Canadian Association of Palynologists
Association Canadienne des Palynologues

# NEWSLETTER

Volume 29 Number 2 December 2006

## President's Message - Nov 2006

In the summer of 2005, I participated in organizing a discussion session at the Ecological Society of America conference on the application of palynological data to testing ecological hypotheses. The session incorporated panelists spanning the whole neo- to paleo- ecologist gradient and some very timely points emerged. There is a long tradition among palynologists of applying pollen datasets to questions of vegetation ecology; Margaret Davis' and Jim Ritchie's work come to mind. In light of today's high rates of biodiversity losses and climatic change, there is a renewed need to answer outstanding questions in vegetation ecology - questions that have now become particularly pressing. How do disturbances, particularly those driven by the climate system, affect vegetation communities? More importantly, what are the mechanisms behind these effects? What controls the rate of vegetation response to climatic change? How does biodiversity factor into this response? The general consensus at this panel discussion was that more attention to the long-term perspective afforded by pollen datasets is needed to answer these questions. The results of ecological modeling exercises to test hypothesized relationships between diversity and ecosystem stability presented by Andrew Gonzalez (McGill) showed that environmental variability results in abrupt changes in species composition - model outputs closely resembled the variable curves of pollen diagrams. Steve Jackson (U. Wyoming) emphasized the importance of continuing to use paleo-data from all time periods from which they are available - not just the Holocene - in tests of ecological hypotheses. Where possible, data from various timescales can be integrated into synthesis studies of long-term vegetation dynamics. Jim Clark (Duke University) reiterated the importance of question-driven paleoecological science; tools should not be the starting point for research. Clearly pollen records have limitations, but an up-front attitude about these limitations in our writing, an awareness of their implications, and continued testing of pollen representation in the modern environment against environmental conditions and the vegetation communities themselves, provide a quantitative basis from which to control for the limitations of the method.

As we are all aware, producing a pollen record can be a very long process, and often data from one site or one core are not adequate to answer research questions of the type discussed above. Therefore, it is essential to access and use data that have been collected by others, to compare with and supplement our own data. In order for palynological

data to be most effectively applied to testing today's urgent ecological questions, we have to make use super-datasets compiled from the work of many groups. Thus, data sharing and collaborations are important components of testing ecological hypotheses with paleo-data. There are many publicly available searchable pollen databases and the palynological community serves as a model of data sharing to other research communities. Previous CAP newsletters have also discussed the utility of including raw data in graduate theses. Further integrative work is needed to maximize the impact of these valuable datasets. In short, the community of ecologists recognizes the importance of palynological and other paleo-datasets, especially in light of recent ecological crises, and many great opportunities exist for palynologists to apply their datasets to these important questions. This is particularly the case when large collaborative datasets are compiled. Please get in touch to comment on these or other CAP- related issues.

Best wishes,
Sarah Finkelstein,
CAP President



## Editor's Notes

Our thanks to all the people who contributed material for this edition of the *CAP Newsletter*: D. Antoniades, A. Beaudoin, S. De la Rue, S. Finkelstein, J. Hall, J. Jansonius, J. McAndrews, K. Mertens, M. Peros, A. Rochon, A. Stewart. R. Wicander, C. Yansa, and S. Zabenskie.

## Palynological Research in Canada II: Department of Earth Sciences, Brock University

This will be the last issue that I will co-edit with Terri Lacourse, who began sharing the Newsletter Editor's duties with this year's May issue. I will be leaving the newsletter in Terri's hands as I will undertake an increasingly demanding role with AASP over the next few years. I will continue contributing to the newsletter, and retain my earlier goal of highlighting various palynological labs across Canada- eventually writing up my notes on Andre Rochon's lab at Rimouski- but for now, I thought I'd highlight palynology at Brock before formally stepping down.

Brock University has a long history of palynological research- at least, long relative to its history. Jaan Terasmae was recruited to Brock from the Geological Survey of Canada in the late 1960's, a few years after the university was incorporated. The emphasis of the (then) Department of Geological Sciences was on Quaternary geology and paleoecology, and many students were taught the importance of pollen analysis by Dr. Terasmae, including Peter Barnett (Ontario Geological Survey) and his sister Cathy, and Steve Blasco (Geological Survey of Canada- Atlantic).

The emphasis shifted slightly when I was hired as Dr. Terasmae's replacement in 1991. With five MSc students, one PhD student, and over a dozen honors students, I studied palynomorphs and other microfossils from marine environments and from the Great Lakes. The next major change occurred about 1.5 years ago, when the department hired Martin Head, long-time CAP member and former president. Martin moved back to Canada from the UK, where he was a lecturer at the University of Cambridge. We were able to make a case that a small-ish institution like Brock would greatly benefit from hiring a second palynologist, as Martin's interests are primarily stratigraphic and taxonomic, while mine are primarily paleoecological and taphonomic. As a result, we are one of the few universities in North America to be able to claim more than a single palynologist on the faculty.

*Left to right*: Ebrahim Ghasemi-Nejad, Salah El Beialy, Francine McCarthy, Martin Head, and Manuel Paez

Martin has since taken on an MSc student from Colombia (Manuel Paez), and two undergraduate students (Dave Chrstie and Lisa Neville) have been working on parts of their honours theses with me in the Palynology Lab. Scholars from Egypt (Salah El Beialy) and Iran (Ebrahim Ghasemi-Nejad) are visiting Martin, and contribute to a lively environment for palynological enquiry. We are always looking for students and colleagues interested in joining our team. For more information , contact francine@brocku.ca or mhead@brocku.ca.

