THE BRODIE CLUB

Established 1921

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

THE 1,107th MEETING OF THE BRODIE CLUB

The 1,107th meeting of the Brodie Club was held on Tuesday, 16 January, 2018 in Room 432 of the Ramsay Wright Laboratories of the University of Toronto.

Chair: George Bryant
Secretary: Kevin Seymour

The meeting was called to order at 7:32 pm and was attended by 43; 31 members and 12 guests.

Roll Call:

Present: E. Addison, R. Addison, Beadle, Bell, Bryant, Carley, Coady, Currie, Curry, Daniels, Dengler, DeMarco, Dunlop, Dunn, A. Falls, B. Falls, Hussell, Iron, H. Juhola, King, Kotanen, LaForest, Martyn, McAndrews, Moldowan, Obbard, Pittaway, Rising, Seymour, Slessor, Sutherland.

Guests: Katie Thomas (Guest of Currie), Ron Dengler (Dengler), Sharon Hick (McAndrews), John Bacher and Mary-Lou Jorgenson-Bacher (H. Juhola), Hollis Dahn (guest of the Club), and six Kvist students: Claire Manglimot, Rafael Inama, D. de Carle, Korma Nangle, James Santengelo and Chris Boccia (with apologies for any misspellings).

Regrets: Abraham, Bertin, Crins, A. Juhola, Kortright, Lindsay, Peter, Rapley, Riley

Minutes: Minutes of the previous meeting were accepted as posted on the website.

Committee Reports:

ON Nature: (Slessor): There is an article in the latest ON Nature magazine about former Brodie Club member Fred Bodsworth. Anne Bell was interested in becoming the Club rep to Ontario Nature, but has learned since tonight's meeting that it would pose a conflict of interest, so Slessor and Curry will continue in that role.

Program Committee (Ed Addison): The February speaker will be Brodie Club member Dunn, presenting "What good is a bird observatory?" The March meeting will have a speaker on the biting flies of Ontario.

Announcements:

Pittaway noted that Brodie Club member Dan Strickland, along with Carla Cicero (University of California Berkeley) and five others, have made a proposal to the American Ornithological Society to "Restore Canada Jay as the English name of *Perisoreus canadensis*." The Canada Jay's current name is Gray Jay, but it was formerly known as the Canada Jay until 1957. It is thought that Parliament is more likely to consider this species as our National Bird with an official name change back to Canada Jay.

A vote for date of the May meeting date resulted in selection of May 15th.

Tonight's speaker will be the Vaughn lecturer at the upcoming ROM Colloquium on the evening of February 28, 2018.

SPEAKER:

Seymour introduced the speaker Sebastian Kvist. Sebastian was hired as the Associate Curator of Invertebrate Zoology at the ROM in 2015. Prior to this, he completed his undergrad and Master's degrees in Sweden, and completed his Ph.D. at the American Museum of Natural History in New York. The ROM wooed him to Canada after he completed a post-doc position at Harvard. He is cross-appointed to the University of Toronto where he teaches the Biodiversity of Invertebrates. His expertise is on leeches and ribbon worms.

"The Natural History of Leeches: evolution, blood and collections"

Although there may only be about 700 species of leeches in the world, they are cosmopolitan in distribution, living in almost every body of water (marine or fresh water) as well as terrestrial habitats, and ranging from mountain tops to deep ocean hydrothermal vents. Due to a scant fossil record, the age of the group is unknown but it probably ranges back 200 million years, deep into the Mesozoic.

Three different feeding strategies have been adopted by different kinds of leeches: *liquidosomatophagous*, consuming the hemolymph of invertebrates; *macrophagous*, eating prey whole (the photo shows one of these consuming an earthworm); and *hematophagous*, blood feeding. Most of the talk focussed on the third group.

Blood feeding is associated with two key innovations. One is the adoption of bacterial symbionts that produce essential nutrients not available from a diet of blood. The second is evolution of anticoagulants that allow a leech to feed for extended periods without their recently-ingested food coagulating and "turning them into bricks." Anticoagulants are also injected into the wound to prevent the host's coagulant system from sealing off blood flow. There is a long history of purposely attaching leeches to humans for medicinal purposes, originally to draw out 'evil humours,' but still in use today to reduce swelling in tissues that engorge with blood during various medical procedures. Anticoagulants derived from leeches are used to heal hernias and prevent strokes. There are at least nine different leech anticoagulants known, and each one attacks the coagulation cascade at different points in that biochemical sequence.

