Festival is putting on an incredible 100 events over 8 days.

SPEAKER

Ed Addison introduced Dr. Nick Eyles, Professor of Geology at University of Toronto Scarborough, who is widely recognized both for his research and as a communicator.



“Cool stuff about ice ages: the ice stream paradigm.”

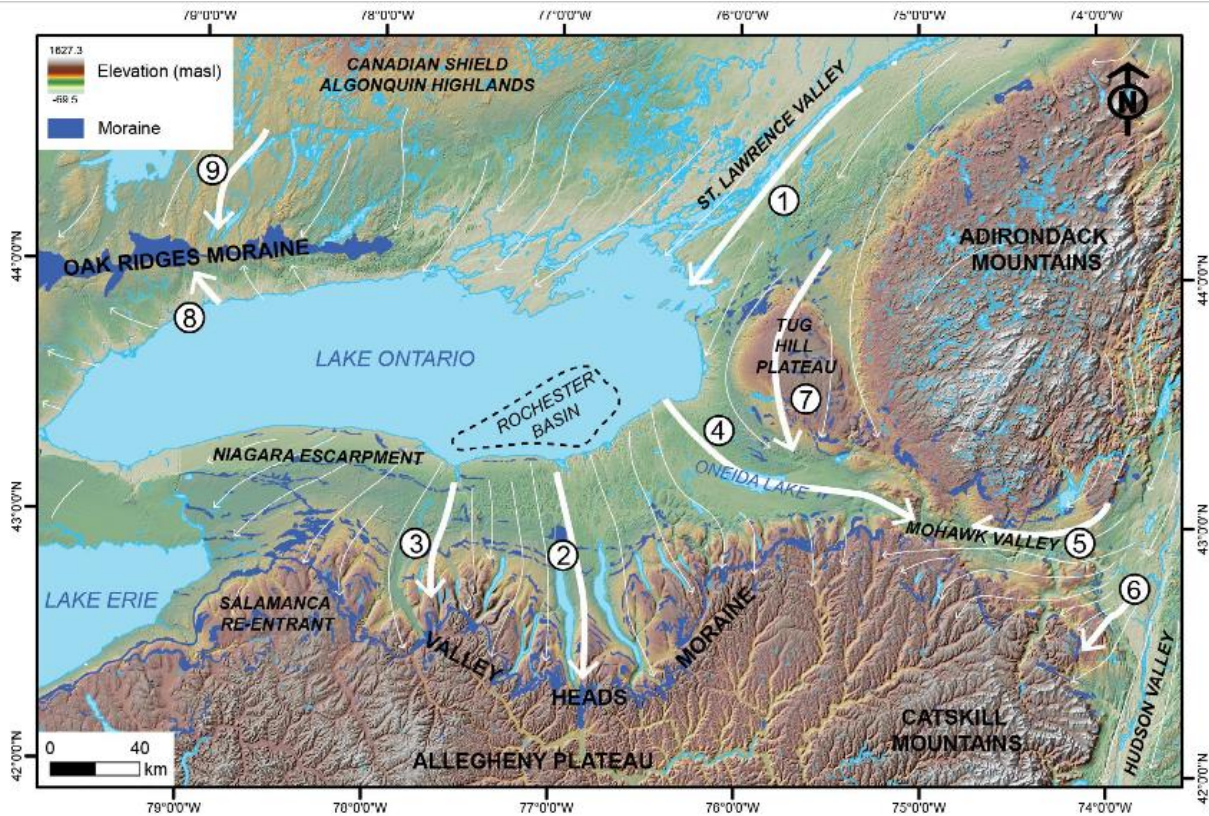
Recent results from Lidar imaging have opened new fields of study on glacial geology. Lidar is a surveying method that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor. It can be operated from a drone, allowing very detailed coverage. Resulting images reveal the surface of bedrock without any buildings, soil or vegetation cover. For the first time we can see geologic features that are hidden from our eyes. Famed geophysicist J. Tuzo Wilson used the new technology of air photography to discover patterns that led him to become a champion of plate tectonics, and now we are making new discoveries about the earth’s surface using another new technology. Among other things, Lidar results are important for mineral discoveries, but Dr. Eyles’ work has focused on the evidence left behind from fast-flowing ice streams formed under the large continental ice sheets, particularly in southern Ontario.

Toronto is a special site for glaciation studies because of the excellent records of the most recent two glaciations and the intervening interglacial. Scarborough Bluffs and Don Valley brickyards show rare evidence in a single location of two glaciations—Wisconsin and Illinoian. Each glaciation normally destroys evidence of earlier ones, but earlier glaciations can now be reconstructed using data from cores of undisturbed deep ocean sediments. The Japanese drillship *Chikyu* has done much of this work. Over millions of years there have been fairly regular cycles of ice ages and interglacials, with smaller ice advances and retreats within them. Recent periods both of cold and warmth are lasting longer than in the past. The speaker suggested that the Little Ice Age may have ended only in 1900. A lot of people think that glaciations are driven by astronomical variations. During the past 2.5 million years, Canada has been under ice more than it has not.