Francine McCarthy
Brock University


New Member:
Jeannine-Marie St. Jacques; Recently completed her PhD at Queen's, Brian Cummings was her supervisor
Interests: numerical and statistical methods in palynology, paleoclimatology, prairie droughts, prairies
Welcome to CAP!

Dr Matthew Peros of the University of Ottawa received the 2006 Nystrom Award from the Association of American Geographers (AAG) for the excellence of research exemplified in his doctoral dissertation entitled "Middle to Late Holocene Environmental Change and Archaeology on the North Coast of Central Cuba". Pollen analysis of coastal deposits figured prominently in Matthew's dissertation. Congratulations!

John Wrenn died of pancreatic cancer in Baton Rouge, LA on Nov. 28, 2006. John had recently retired from Louisiana State University following 13 years as director of the Center for Excellence in Palynology. He is mourned by his family and friends and by the palynological community.

The latest compilation of the "Genera File" has been published:

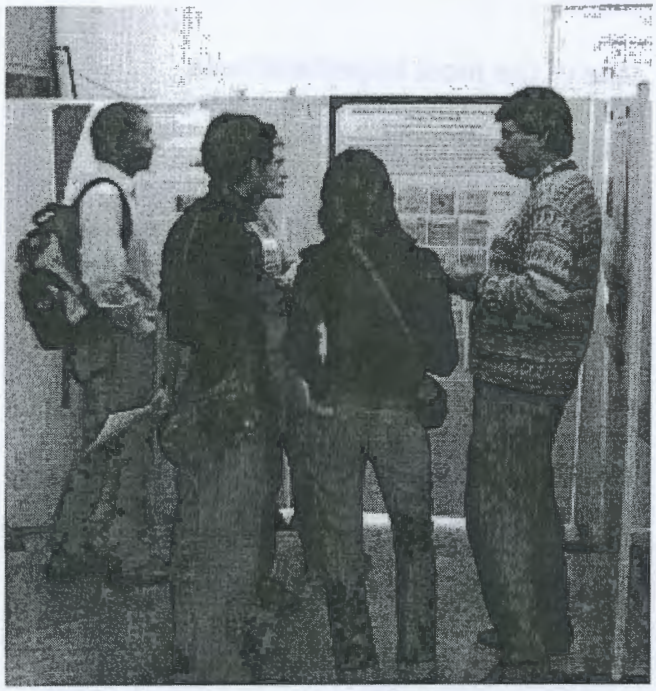
J. Jansonius, L.V. Hills & C. Hartkopf-Fröder, 2006, GENERA FILE OF FOSSIL SPORES -- SUPPLEMENT 14;
Special Publication -- Dept. of Geology and Geophysics, University of Calgary, AB, Canada T2N 1N4.
Contains the 'cards' #5535 -- #5679.
Cost of Supplement: CAN$15.--, postage included. Orders should be addressed to Dr. L.V. Hills, at the address cited above, or to lvhills@ucalgary.ca

## Meeting Report: *2nd International Workshop on Quaternary Non-pollen Palynomorphs ("Extrafossils") Innsbruck Austria*

More than 60 participants from 13 countries attended the 2nd International Workshop on non-pollen palynomorphs at the University of Innsbruck in August 2006. Long-time CAP member and our councillor to IFPS, Jean Nicolas Haas, hosted the workshop at the Department of Botany, which is situated in the midst of a venerable botanical garden- in fact, the gala dinner on the last evening of the workshop was held in a reception room in the greenhouse. Although the weather was a bit cool and quite wet during the workshop (see my photo below...), the warmth and greenery of the greenhouse- and of the participants!- made up for that. Following the format established the previous year by A. Prager and H. Joosten in Greifswald (Germany), Jean Nicolas organised a mix of oral and poster presentations, and microscopy and photo sessions.

Participants brought material from most biological kingdoms and from a wide variety of environments, and several participants, including Bas van Geel (the "grandfather" of these curious palynomorphs largely ignored by pollen researchers) brought reference material to help in identifying the material. I was most interested in the cysts of freshwater dinoflagellates identified by several workers, but learned a great deal about the acid-resistant oddities I have been seeing in my pollen slides over the last 25 years. Presentations showed the application of these "extrafossils"

(algal cysts, fungal spores, various animal remains, and various others) to a variety of biological, archeological, environmental and geological problems. In each case, the non-pollen palynomorphs provided important insights that pollen analysis would not provide.



Vigorous discussion attested to the high degree of interest maintained over the three days, both by the curiosity of the participants and by the diversity of material and of session type (see photo of poster session).
The proceedings will eventually be published in the journal *Vegetation History and Archaeobotany*- but for those of you anxious to learn more about non-pollen palynomorphs, the abstract volume was published in the review Palyno-Bulletin (http://botany.uibk.ac.at/downloads/palynobulletinweb.pdf) and Volume 141 (Issue 1-2) of the *Review of Palaeobotany and Palynology* edited by Bas van Geel focuses on these palynomorphs that "deserve our attention".

