

The 947th MEETING OF THE BRODIE CLUB

The 947th meeting of the Brodie Club was held on March 21, 2000 in the Ramsay Wright Zoological Laboratories of the University of Toronto.

Chairman: Bruce Falls

Secretary: Michael Boyer

Attendance: 24 members and five guests

Jean Iron, guest of Bruce Falls

Joe Cladman, guest of Bernard and Claire Muller

Sid Daniels, guest of George Bryant

Paul Grey, guest of Bill Crins

Tom Low (speaker), guest of the Brodie Club

Minutes of the previous meeting were approved with minor amendments.

New Business and Announcements:

Bill Carrick moved an amendment to the by-laws of the Brodie Club to raise the ceiling on membership to 40 from 35 to allow for the induction of new members. The motion was seconded by Jim Rising, who proposed an amendment that the number be raised to 50. The amended proposal, after some discussion, was seconded by Ron Tasker and passed by a majority of members present.

Claire Muller proposed that name tags be made available for the convenience of members and guests at meetings. This received general approval and Muller and Rising agreed to oversee its implementation.

At the instigation of Claire Muller, nominations for the annual June field trip were solicited a month earlier than usual. Dr. William Rapley's invitation to a "behind the scenes" visit to the Metro Toronto Zoo, issued two years ago but cancelled because of a staff strike, was extended again for Sunday June 11, 2000. This was accepted with enthusiasm. Carrick proposed that \$100 be donated by the club and earmarked for research at the zoo. Whatever donations individual members wish to make will be added to that sum.

Claire Muller drew attention to a newly revised edition of *The World History of Beekeeping and Honey Hunting* by Eva Crane, Duckworth Publishing, 720 pp. at a cost of 85 pounds.

Boyer spoke briefly of continuing concerns about the fate of the Oak Ridges Moraine. On March 8, 2000, a Liberal committee at Queen's Park heard from some 40 environmentalists, naturalists and concerned citizens in furtherance of a private members bill (Bill 12), put forward by MPP Mike Colle, calling for the protection of the moraine through the establishment of an Oak Ridges Moraine Commission. Although the Bill has received first reading, it is unlikely to reach second reading before the OMB makes its final decision on development of some 60% of the moraine within Richmond Hill. He requested that members write to the Premier in support of a moratorium.

Both Paul Aird and Harry Lumsden attended the Richmond Hill council meeting on Feb. 23 and commented on the vigorous opposition of some 2,000 or more concerned people. Lumsden suggested that it was important for groups opposed to development to pressure municipal councils to have this issue, appropriately worded, on the ballot in upcoming elections. Tasker pointed out that the rules of appeal to the OMB have changed. The only recourse is to challenge the decisions in court, as is presently being done by the citizens of King City. It is a costly and time-consuming process.

All agreed that individuals should continue to write to the Premier and members of the Government, given the successful precedent established in the case of the Lands for Life Conference.

A collective letter expressing the views of the Brodie Club was also solicited.

Tasker thanked the members for their expression of concern and the gift of flowers for Mary Tasker. The chair expressed the hope Mary would soon be back in our midst.

Falls nominated Jean Iron as a member of the Brodie Club. Iron is a retired school principal with a great interest in ornithology. She is president of the Ontario Field Ornithologists and editor of its newsletter, the OFO News. She holds memberships in the Toronto Ornithological Club and the American Birding Association. Jean has been actively involved in bird-watching in several countries over the past 12 years, with a particular interest in shore birds and hawks.

Speaker:

Oliver Bertin introduced the guest speaker, Dr. Tom Low, a graduate of the Physics Department, UofT. His training in meteorology has led to professional activities on many interesting practical and theoretical problems in climatic modelling, weather abnormalities and the impact of weather on human affairs. He will be leaving Canada shortly to take up a position as director of research for a company that does meteorological work for NASA. The topic was:

What Does Global Warming Have to Do With Severe Weather Events?

Dr. Low first reviewed some evidence that the occurrence and intensity of weather anomalies may be increasing dramatically.

The National Climatic Data Center in Asheville, N.C. has accumulated data showing that there have been 44 weather events - destructive tornadoes, hurricanes, winter storms and droughts - in the past 20 years that have exceeded \$1-billion in damage. Thirty-eight of these occurred in the 12-year period, 1988-1999, with the average cost estimated at \$4-billion.

Perhaps equally convincing has been the increase in recent years in the frequency of so-called "Storms of the Century." These storms have a statistical probability of occurring on average only once a century.