At one time the Laurentide ice sheet (the most recent) covered 35-40% of the northern hemisphere, including much of Canada, starting to melt rapidly about 14,000 BP and only disappearing from Ontario 10,000 years ago. The Laurentide ice was 3 km thick; totally different from modern polar ice. The sheer weight of it caused ice to push forward at a high rate of speed, forming ice streams. Ice flows more quickly closer to shorelines, and it is ice streams that gouged out fjords in Norway up to 2 km deep. The Finger Lakes in New York state are also fjord-type valleys cut by the ice streams.

Lidar images reveal the locations of ice streams, showing that there are far more than the visible ones like fjords. An ice stream accumulates large quantities of debris on its underside, making it into a kind of mobile strip of sandpaper that scours the bedrock surface as it moves. The result is “mega-scale glacial lineation (MSGL),” or deep parallel grooves that are clearly visible in Lidar images. Images for southern Ontario delineate the glacial Lake Iroquois shoreline 40 metres above Lake Ontario, and glacial ice streams are revealed as linear features leading both to and from Lake Ontario (see figure). Lidar maps also show drumlins, such as those in the Peterborough drumlin

field. Drumlins are shaped like bullets or comets with a “bow” and “stern,” and though no one knows exactly how they were formed, many are almost split in two by deep grooves that are presumed to have been gouged out by ice streams flowing over them.



Arrows indicate flow direction of ice streams from recent glaciation.
 (Thick arrows with numbers refer to details given in text from which this figure came.)

Dr. Eyles showed evidence of ice stream effects on bedrock surfaces from around the world, from Lidar images over land and from side-scan imaging deep in the ocean. Scours vary from very deep and broad to tiny grooves on a micro-scale. “Tribology,” the study of how things wear, shows that grooved tracks similar to those left by ice streams are formed whenever two materials slide past each other under pressure, as in wear between machinery parts, the faces of geologic fault planes or where there have been landslides. Mid-ocean ridge plates move in opposite directions, and detachment faults along the ridges also show parallel grooving.

In Ontario, ice stream evidence shows that Toronto is built across the former till beds of two fast-flowing ice streams that converge on the Oak Ridges Moraine both from the north and south (see figure). The grooving resulted in sets of highly elongated and closely spaced till ridges up to 4 km in length and 100 m in width. Where grooves are pronounced there are obvious indications that they affect surface vegetation. Grooves have deeper soils, affecting hydrology and plant communities.

Questions

Dunn: Do ice streams flowing towards each other indicate that there were separate centres of higher ice accumulation, maybe in areas of higher altitude?

- A. Ice streams aren’t restricted to areas of thinner ice, but form where shape and slope of underlying bedrock directs streams that are forced to flow by weight of the ice cap above them.

Riley: The Laurentide Basin sits right over Hudson Bay—a great place to form an ice sheet.

- A. There is still a big debate in Ontario about the role of water in glaciations, but certainly wet summers help ice to accumulate rapidly.

Bertin: I sailed down the Hudson River a few years ago. I was very impressed by the beauty of the trip. The river is very deep and very straight with high cliffs on both sides. I asked numerous people whether it was a glacial trough or a fault line and got many different answers.

- A. This is a glacial gouge that released water from the Great Lakes after the ice age.

Gavin Miller: noted examples of vegetation revealing subsurface geology, such as vernal pools and Silver Maple swamps.

Daniels: Are drumlins overcut by glacial lines and was there a difference in speed of movement?

- A. Yes, to both. Glacial lines were the last ice event to take place as the glacier move forward.

Addison: The lidar imagery is interesting, but what caused the ridges in the rocks along Georgian Bay:

- A. Those are simply a result of big boulders creating big grooves.

Rapley: Any comment on increased carbon in the air and other pollutants as they relate to ice formation?

- A. Climatologists have looked at changing CO₂ levels but more is involved, such as methane and other factors. Climate change is more complicated than generally acknowledged – but that's a topic for another talk.

Bertin: Responding to comment by Eyles that he plans to write a book on J. Tuzo Wilson, Bertin told how his Jarvis C.I. Science Club in Grade 10 or 11 was looking for a good speaker, and one of the boys suggested a scientist who lived a few doors down from his place. Having no idea who that was, the boy went over one day to find Tuzo Wilson on his knees planting tulips in his front garden and asked if he would speak at the science club. After getting genial agreement, the club looked him up and realized he was a world-famous geophysicist. They rushed around to prepare, cleaning up the chemistry lab, grabbing some cookies and making tea. Wilson gave a very impressive talk and didn't seem to mind the hot tea served in wax paper cups.