Francine McCarthy
Brock University

# ESSAYS

## The use of heavy-liquid in the separation of pollen from Arctic lake sediments

Pollen analysts have long used a standardized methodology to extract the pollen from sediments (Faegri and Iversen, 1975). This has proven effective in concentrating the pollen from many different types of sediment and permits the comparison of pollen assemblages from different regions and various environments.
Modifications to the method, such as sieving though 7-micron screens, facilitated the application of pollen analysis in tundra regions (e.g., Cwynar et al. 1979; Gajewski, n.d.). However, these traditional processing methods are less effective when used in High- or Middle-Arctic lake sediments due to the extremely low level of pollen produced in that region. Very often there are as few as 20-25 pollen grains per slide, making it difficult to count a large number of pollen grains per level (Gajewski et al., 1995). For this reason, most Arctic pollen diagrams end up having a low temporal resolution, which limits the interpretations that can be drawn.

In the Laboratory for Paleoclimatology and Climatology at the University of Ottawa, we have been using a heavy-

liquid separation technique to increase the number of pollen grains per slide, with a great deal of success. With this technique, the pollen floats and can be decanted off, whereas the heavier inorganic materials (such as quartz and clay) sink to the bottom. As a consequence, we can now concentrate the pollen from the clay-rich Arctic sediments more efficiently. Most previous pollen studies from the Canadian Arctic have, on average, around 20 levels counted (e.g. Gajewski, 1995; Gajewski and Frappier, 2001). With the application of this new technique, we have been able to generate pollen diagrams of 60 to 70 levels within the same time frame (Zabenskie, 2006; Peros and Gajewski, In preparation), a significant improvement in both temporal resolution as well as the number of pollen grains counted at each level.

Traditionally, Bromoform has been used to concentrate the pollen material from the sediment matrix. However, Bromoform is highly toxic, and our goal was to find a material that would be safer to use. Sodium Polytungstate (SPT) is a noncorrosive material with a neutral pH. It is somewhat expensive (~$700 for 2 kg of crystals), but by filtering after the analysis is complete, SPT can be easily reclaimed, making it an ideal material for our purposes. Furthermore, because the SPT method separates heavy minerals from the lighter pollen grains, the use of HF can often be omitted from the procedure.

The use of heavy liquid separation in pollen processing is not new, yet the specific steps in its application are not widely known or advertised. In order to determine how to make the use of the SPT method most efficient for Arctic lake sediments, Zabenskie (2006) did a detailed literature survey, sought the advice of other palynologists, and undertook numerous laboratory trials. After months of testing, several modifications were made to some previously published heavy-liquid methods (Bolch, 1997; Munsterman, & Kerstholt, 1995; Skipp & Brownfield, 1993; Takeshi et al., 1998; Torresan, 1987), including the addition of an HCl step, several water washes, and agitation with a vortex mixer.

One of the most important tests undertaken was to determine whether the SPT method was comparable to traditional processing techniques using HF. Replicate samples were counted from sediment processed using both methods, and it was determined that the proportion of pollen types and the ratio of exotic marker to the overall number of pollen grains counted were statistically similar in sediment processed using both the SPT and HF methods. The only difference, of course, was that the samples processed using SPT had significantly higher concentrations of pollen.

The SPT method we use in the Laboratory for Paleoclimatology and Climatology works very well for Arctic lake sediments and we advocate its use. At present, we have not yet used this technique on sediments from non-Arctic regions, and we would be interested to know what experiences/opinions other researchers may have. Please feel free to contact us at the address below.

For the full protocol, please visit our website:
http://www.lpc.uottawa.ca/resources/pollen%20-%20heavy%20liquid.html.

Extensive protocols for Quaternary paleoecology are found elsewhere on this website. We have purchased our

SPT through: http://www.sometu.com/. This site has contact information as well as technical information about SPT.

*Acknowledgments*: We thank Antonia López-Higuera (UNAM) for help in implementing the method and Brett O'Neill for extensive help in the lab.

Susan Zabenskie, Matthew Peros and Konrad Gajewski
University of Ottawa Laboratory for Paleoclimatology and Climatology
University of Ottawa
Ottawa, Ontario
K1N 6N5
E-mail: gajewski@uottawa.ca

**References**

Bolch, C.J.S. 1997. The use of sodium polytungstate for the separation and concentration of living dinoflagellate cysts from marine sediments. *Phycologia* **36**, 472-478.

Cwynar, L.C., Burden, E. McAndrews, J.H. 1979. An inexpensive sieving method for concentrating pollen and spores from fine grained sediments. *Canadian Journal of Earth Sciences* **16**, 1115-1120.

Faegri, K. and Iversen, J. 1975. Textbook of Pollen Analysis. 3rd ed. New York: Hafner Press. 295 pp.

Gajewski, K. n.d. Preparation of organic sediments for pollen analysis. http://www.lpc.uottawa.ca/resources/pollen.html.

Gajewski, K. 1995. Modern and Holocene pollen accumulation in some small arctic lakes from Somerset Island, N.W.T., Canada. *Quaternary Research* **44**, 228-236.

Gajewski, K. and Frappier. M. 2001. Postglacial environmental history from Prince of Wales Island, Nunavut, Canada. *Boreas* **30**, 485-489.

