LIMNOLOGY AROUND THE WORLD: CANADA

Flett Research Ltd

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I am Bob Flett, the owner and chief scientist of Flett Research Ltd., an ISO/IEC 17025 fully accredited lab situated in Winnipeg, Manitoba, Canada, specializing in low level mercury analyses (methyl and total Hg) and sediment core radio dating (Pb-210, Cs-137, Ra-226). Client samples come from lakes, rivers, peat bogs and ocean shelves spread around the world.

My undergraduate training was in microbial ecology at U. Manitoba. Graduate studies (1971-76) followed at the Freshwater Institute's Experimental Lakes Area (ELA), a remote collection of 58 pristine Canadian lakes in the boreal forest of Northwestern Ontario. The lakes were devoted to whole lake limnological studies, particularly eutrophication in those years. David Schindler was the chief scientist at ELA and he suggested that my thesis be devoted to measuring nitrogen fixation rates in lakes that were being artificially eutrophied with phosphorous. The lake nutrient budgets Dave had constructed allowed me to conclude that blue green algal nitrogen fixation was a significant source of fixed nitrogen in these phosphorous fertilized lakes. During the 5 years of study, both at ELA and my lab in the Freshwater Institute in Winnipeg, the scientific staff were generous with their knowledge and ensured that I received the best possible education as a limnologist.

A post doc followed at McGill University in the Limnology section of the Biology Dept. In summer, I oversaw the Lake Memphremagog Limnology Field Station and, over a period of 2+ years, learned how to core lake sediments and date them with Pb-210 and Cs-137. These were procedures I had briefly encountered at ELA and was excited to try myself. The department offered me a job at the end of my term in 1978, I thought it over, and reluctantly declined. McGill was great but I believe the idea of being part of a large teaching and research institution frightened me. Too much freedom had to be given up.

While returning to my home town of Winnipeg, I visited a scientist at the Ontario Dorset Limnology lab and unexpectedly received a contract to delve into acidification processes of boreal forest soil. This allowed me to eat, rent a low-income townhouse, get married to my girlfriend from McGill, and establish Flett Research Ltd (1979) in my townhouse basement. During the following 2 years I acquired nuclear spectroscopy equipment which allowed me to begin sediment core dating. In 1984 I was appointed an adjunct professor at U. Man. Microbiology and, over a 15-year period, was on 4 PhD committees and co-supervised one of these students. Concurrently, I was designing and building limnological equipment such as water samplers, sediment oxygen electrodes, and electronic water temperature meters for scientists at ELA. Environmental consulting for a number of heavy industries and Atomic Energy of Canada was also being done. In 1986 I moved into our present lab space, also into our own home, and became a father. In 1990, John Rudd, a mercury scientist at ELA/Freshwater Institute, asked me if I would be interested in setting up a clean lab to analyse mercury for his long-term whole lake/reservoir experiment at ELA. I said yes and spent the next 2 years establishing our lab for trace level methyl and total mercury analyses. Mercury analyses for the ELARP, FLUDEX, and METAALICUS projects at ELA kept us busy for nearly 10 years, with additional long-term Canadian government contracts for mercury analyses being acquired during this period and afterward. Sediment core dating work also steadily increased. In 2006 we were contracted by the Penobscot River Mercury Study in Maine, USA to do an intensive program of mercury analyses and sediment core dating that spanned 6 years. More recent work (2017 – 2020) includes the Muskrat Falls mercury study in Labrador and the Wabigoon River, Ontario mercury study, both in Canada. Core dating is also a component in both studies. The Muskrat Falls project in particular challenged us to lower our methyl Hg detection limit in fresh and sea water to the current level of 0.0035 ng/L. This is unusually low for a 30 ml sample.

We are a small lab, only 7 people, but we have accumulated here more than 100 person years in mercury analytical work and 65 person years in core dating experience with our present staff. We have never advertised but have relied upon word of mouth to generate clients from universities, governments and consulting companies large and small. We do gain some clients via our website but most are repeats or referrals. Avoiding advertising costs allows us to pay staff well enough to retain them. They continually gain experience and improve, have pride in their work, and build a good reputation for the lab. R&D is a welcome relief which fills in the occasional slow work periods.

For many years we have been an invited participant in CRM evaluations with IAEA, and since 2007 have been one of about 6 expert labs from around the world invited to regularly participate in the US Geological Service 'Mercury Deposition Network' proficiency program. Continued superior performance assures us that we are indeed in control analytically. This is important for all of us and permits the chief scientist to sleep peacefully at night.

For more information about our lab please click on our website **www.flettresearch.ca**. My email is **flett@flettresearch.ca**. It is always a pleasure to communicate with fellow limnologists, oceanographers and people in related fields.

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Boreal lakes Northern Saskatchewan, Canada
Photo by Anas Mohamed