Brodie Club members will remember the consequences of one of them, the Ice Storm of 1998. (See the minutes of the 929th meeting.) In 1993, the March blizzard in the U.S. proved to be a Category 3 winter hurricane entitling it to the label "Storm of the Century." Only three years later, in 1996, another "Storm of the Century" occurred. On a global basis, their frequency has become an annual event.

Accepting that something is happening, the stage was set by the speaker to ask: What is causing these anomalies? Is global warming a factor? Or are we witnessing natural climatic variability, much of which appears to be cyclical in nature?

A distinction was made between weather events and climate. Climatic change is determined by measuring daily or short-term events over extended periods, often centuries. The data are obtained indirectly through measuring the growth and recession of glaciers, sea-level changes, tree-ring data or analyses of gasses trapped in Arctic ice. Climatic change is seen to be cyclical in nature, longer-term cycles on which are imposed shorter-term cycles of perhaps one hundred years duration. He noted that only a few years ago, in the 1970s, we were threatened with a mini-ice-age, which has now been superseded by the threat of global warming. That shows how tenuous is our grasp of climatic change. So whether the earth is warming or cooling, and its causes, are open to questioning and experimentation.

It seems apparent that the mean global temperature has increased dramatically since the 1890s, although the trend has been most significant from 1960-2000. The trend is far from continuous. The warmest year on record was 1999. At least two discernable cooling trends are evident, one in the 1890s and another in the period 1940-1970.

Accepting that we are in the midst of a warming trend, Low asked: What are the causes? And are they responsible for the increasing severity of weather events?

Foremost among possible causes of the increasing temperature is the "Greenhouse Effect." It represents a natural phenomenon and the earth's way of regulating air temperatures. Incoming solar radiation, much of it in the form of light and invisible UV, is selectively transmitted by the mix of greenhouse gasses. Much of it is re-emitted from the earth's surface at longer wavelengths including heat. The balance struck between outgoing radiation and incoming radiation regulates the air temperature, maintaining it at levels tolerable to life. When the composition of the atmosphere is altered, for example by polluting gasses, its temperature-regulating capacity is compromised.

The significant greenhouse gasses include: water vapor, CO₂, methane, nitrous oxides, ozone and halocarbons, CFCs among them. Most of these gasses have increased and brief comments on their origins and significance were made. The concentrations of methane and CO₂, for example, are over 20% higher than at any time in the past. Many natural phenomena also come into play here. Evapotranspiration from vegetation and soils has been enhanced by rising temperatures, increasing the concentration of water vapour and the incidence of clouds.

The effects of cloud cover were shown to be extremely important in reflecting, absorbing and re-radiating light and heat. Aerosols from natural sources as well as from human pollutants have more recently been implicated as well, adding to the complexity of the modelling process. Sulphur dioxide spewed into the atmosphere from volcanic activity forms

sulphuric-acid droplets which scatter light waves, reflecting them back and cooling the atmosphere by a degree or so, as occurred in 1991 following the eruption of Mount Pinatubo in the Philippines.

This natural event mimicked a nuclear disaster. The nuclear-winter scenario envisages an explosion vast enough to enshroud the earth in dust and vapour, occluding the light and drastically decreasing global temperatures. The great Cretaceous extinction of dinosaurs appears to have been a consequence of an event of similar magnitude, a collision between a giant asteroid and the earth.

Evaporation from surface water in the oceans and its subsequent condensation and precipitation redistributes the heat load between sea and land and between different parts of the atmosphere. El Nino is such an oceanic event that has profound effects on the terrestrial climate.

Oceanic temperatures, particularly those off the west coast of South America, become warm or relatively cold in a somewhat erratic cycle of two to seven years, depending in part on the influence of the Trade Winds. La Nina, the cold-water phase, influences the climate indirectly through its effect on the winter jet stream, bringing colder winters to the Canadian West and drier, often warmer, conditions to the rest of the continent.

The projected effects on our ecosystem were touched on. Slow or rapid change will generate very different scenarios. Warming trends and increasing CO₂ might be perceived as beneficial, leading to an increase in productivity, but much of Canada's north is unsuited to agriculture of any kind. More significantly, increasing temperatures and changing climate will have profound effects on natural vegetation and the fauna dependent on it.

The speaker concluded his talk with a further note of caution. Are the weather events related to global warming? Perhaps. The turbulent effects of warming air masses, for instance, are well known. But the causal links, if any, can only be determined through the statistical analyses of long-term data because the natural variation in the climatic system permits such extremes.

Is the earth's climate warming? It would seem so. But the global-warming theory is based on mathematical models and simplified assumptions. These models, for example, give rise to the conclusion that global temperatures could rise by four degrees centigrade if CO₂ concentrations double by 2050. But nobody knows whether that will actually happen.