Gajewski, K., Garneau, M. and Bourgeois, J.C. 1995. Paleoenvironments of the Canadian High Arctic derived from pollen and plant macrofossils: problems and potentials. *Quaternary Science Reviews* **14**, 609-629

Munsterman, D. and Kerstholt, S. 1995. Sodium polytungstate, a new non-toxic alternative to bromoform in heavy liquid separation. *Elsevier* **91**, 417-422.

Peros, M.C. and Gajewski, K. In preparation. Holocene climate and vegetation change from northwest Victoria Island, NWT, Canada.

Skipp, G.L. and Brownfield I. 1993 Improved density gradient separation techniques using Sodium Polytungstate and a comparison to the use of other heavy liquids. U.S. Geological Survey Open-File report 92-386.

Takeshi, N., Brugiapaglia, E., Digerfeldt, G., Reille, M., De Beaulieu, J. and Yasuda, Y. 1998 Dense-media separation as a more efficient pollen extraction method for use with organic sediment/deposit samples: comparison with the conventional method. *Boreas* **27**, 15-24.

Torresan, M. 1987. The use of sodium polytungstate in heavy mineral separations. U.S. Geological Survey Open-File Report 87-590.

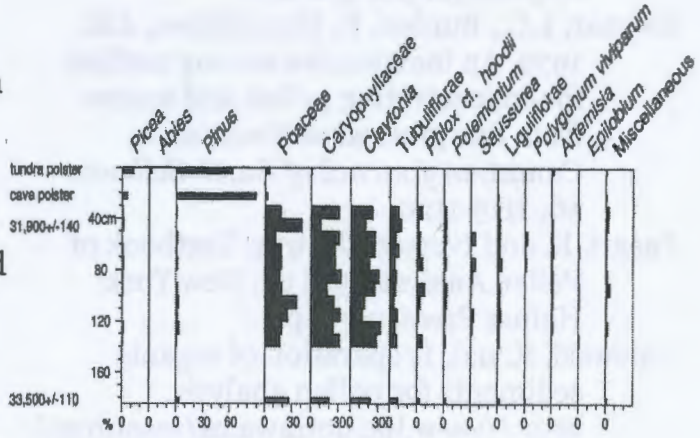
Zabenskie, S. 2006. Postglacial climatic change on Boothia Peninsula, Nunavut, Canada. M.Sc. thesis, Department of Geography, University of Ottawa.

## *Raptors carried pollen to January Cave, Alberta, 30,000 years ago*

January Cave (100 km southwest of Calgary at 50.188594, -114.518718) is an office-size solution cavity in Mississippian limestone on the south flank of Plateau Mountain. In the early 1980's Jim Burns, now of the Royal Alberta Museum, tested cave earth for Early Man artefacts but found none. What he did find in a meter-deep hole were thousands of little bones dating to around 30,000 radiocarbon years ago. They were mostly of marmot, pika, mouse, vole and lemming, which, except for two arctic species, live in Alberta today. He concluded that the cave sheltered raptors, perhaps eagle or owl, who hunted within a 5 km radius and returned to the cave to eat their prey (Burns 1991).

To reconstruct the vegetation, he got me to try pollen analysis on the cave earth. Although cave earth is notorious for being barren, a gram of January Cave earth, when treated with HCl and HF and concentrated on a 15-µm sieve, yielded about 60,000 pollen grains. Microscope slides were dense with pollen, half were identifiable and half were degraded ghosts. In contrast to the modern regional rain of tree pollen, the cave earth had hardly any tree pollen. Most pollen grains were new to me and most turned out to be from entomophilous herbs of alpine tundra. Apparently, the mid-Wisconsinan hosted treeless tundra inhabited by small herbivores that enjoyed eating tundra plants just before becoming raptor prey. Pollen of their last meal as well as their bones came to be fossils in January Cave.

January Cave (enhanced image) at 2040 m asl is in a subalpine forest of *Pinus contorta*, *Picea glauca* and *Abies lasiocarpa*. Alpine tundra above 2440 m today supports *Polygonum viviparum*, Caryophyllaceae, *Epilobium*, *Polemonium* and Compositae such as *Artemisia*, Liguliflorae and Tubuliflorae *pp.* including *Saussurea*. Genera absent from the local tundra but that today grow elsewhere in Alberta include *Thalictrum* and *Claytonia*. *Phlox* inhabits tundra in British Columbia and the Western Arctic.




Pollen diagram from January Cave: clumps of herb pollen were common, indicating mass deposition in flowers. The pollen spectra from living moss polsters represent modern atmospheric transport of mostly tree pollen. Fossil pollen counts are in the North American Pollen Database.

This is another example of how birds, in this case raptors, were responsible for an unusual fossil pollen assemblage. The detailed story of Canada geese supplying herb pollen to Crawford Lake, Ontario, (McAndrews 2005) is forthcoming in Palynology (McAndrews and Turton (2007): it includes a glorious color plate of organic varves, fossil pollen and goose turds.

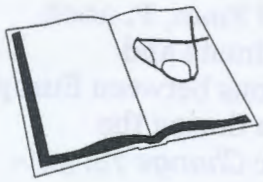
J. H. McAndrews
Department of Ecology and Evolutionary Biology
University of Toronto
25 Willcocks St.
Toronto ON M5S 3B2

**References Cited:**

Burns, J.A. 1991. Mid-Wisconsinan vertebrates and their environment from January Cave, Alberta, Canada. Quaternary Research 35, 130-143.