- A. Great story – please email it to me for my book!

The speaker was thanked by Marty Obbard.

OBSERVATIONS

Jean Iron has an unusual yard bird. A Barred Owl has been monitoring activity at her feeders, presumably with dinner in mind. This is the second at this location in about 20 years.

Glenn Coady mentioned that *Birds of Saskatchewan*, of which Stuart Houston is a co-editor, has just been published and may still be available at a pre-publication discount.

Bertin: We have several Red-tailed Hawks that nest in the Wychwood Park area and hang out in our back garden. There is one that likes to sit at the top of our lamp-post. A female robin and several sparrows that objected to the hawk and would dive-bomb it and screech at it and were generally unwelcoming. The hawk would dismiss them with a wave of its wing much as we dismiss nuisance

flies. We noticed one day that the robin was no longer around. We found it a day later – or the wings and what was left of the body. The hawk had obviously caught and eaten it.

Helen Juhola recommended the book “The World in a Grain: The Story of Sand and How it Transformed Civilization,” by Vince Beiser. Sand is used in almost everything (buildings to electronics to lenses) and increased extraction as old sources are used up is having environmental consequences.

Meeting adjourned at 8:55

NEXT MEETING

The next meeting will be on 19 February, 2019. Mike Oldham will speak on vascular plants of Ontario.

MEMBERSHIP

For the official record, here are the mini-bios of the two new members welcomed at this meeting.



Rae Hutchinson

Brodie Club: 2019

I grew up in a house where love of both nature and learning were all around me. As a child I particularly loved mammals, but any animal interested me, and some of my most treasured items were a simple sticker album published one year by the Toronto Zoo and animal collector cards that came with scientific facts about each species.

My first memory of being obsessed with a bird was on a family camping holiday travelling to B.C. While looking through *Peterson's Field Guide to Western Birds* on the long drive, I stumbled on the Scissor-tailed Flycatcher and spent the rest of the trip imagining all the glorious things it could do with its tail, making up stories about the adventures he would have with such a spectacular tail. In particular the words ‘usually the “Scissors” are folded’ caught my imagination. Never mind that there was no realistic chance we would see one, I imagined spotting one enough times!

In 2004, I graduated with a B.A. in German and Linguistics from the University of British Columbia, also taking classes in Russian, French, Polish and Japanese. As part of my degree, I spent 2 years at the Universität Augsburg in Germany. Following graduation, I lived for 4 years in Japan as an English teacher. For the last few years, I have seemingly become a “professional” citizen scientist, spending much of my time working on projects with Nature Aurora. I’m particularly involved with the Breeding Bird Survey and Snake Monitoring using Coverboards. I also monitor nest boxes and am active with Swift Watch and Nature Reserve maintenance.

Although I did well at school, most things I became interested in, I taught myself. When I became more interested in birding, it seemed natural to approach it in the same way. If I wanted to learn about a specific bird, I turned to books or the internet. My mom was really the only other person close to me who was interested enough to go birding with me, and it was she who sparked the deeper interest. But if she was busy, I would go birding on my own, spending hours just exploring, often using my camera and love of photography as a tool to teach myself about field identification. However, until I joined David Tomlinson’s Nature Aurora group, I didn’t realise what I was missing by not birding with other birders. Not only did I find a lot of joy in birding with people with the same interest, but I also found that, like learning languages, immersing yourself with those who are “fluent” may be a sharp learning curve, but also brings tangible results.

I'm especially interested in animal behaviour, and the behaviour of both breeding bird and migrating bird populations. This interest has taught me that even common species can ignite a passion, just by dedicating a little time to observing their behaviour. One of my goals is to work in/learn the skills of bird-banding, so I am hoping to volunteer with the Tommy Thomson Park Bird Research Station.



Dominic Paul Stones

Born: Oct 27, 1969, Clevedon, Somerset UK.

Brodie Club: 2019

With parents, I moved to Canada in 1975 becoming a Canadian citizen in 1979. We lived first in Arvida, Quebec and latterly in eastern Ontario. After graduation from University I moved to Toronto, where I have lived since 2001.

Education and Work History: I obtained an Honors BA in English literature from Mount Alison University in 1993 followed by Publishing Diplomas from Centennial College and Simon Fraser University. For the past twenty years, I have worked in the publishing industry – primarily in sales, with some editing responsibilities. Currently employed by Hachette Book Group Canada.

Natural History Interests: I have a wide interest in all aspects of natural history, particularly fish, reptiles and amphibians and gardening. At one time I had a huge tropical fish set-up. Fortunately for me, marriage and family displaced my beloved fish although I still have an outside fish pond.

Personal Life

Married to Margaret Bryant with one child, daughter Alexandra.