In the wild leeches can survive for up to a year without feeding, and when they feed they can consume up to five times their body weight in blood. Leeches are attracted to mucous membranes as attachment areas, such as the throat, nose, and eyeballs but will attach anywhere on the skin.

Their prey include of all kinds of vertebrates, including fish, turtles, birds and mammals (and yes, humans).

There are two main ways to catch leeches: construct a trap consisting of fresh beef liver placed between a loosely folded aluminum pie plate, or use your legs as bait. Removal of leeches from your skin must be done quickly to prevent the leech regurgitating into you, but there are actually no known diseases transmitted by leeches. Researchers learn how to remove them properly – which does not include application of salt, matches, or other folk remedies—but consists rather of an expert insertion and twist of a fingernail. An alternative is to let them feed until they fall off by themselves, which for Ontario species usually takes about half an hour.

Kvist described a research project on *Macrobdella decora* (see photo) to determine whether there were morphological or genetic differences between the Ontario population and specimens from eastern USA (Maryland in particular). There proved indeed to be morphological differences, but description of one form as a new species required knowing which one was the "real" *M. decora*. This required revisiting the type locality in Minnesota where the species was originally collected in 1824. Kvist's team could find no live specimens in Minnesota using their normal methods, but a visit to a professional collector who sells leeches as fishing bait turned up the needed samples. It turned out that the Ontario population is *M. decora*, whereas the eastern USA population will be described as a new species.

Another study took place in Panama, as part of a larger project to collect representative samples of all the major clades of blood-feeding leeches. The aim is to re-analyze the systematic relationships of all leeches, to learn the feeding habit used by the ancestral leech and evolution of anticoagulants used by different groups, amongst other things. One of the long-term research goals is to isolate anticoagulant-like molecules and test for anticoagulant properties. Kvist has one more family to sample before this work is completed. At this point in his work it appears that blood-feeding was probably the ancestral state.

If you missed this talk, you missed a number of fascinating visuals, including videos of catching leeches, and of leeches consuming various types of food.

Questions following the presentation:

B. Falls – *What is the distribution of the terrestrial leeches?* They are confined primarily to NW and SE Asia as well as Australasia. Because of their wide range of possible prey animals, they have the widest repertoire of anticoagulants.

Curry – *What is the life cycle of the typical leech?* They are hermaphrodites, have both male and female organs, allowing for double copulation. They lay a large number of eggs, and some species show parental care. They can live up to 10 years in captivity, but it is largely unknown how long they live in the wild, perhaps only a couple of years.

Bacher – *Can a human die from leech feeding?* It is theoretically possible, with enough leeches and blood loss causing shock, but this has not been recorded.

Bryant – *Snapping turtles always seem to have leeches on them. Are these turtle specialists or could they also feed on humans?* Answers: yes they are turtle specialists, but yes they could also feed on humans. There are 42 leech species known from Ontario, 8 feeding exclusively on fishes.

Daniels – *Do microphagous leeches digest the whole prey and do they also have anticoagulants?* Yes to both questions.

Daniels – *Are there any terrestrial leeches in Canada?* Yes, though only one known, and it appears to live in moist soil.

Kotanen – *Do leeches have a blood-feeding ancestor?* The ancestral earthworm, akin to a bristle worm, can at least feed on blood sometimes, so the qualified answer is yes, maybe partly. Some leech forbears have anticoagulant like molecules, but their anticoagulant properties have not been tested.

Obbard – *What are the cues that leeches use to find their prey?* Although leeches have eyes, it isn't clear how good they are for seeing. There are many possible cues for leeches: motion, warmth, blood, amino acids, even carbon dioxide emissions.

Hick – *Can a DNA sequence be obtained from a preserved leech?* Yes, DNA can be extracted but anticoagulants cannot, so a special preservation method is required in order to preserve anticoagulants.

Sutherland – *Actinobdella annectens has been collected only once at Long Point, on a Snapping Turtle, and nowhere else. Is that still the case?* Answer, not sure. *Clove oil is commonly used for narcotizing fish; can it be used for narcotizing leeches?* Yes, but we prefer to use ethanol as a narcotic.

Daniels - Commented that the application of DEET insect repellent makes an attached leech drop off immediately. This was new to Kvist, and he'll probably try it out.

The speaker was thanked by Dunlop.

OBSERVATIONS

Coady – Noted that he has found five records of Eskimo Curlews in the Toronto area beyond the two known as specimens. The last was shot in Toronto in 1907 by Hector Gunn, grandfather of former Brodie Club member Bill Gunn.