McAndrews, J.H. and C.L. Turton. 2007. Canada geese transported cultigen pollen grains to Crawford Lake from 14th and 15th century Iroquoian maize fields. 31 (accepted).

McAndrews, J.H. 2005. The goosing of Crawford Lake with prehistoric corn pollen. Canadian Association of Palynologists Newsletter 28(1), 5-7.



## Recent Publications by Canadian and Other Palynologists - 25

*Asselin, H. and S. Payette. 2005. Late Holocene opening of the forest tundra landscape in northern Quebec, Canada. *Global Ecology and Biogeography* **14,** 307-314.

*Beaudoin, A.B. 2006. On the development, care, and maintenance of collections of reference and subfossil seed and plant macroremains. *Collection Forum* **20**, 55-66.

Brand, U. and *McCarthy, F.M.G. 2005. The Allerød-Younger Dryas-Holocene sequence in the west-central Champlain Sea, eastern Ontario: a record of glacial, oceanographic, and climatic changes. *Quaternary Science Reviews* **24**, 1463-1478.

Carcaillet, C., *Richard, P.J.H., *Asnong, H., Capece, L. and Bergeron, Y. 2006. Fire and soil erosion history in East Canadian boreal and temperate forests. *Quaternary Science Reviews* **25**, 1489-1500.

Frechette, B., Wolfe, A.P., Miller, G.H., *Richard, P.J.H. and *de Vernal, A. 2006. Vegetation and climate of the last interglacial on Baffin Island, Arctic Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology* 236, 91-106.

*Gajewski, K., Viau, A.E., Sawada, M., Atkinson, D.E. and Fines, P. 2006. Synchronicity in climate and vegetation transitions between Europe and North America during the Holocene. *Climatic Change* 78, 341-361.

*Heinrichs, M.L., Evans, M.G., Hebda, R.J., Walker, I.R., Palmer, S.L. and Rosenberg, S.A. 2004. Holocene climatic change and landscape response at Cathedral Provincial Park, British Columbia, Canada. *Géographie physique et Quaternaire* 58, 123-139.

*Mathewes, R.W. 2006. Forensic palynology in Canada: An overview with emphasis on archaeology and anthropology. *Forensic Science International* 163, 198-203.

Michelutti, N., Douglas, M.S.V., Wolfe, A.P. and *Smol, J.P. 2006. Heightened sensitivity of a poorly buffered high arctic lake to late-Holocene climatic change. *Quaternary Research* 65, 421-430.

*Mott, R.J., Jette, H., Guiot, J. and Cloutier, A. 2004. Postglacial vegetation, climate history and land-sea interaction at Island Lake, Baie des Chaleurs, New Brunswick, as documented by palynological analysis. *Géographie physique et Quaternaire* 58, 109-122.

*Mudie, P.J. and *McCarthy, F.M.G. (2006). Marine palynology: potentials for onshore-offshore correlation of Pleistocene-Holocene records. Invited paper, *Transactions of the Royal Society of South Africa,* Vol. 61(2) p. 139-157

Stea, R.R. and *Mott, R.J. 2005. Younger Dryas glacial advance in the southern Gulf of St. Lawrence, Canada: analogue for ice inception? *Boreas* 34, 345-362.

Turton, C.L. and McAndrews, J.H. 2006. Rotifer loricas in second millennium sediment of Crawford Lake, Ontario, Canada. *Review of Palaeobotany and Palynology* 141, 1-6.

* denotes CAP Member


**Matthew Charles Peros**

**Middle to Late Holocene Environmental Change and Archaeology on the North Coast of Central Cuba**

**Ph.D. thesis, Department of Geography, University of Toronto, 2005. Supervised by Tony Davis.**

Multiple proxy data were investigated from a lake (Laguna de la Leche) and several mangrove systems on the north coast of central Cuba to document Holocene environmental changes, identify their causes, and provide an environmental basis to interpret the rich archaeological record of the region. Sediments were investigated for pollen, benthic foraminifera,

ostracodes, gastropods, charophytes, plant macrofossils, and Sr, O, and C isotopes.

Pollen records from two mangrove systems provide information on the processes that influenced mangrove succession. Northwest of Laguna de la Leche, local changes in drainage caused centennial-scale fluctuations in mangrove distribution. Allochotonous sedimentation and bioturbation may have been important within a chenier plain system. These results help predict mangrove responses to global warming.

An oligohaline (~1 ‰) marsh was present at Laguna de la Leche beginning ~5,300 $^{14}$C yr B.P. From ~3,800 to 3,000 $^{14}$C yr B.P., a freshening of the marsh suggests that precipitation increased. From ~3,000 to 1,100 $^{14}$C yr B.P., relative sea level (RSL) rise caused salinity and water depth to increase, transforming Laguna de la Leche into an open, mesohaline (~10 ‰) lagoon. Since 1,100 $^{14}$C yr B.P., mangrove expansion isolated Laguna de la Leche from the sea.