The world does appear to be warming, but the underlying causes are far from clear. What is certain is that erroneous conclusions can have profound social and political consequences for all of us.

Questions and Comments:

Falls asked if the causes of the cooling trend from 1940 to 1970 were known. Various possibilities were raised but there is little evidence for any of them.

Cladman stated that climatic change had been well documented in human history, for instance the Vikings' reference to Greenland; the cyclical periods when England's Thames River froze over; and the evidence provided by terminal moraines on mountain glaciers. Scientific studies have since amplified and refined this evidence. The question is: What

proportion of these cycles can be attributed to normal cyclical events and how much to anthropogenic causes? Assuming both are important, are the effects additive or independent?

Jock McAndrews commented on two significant weather events in Ontario in the last two hundred years: Hurricane Hazel on Oct. 15, 1954 and the great rainstorm of Sept. 13, 1878. Both can be observed stratigraphically from river deposits.

Fred Bodsworth queried the reliability of weather events based on cost analyses. The population of southern Florida, for instance, has climbed steadily, and more people means more damage and hence higher cost estimates and higher insurance claims. He noted that some major weather events are clearly not caused by global warming, citing as an example the Great Drought of the 1930s. Bodsworth raised the possibility that solar variability may be significant factor. Low replied that it was certainly feasible. The estimated cost of weather events was not the only criterion for measuring severity. It was a convenient parameter.

In answer to an enquiry, Cladman said it was not known how high global temperatures could climb. But there have been occasions in history when ice caps completely disappeared.

Daniels asked if a report that precipitation is inhibited by aerosols was true. Low doubted the veracity of that theory because an increase in the number of nuclei around which water could condense to form a raindrop would lead to more droplets of a smaller size. These droplets would then coalesce into larger ones.

A final request sought clarification of the role of ozone depletion in global warming. Ozone depletion does not appear to directly influence temperature, Low said, but it does lead to an increase in short-wave ultraviolet light.

The speaker was thanked by Bernard Muller.

Notes and Observations:

Rising reported the arrival of Song Sparrows in Toronto.

Alexandra Eadie found the Heermann's Gull visiting Toronto to be very tame. It comes very close when offered food and poses for photographs. A native of California, the gull can be found on the waterfront behind the Knob Hill supermarket on Cherry St.

Bertin showed a photograph of a very large hybrid goose (probably domestic x Canada) which he has seen at the corner of Lakeshore Blvd. and Leslie St. in east-end Toronto.

Jim Bendell reported the presence of Turkey Vultures and American Kestrels in the Ottawa area, and a myriad of zebra mussel shells on the Lake Ontario shoreline in Clarkson, west of Toronto.

Bill Crins saw a Merlin in Peterborough and migrant Kingfishers in London.

Mc Andrews reported on the archeological distribution of wild rice along ancient Ontario shorelines and possible implications for old lake levels.

Ron Scovell noted large numbers of Ring-billed and Bonaparte's Gulls and the absence of Herring Gulls at the base of the Adam Beck Generating Station in Niagara Falls, Ont. The two species move in when Herring Gulls leave for their nesting areas. They appear to be feeding on fish killed by the turbines.

Hugh Currie reported that a pair of nesting Peregrine Falcons in Hamilton has produced an egg. He added that there are five pairs in Toronto.

Bodsworth sighted about 500 Redpolls together with a small number of Hoary Redpolls in Orillia. The distinguishing white coloration is very prominent in some, but blends into that of the Common Redpoll.

Daniels found about 10 Red-eyed Slider turtles, some up to 10 inches long, sunning on the Toronto shoreline.

George Bryant has just returned from an around-the-world cruise. He noted that the world was getting smaller and the oceans bigger. He promised a report on sea birds.

Lumsden has recorded "ice-out" in his pond in Aurora for 29 years. The earliest date was March 10, 1983. This year, the ice was gone by March 14. The latest date was April 20.

Norm Martin saw 20 or so Hooded Mergansers in the harbour at Belleville.

Claire Muller recorded two Kestrels, two Red-tailed Hawks, one Phoebe, one Yellow-shafted Flicker, several Robins and one mink between March 6 and March 17.

Carrick described a spectacular display of five competitive Trumpeter Swans. He requested information on where he might obtain an intact skeleton of a beaver and a porcupine for a film on beavers he is working on.

Next Meeting:

The next meeting of the Brodie Club will be held on Apr. 18 in Rm. 432 of the Ramsay Wright building, University of Toronto. The speaker will be Mary Boswell, who will speak on "Antarctica 2000."

Members are invited on a tour of the Metro Toronto Zoo on Sunday, June 11.