Iron – "Project Snowstorm" is presently operating on Amherst Island, to attach radio transmitters to Snowy Owls. Two were done recently, for a total of 10. It is hoped that their return to the Arctic can now be tracked. For more detail, see https://www.projectsnowstorm.org/posts/back-to-amherst/

Hussell – Found the remains of a Cooper's Hawk killed by a coyote. In its talons were the feathers of a smaller bird. He surmises the Cooper's caught a small bird on the ground and then the coyote caught the Cooper's.

Helen Juhola recommends the following recent books: "The Plant Messiah: Adventures in search of the world's rarest species" 2017 by Carlos Magdalena; "Bee Quest" 2017 by Dave Goulson; "What

a fish knows" 2016 by Jonathan Balcombe; "The Secret Life of Flies" 2017 by Erica McAlister; "Spineless: the science of jellyfish and the art of growing a backbone" 2017 by Juli Berwald; "Georgian Bay: Discovering a unique North American ecosystem" 2017 by Nick Eyles, Christine Boyanoski and Martin Cooper.

The meeting was adjourned at 9:20 p.m.

NEXT MEETING

The next meeting, Tuesday 20 February, 2018, will feature Ricky Dunn on "What good is a bird observatory? – Past, present and future."

MEMBERSHIP

The Membership Committee received an application for membership from Katie Thomas. The application has been welcomed and approved by the committee, and forwarded for inclusion in these minutes.

Katie Thomas

Interests: From a young age I have had a wide-ranging interest in a number of natural history areas with a particular interest in ornithology (migration biology), plants (particularly shrubs!), and limnology.

Education and Work: I hold a BSc. (Zoology) from Trent University and a Masters in Library and Information Science (Western University).

I currently conduct legal research at a downtown law firm and from where, on the 57th floor, I can keep an eye on the local Peregrine Falcon population.

Publications:

Thomas, K. (1993) Birding by electronic computer conferences. *Birders Journal*, 2(2), 130-131

Helleiner, F., Thomas, K., & McGeachy-Currie, M. (1987). Breeding bird observations in northwestern Ontario. *Ontario Birds*, 5(3), 94-102

Blokpoel, H., Thomas, K., & Farraway, A. (1986). Common Tern egg predation by Ruddy Turnstones. *Condor*, 88, 521-522

Activities: I have recently participated in the Prince Edward County Bio-Blitz (June 2017) (helping with benthos and bird ID), and the Norfolk County Bio-Blitz (July 2016) (helping with moth ID).

Natural history fieldwork has included:

- Ontario Breeding Bird Atlas (James Bay lowlands and northern Ontario)
- Bird Studies Canada Field Biologist
- James Bay shorebird project (with G. Morrison)
- Pribilof Islands study of cliff nesting seabirds and Northern Fur Seals
- Farallon Islands study of Great White Shark attacks on Elephant Seals and migration monitoring

I actively hike the Bruce Trail and Oak Ridges Moraine Trail, completed the Boston Marathon in 2010 and many half and full marathons.

Influences: My dad, Doug Thomas who was a keen naturalist and who would always encourage his 5 kids to get out and identify "confusing fall warblers". Also, my grandfather, JD Thomas (who was the Chairman of the Guelph Conference in 1941).

CORRESPONDENCE

David Tomlinson has written a very impressive book 'The Breeding Birds of Aurora: Mapping, Monitoring, Managing,' which can be perused and downloaded at https://natureaurora.ca/current-projects/ It compiles extensive citizen-science projects to document 103 species and effects on them of Aurora's human population expansion from 13,000 to 50,000 in a 40 year period.

David writes that he would greatly appreciate any comments on observations on the book. He also wrote the following comment on the December meeting minutes:

I found the information on cannabis interesting, as in my 20s I worked as the propagator's assistant at the Manchester Parks Department in the U.K. Occasionally we grew cannabis sativa as a feature plant in the park's annual flower beds. At the end of the summer they were thrown into the park's rubbish clump. Hemp seed was also included in the cage bird seed mix that I fed to my Norwich canaries and aviary bred British birds. I used it sparingly as it had a tendency to make them fat. It was often used boiled as a coarse fishing bait.

Jim Bendell sent the photos at right from his home in Clayton, ON, showing his home-made squirrel-proofing for a tube-feeder, and summer visitors. (Pictures are worth a thousand words!)

-30-