An RSL curve shows that sea level was ~4 m below present level at ~6,000 cal yr B.P. and then rose to its present position. The data support the notion that north-central Cuba is affected proglacial forebulge collapse. The RSL curve also indicates that the Los Buchillones site, a presently submerged Taino village, was inundated prior to its construction at ~AD 1220. This information has important implications for understanding Taino settlement patterns.

## Dermot Antoniades

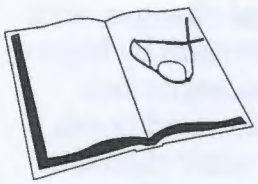
**M.Sc. Thesis, Department of Geology, University of Toronto, 2005. Supervised by Dr. Marianne Douglas.**

The limnological characteristics of lakes and ponds were established for previously unexplored high arctic sites from Alert, Ellesmere Island, Isachsen, Ellef Ringnes Island, and Mould Bay, Prince Patrick Island. The Alert lakes and ponds were typically oligotrophic, low in dissolved organic carbon (DOC), and very alkaline, similar to the characteristics of the freshwaters across most of the Canadian High Arctic. Differences in water chemistry between the large lakes and the shallow ponds illustrated the different responses of these two types of water bodies to environmental changes, with ponds typically characterized by higher nutrient and solute concentrations than lakes. Isachsen lakes and ponds had strikingly diverse water chemistry characteristics, with ranges often exceeding those found from the entire High Arctic. In general, these sites were slightly acidic. The characteristics of Mould Bay freshwaters were strongly influenced by the atypically high vegetation levels and soil development of the local landscape. Sites were typically mesotrophic, weakly alkaline, and high in DOC.

The diverse diatom assemblages from the 90 sites reflected the diverse limnological characteristics of these three regions. 352 diatom taxa were identified, and multivariate analyses indicated that species compositions were most strongly related to specific conductivity and pH. The autecological characteristics of diatom taxa were used to develop inference models for

the reconstruction of these two important variables. These models were then used to infer past limnological trends from fossil diatoms preserved in dated sediment cores.

Analysis of sediment cores from Alert and Isachsen revealed relatively stable community composition for centuries to millenia, followed by marked assemblage changes in the mid-18th century in two shallow Isachsen ponds, and ~1920 in Self Pond, a lake near Alert. Diatom models inferred an increase of 0.5 to 0.8 pH units corresponding to these assemblage changes, which were strongly correlated with Alert temperature records for the last ~30 years.



**Book Review**
***Haida Gwaii: Human History and Environment from the Time of the Loon to the Time of the Iron People***
edited by Daryl W. Fedje and Rolf W. Mathewes. UBC Press, Vancouver, 1985. 426 pages. 16 chapters plus 3 section introductions, 1 conclusion, references, index, 86 figures, 35 tables. ISBN 0-7748-0992-1 (paperback); Cdn $39.95

Haida Gwaii (the Queen Charlotte Islands) represents a unique environment and fabulous opportunity for research. This archipelago is the most disjunct land mass in North America. It is likely part of, or attached to, a late Wisconsin biotic refugium that currently, or historically, contains a distinct array of endemic and disjunct species. And it was part of a possible coastal land route for the original movement of people into North America from Beringia after 14,000 BP. The opportunity lies in continuing the research reported on here, carrying it underwater to the continental shelf where this movement of people might have occurred. The text of this clearly written and well-edited volume conveys the sense that this is one of the most exciting and important research areas in the Americas. Geomorphology, biogeography, environmental change and cultural adaptation, and human history as informed by Haida traditional accounts as well as archaeological evidence are all part of the story. The book is divided into three parts: Paleoenvironmental History; Haida Traditional History; and Haida History through Archaeological Research (extending back to the early Holocene). This last section accounts for the largest part of the book (230 out of 375 pages of text). The content is integrated by short introductions to each of these parts, by cross-referencing of chapters, and by a good, detailed index. The book is suitable for both a general readership as well as scholars seeking a single source on Haida Gwaii from the end of the last ice age.

More specifically, paleoenvironmental research questions include: the existence and role of a possible (increasingly likely) late Wisconsin biotic refugium on the now submerged continental shelf in Hecate Strait between the island archipelago and the mainland; paleoecological reconstruction of the early post-glacial landscape of the coastal plain, between 14,000 and 10,000 BP, based on evidence of flora and fauna, the problem of modelling and

sampling that landscape (now drowned) and the viability of human occupation there; the relation between vegetation trends and cultural developments (e.g., the expansion of western red cedar by 3000 BP and the elaboration of woodworking); the evaluation of competing theories to explain endemic taxa on Haida Gwaii using the evidence of mitochondrial DNA; the distribution of vertebrate fauna through time and its implications for understanding of habitat; and the dynamism of sea level and the coastal environment.

At the archaeological end of the spectrum, chapters highlight several topics. Geomorphic and stratigraphic contexts of several coastal sites are presented in some detail, appropriately so, considering the constantly changing sea level. Lithic technology figures prominently - stone tools form the most enduring archaeological evidence throughout the Holocene. Stone tools and ways of making them vary among dated sites and stratigraphic levels. On this basis, three distinct periods are defined on Haida Gwaii. Archaeologists attempt to capture the complexity of information contained in stone tool assemblages using a confusion of terms, such as "complex" and "tradition." Rarely do these concepts correspond with other aspects of culture. But at least in this region there is the interesting possibility that local traditions can be related to regional (Northwest Coast/Alaska) ones. These regional traditions may, in turn, relate to distinct subsistence adaptations, environmental change, and even to migrations of identifiable peoples. Thus, microblades are linked to the idea of adaptation to marginally productive environments (p. 243) and to exploitation of salmon runs (p. 367). Nevertheless, continuity among traditions at sites on Haida Gwaii is fully acknowledged and described, making it harder to formulate testable hypotheses about the relation between changes in technology and environment. The importance of organic (bone and wood) artifacts in the later period underscores the bias imposed by differential preservation. Settlement archaeology is another important theme; archaeological site location is examined in relation to both stable and moving (retreating and advancing) shorelines. The question of the nature of resources available to people on retreating as opposed to stable or advancing shorelines is taken up in several chapters. The emergence of chiefdoms at the time of European contact can be traced using archaeological and written (ethnohistoric) evidence for location and amalgamation of villages.

There is a sense, expressed in various chapters and in the conclusions, that cultural features or patterns were added or enhanced throughout the middle and later Holocene (e.g., use of anadromous fish), rather than being replaced, and that this accretion coincides with the emergence of social complexity. In part, additions were enabled by changes in the environment (expanding red cedar forests allowing more sea-worthy canoes to be made, enabling more extensive coastal trade and contact). Differential preservation is, however, an important theme in the book. Preservation of organic remains is favoured in wet and alkaline sites, including shell middens, which only become common after 5000 BP. Exceptionally preserved organic remains from a deeply stratified intertidal zone site dating to 9400 BP are reported in Chapter 11.

Sandwiched between the paleoenvironmental and archaeological sections are two chapters containing oral

histories. These histories work on at least three levels. First, there are fascinating glimpses of activity invisible to archaeology (e.g., capturing eagles from pits, p. 143). Second, there are remarkable convergences between events in the natural world that are related in oral history, on the one hand, and geologically documented events (ice retreat; sea level rise). Third, they convey a sense of mutual involvement between people and animals as actors. It is right, somehow, that these chapters are found in the middle of the book, providing a fulcrum for the investigations of the natural and human worlds at either end. Together with a forward by the president of the Haida nation, they call attention to our place in the world and the limitations of our understanding.

Andrew M. Stewart
Strata Consulting, 528 Bathurst St.
Toronto, Ontario M5S 2P9
andrew.stewart@bellnet.ca

# Announcements

## Graduate students wanted!

I am recruiting graduate students to the new Paleoecology Research Lab in the Department of Geography at the downtown campus of the University of Toronto. Graduate student theses will focus on paleoecological records from Arctic and boreal ecosystems, and will involve palynological or other microfossil work. While no prior experience with pollen or microfossils is required, lab and field experience are great assets.

The Department of Geography has top-notch lab facilities and a dynamic group of researchers investigating many aspects of global change. The University of Toronto provides a guaranteed funding package to graduate students and offers a phenomenal research and learning experience in a vibrant urban setting.

The deadline for applications for graduate studies beginning Sept. 2007 is Jan. 15, 2007.

Please visit the lab webpage for more information and details on specific projects:
http://www.geog.utoronto.ca/info/facweb/finkelstein/index.html

Sarah Finkelstein
(Finkelstein@geog.utoronto.ca)

We are presently seeking a Masters student to work on an IPY project in the western Canadian Arctic. The project called "International Polar Year: Natural Climate Variability and Forcings in Canadian Arctic and Arctic Ocean" is funded by NSERC and aims at understanding secular to millennial climate changes and forcincgs in the present context of global warming. It will consist of the palynological analysis (pollen, spores, dinoflagellate cysts) of a sediment core collected in 2004 on the Mackenzie Slope (Beaufort Sea, Canada). The selected student will be funded at $14k/year, starting in May/September 2007. Funding for the second year will be dependant upon renewal of project funding by NSERC. The position will be based in Rimouski, at ISMER-UQAR.

To apply, please send your CV, grade transcripts and two letters of recommendation to be sent by e-mail to:

André Rochon, Professor (Andre rochon@uqar.qc.ca)
Institut des sciences de la mer de Rimouski (ISMER),
Université du Québec à Rimouski
310 allée des Ursulines
Rimouski, Québec, G5L 3A1, Canada
Phone: +1 418 723-1986, ext. 1742
Fax: +1 418 724-1842

**Postdoctoral position in marine biology at ISMER-UQAR**

One postdoctoral position is currently open to test a ballast water treatment method using dinoflagellate cysts. This work is under the supervision of André Rochon (marine geology) and Suzanne Roy (biological oceanography).

The goal of the NISOB project (No Invasive Species on Board) is to assess the viability and excystment potential of dinoflagellate cysts before and after the treatment with a commercial ballast treatment agent called Peraclean®.

The successful candidate is expected to (1) be in charge of all aspects of the analytical program on ballast water treatment that includes laboratory and field experiments on survival rate of dinoflagellate cyst, and (ii) to analyze data and present final results in a report.

The position requires prior experience with dinoflagellate cysts, some experience in algal culturing, a statistical background, and experience in designing experimental protocols. It is available for 1.5 years (non-renewable) to researchers who obtained their Ph.D. during the last five years. Annual salary will be Can$37,000. The position will be based in Rimouski, at ISMER-UQAR. The project also involves close collaborations with researchers of the Maurice Lamontagne Institute (Department of Fisheries and Oceans, Mont-Joli), the Centre de recherche en biotechnologie marine (CRBM - Rimouski) and Degussa Canada, the manufacturer of Peraclean®.

Review of applications will begin immediately and will continue until the position is filled. To apply, please send by e-mail a letter of application, a CV, a detailed statement of research interests and ask for two letters of recommendation to be sent by e-mail to:

André Rochon, Professor (Andre rochon@uqar.qc.ca)
Institut des sciences de la mer de Rimouski (ISMER),
Université du Québec à Rimouski
310 allée des Ursulines
Rimouski, Québec, G5L 3A1, Canada
Phone: +1 418 723-1986, ext. 1742
Fax: +1 418 724-1842

## Meeting Reminders

The CIMP Lisbon'07, joint meeting of the Spores/Pollen and Acritarch CIMP Subcommissions, organized by LNEG-LGM (Portuguese Geological Survey), will be held in Lisbon, Portugal from 24 to 28th September 2007.

This meeting will involve 3 days of scientific sessions followed by a 2-day post-meeting field trip to southern Portugal. The venue is the Portuguese Geological Survey headquarters.

CIMP Lisbon'07 will be a forum for specialists interested in current progress, future developments and application of Palaeozoic palynology.

You are strongly encouraged to participate and submit papers to CIMP Lisbon'07. The official working language is English and you are most welcome to visit the web page at http://e-geo.ineti.pt/CIMPLisbon07 for further information. Please visit the web page and fill out the questionnaire regarding your possible attendance. This will help us greatly in planning for the meeting by letting us know how many people will possibly attend.

CIMP Lisbon'07
Joint Meeting of Spores/Pollen and Acritarch Subcommissions

# Meeting calendar

**2007**

May 23-25: GAC / MAC Meeting
Yellowknife, Canada.
www.nwtgeoscience.ca/yellowknife2007

May 29-June 2: Canadian Association of Geographers Annual General Meeting, Saskatoon, Saskatchewan.
www.usask.ca/geography/cag2007/

June 4-8 2007. *CANQUA 2007*, Carleton University, Ottawa. Details: Greg Brooks (gbrooks@nrcan.gc.ca).
www.canquaottawa2007.ca

May 23-25, 2007. *GAC/MAC Annual Meeting*, Yellowknife, NT. Website: www.esd.mun.ca/~gac/ANNMEET/annmeet.html

September 3-7: 9th International Conference on Paleoceanography
Shanghai, China.
http://icp9.iodp-china.org

September 8-12: AASP 40th Annual Meeting Smithsonian Tropical Research Institute, Panama.
www.palynology.org/meetings.html

September 24-28: CIMP (Commission Internationale de Microflore du Paléozoique): the Joint Meeting of Spores/Pollen and Acritarch Subcommissions.
Lisbon, Portugal.
http://e-geo.ineti.pt/CIMPLisbon07

October 28-31: GSA 119th Annual Meeting
Denver, Colorado, USA.
www.geosociety.org/calendar/

**2008**

May 26-28: GAC/MAC Meeting
Quebec City, Quebec, Canada
www.esd.mun.ca/~gac/ANNMEET/annmeet.html

August 6-14: 33rd International Geological Congress (IGC)
Oslo, Norway.
www.33igc.org/

August 30-Sept. 6: XII International Palynological Congress (IPC)
Bonn, Germany.
First announcement:
www.geo.arizona.edu/palynology/IPC12

August 30-Sept. 6: AASP 41st Annual Meeting, Bonn, Germany. (Held in conjunction with XII IPC)
Organizer: Owen Davis
www.palynology.org/meetings.html

October 26-29: GSA 120th Annual Meeting
Chicago, USA. Joint meeting with American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America
www.geosociety.org/calendar/

More conference information, together with other material relevant to Canadian palynology and information about the Association, can be found on CAP's website at
www.scirpus.ca/cap/cap.shtml

## Deadlines for CAP Newsletter

Please submit items for the next issue of the *CAP Newsletter* (Volume 30, Number 1, May 2007) by **April 30, 2007**. Conference reports, announcements, field trip reports, notices of new books, book reviews, news, and essays on topics relevant to Canadian palynology are all welcome. Please send material to:

Dr Terri Lacourse
Department of Botany
University of British Columbia
#3529-6720 University Boulevard
Vancouver, British Columbia
V6T 1Z4

## DUES REMINDER

**Dues due (2007):**

Muhammad Arshad
Anne De Vernal
Julie Loisel
Rolf Mathewes
Jock McAndrews
Ayobami Babalola Oyelami
Niels Poulsen
Pierre Richard
Bert van Helden

**Dues due (2006 & 2007):**

Hans Asnong
Trevor Bell
Jennifer Bonnell
Jocelyne Bourgeois
Marjolaine Dumais
Jason Gillespie
Robin Helby
Ramakant Kalgutkar
Andrew MacRae
Marian McCoy
Peta Mudie
Jeffery Richardson
David Richardson
Stephen Schwartz
Art Sweet
Mariana Trindade
Jesse Vermaire
James White
Zicheng Yu
Susan Zabenskie