Canadian Association of Palynologists
Association Canadienne des Palynologues

# NEWSLETTER

Volume 39 Number 1 May 2016

## President's Message

This is my final President's Message before Vera Pospelova steps into the role at the next Annual General Meeting. Having known Vera since shortly after she arrived in Montreal to work with Gail Chmura, and getting to know her much better at the San Antonio AASP meeting, I am sure that her enthusiastic, upbeat and determined qualities will serve CAP well. I am also confident that several of our younger/ newer members who expressed interest in becoming more actively involved in CAP at the Baltimore AGM will follow through and stand for election – the association can only thrive with the involvement of the next generation, and having interacted with several young Canadian palynologists in recent years, I am optimistic about the future of our organization. Shortly, an email will be sent to the membership soliciting nominations/ self- nominations for the positions of President-Elect, Secretary-Treasurer, and Newsletter Editor, and we will hold an electronic vote to elect the new Executive who will take over during the next AGM to be held on October 4, 2016 PST in Victoria.

**CAP EXECUTIVE 2013**

*President:* Francine McCarthy
*President elect:* Vera Pospelova
*Secretary-Treasurer*: Mary Vetter
*Website Editor*: Alwynne Beaudoin
*Newsletter Editor*: Florin Pendea
*IFPS Councillor*: Simon Goring

Victoria is a thriving hub, with palynologists including Richard Hebda of the Royal BC Museum (this year's recipient of the Bruce Naylor Award- see page 2) in addition to former CAP President Terri Lacourse and President-Elect Vera Pospelova at the University of Victoria, so together with some of their students and a few visiting scholars from the mainland, we will be able to achieve quorum. We should have a strong presence at the 2017 GAC MAC meeting in Kingston, but should we ever need to schedule a CAP meeting in a year when there is no consensus on participation at a meeting I will be happy to host in Niagara where we have a similar nexus of palynologists and within driving distance of several additional CAP members.

I am honoured to have been given the opportunity to serve as President of CAP over the past several years with such a dedicated and talented co-Executive (including our Newsletter Editor Florin Pendea who managed to get the newsletter out despite suffering life-threatening injuries in the field a few summers ago!), and at the risk of sounding like a broken record I want to thank Mary Vetter and Alwynne Beaudoin for their many years of tireless service to CAP. I will continue to participate in endeavours that I initially took on merely because I was President – playing a role in selecting the CAP Award winners (with the able help of volunteers like Alwynne Beaudoin, Simon Goring, Jean Nicolas Haas, and Jessie Holst Vincent), writing newsletter articles about my favourite palynologically-related things (that fortunately are many and varied… and I even have another in the works for the December newsletter) – and I will forever remain an active member of the organization.

Francine McCarthy
CAP President
(fmccarthy@brocku.ca)

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# Editor's Notes

Thank you to all who contributed material for this edition of the *CAP Newsletter*:

A. Beaudoin, V. Bryant, M. Chaput, S. Goring, J. McAndrews, F. McCarthy, V. Pospelova, S. Stolze, M. Vetter, and J. Vincent.

## *Deadline for Next CAP Newsletter*

Please submit items for the next issue of the *CAP Newsletter* (Volume 39, Number 2, December 2016) by November 10, 2016. Conference reports, announcements, field trip reports, notices of new books, dissertation abstracts, book reviews, news, and essays on topics relevant to Canadian palynology are all welcome. Please send contributions to:

**Florin Pendea**
*CAP Newsletter* Editor
ifpendea@lakeheadu.ca

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# CAP STUDENT AWARD

With three good applications to choose from this year, that of Michelle Chaput (U. Ottawa, advisor K. Gajewski) was the unanimous choice of the CAP Awards committee. Her project is entitled "Quantitative reconstruction of past land-cover in eastern North America using the Landscape Reconstruction Algorithm" and she will use the funds toward travel to the General Meeting in Utrecht this year. Congratulations Michelle, and I encourage the other applicants to consider applying again next year.

**Francine McCarthy**
Chair of Awards Selection Committee

# MEDIA RELEASE

ROYAL BC MUSEUM CURATOR
RECIPIENT OF THE 2015
BRUCE NAYLOR AWARD

Dr. Richard Hebda is the 2015 recipient of the Alliance of Natural History Museum's (ANHMC) Bruce Naylor Award. The award is given annually to recognize achievement by an individual or individuals of national or international significance in the museum-based natural history field in Canada through distinctive leadership, publications or other remarkable endeavours.

# Featured article

## New insights into the Don Brickyards Section

*Francine McCarthy and Jock McAndrews, with contributions from Leslie Kerr-Lawson, Paul Karrow and James Eckenwalder*

The "Toronto beds" became world-famous when fossil wood and broad leaves and unionid clams were identified between glacial strata exposed by mining at Taylor's Brickyard in 1889 (Coleman 1894). Penhallow (1896) concluded that the climate recorded in the Don Fm. was similar to the "Middle United States". J.E. Eckenwalder re-identified 23 compression fossils of broad leaves from the Brickyard section in the ROM as from extant deciduous trees that today range into southern Ontario, notably several extinct species of *Acer* as *A. rubrum, A. saccharum* and *Platanus occidentalis* (McAndrews et al., in prep.), much like those from Townsend's "Gaol Hill, Don" excavation in the Redpath Museum (Brown 1942, Warner 1984). Wood (AMS carbon date >44,400; Beta-254799), and needles identified as *Chamaecyparis thyoides* (Kerr-Lawson 1985) have been re-identified as *Juniperus virginiana* (McAndrews et al. in prep.). Although the flora is less exotic than earlier workers thought, macrofossils are consistent with deposition during the Sangamon interglacial.

Anticipating sale of the brickyard (now Evergreen Park) we collected samples in 1984. Figure 1 presents more details than originally published in Westgate et al. (1999) including transfer reconstructions of mean July and January temperatures and calculations of mean annual temperature (MAT = 9mean July + mean January temperature) / 2. These confirm the interpretation of marked cooling up-section in the Don Brickyard noted by both Terasmae (1960) and Richard et al. (1999); MAT declined from ca. 1°C warmer than the modern value of 7.2°C at Toronto Island Airport (Environment Canada 1982) near the base of the Don Fm. to ca. 5°C cooler than today in pollen zone 3a five meters higher in the section (Figure 1b). The most surprising result, not identified by Jaan Terasmae or Pierre Richard who reported the oxidised sands of zone 3b as barren, was the apparent warming with mean July temperatures close to the modern value of 20.3°C. Francine attributes this to the MIS 5c interstadial; as at the Ziegler Reservoir fossil site/ ZRFS (Figure 2), variations in summer insolation at 65°N appear to have exerted a strong influence on climate and vegetation in Toronto. Jock believes that oxidation altered the assemblage to sparse conifer pollen scraps in pollen zone 3b, producing spuriously warm reconstructions - a possibility consistent with the relative abundance of macrofossils of *Picea*, *Abies* and *Pinus* in these sands. Because transfer function reconstructions from the few pollen-rich samples in zone 3b were comparable to paleoclimatic reconstructions in adjacent sparse samples, the reconstruction of warming at the top of the Don Fm. appears to be supported. Cooling during MIS 5d in Toronto (pollen zones 2 + 3b) was much more pronounced than at the more southerly (albeit higher altitude) ZRFS in

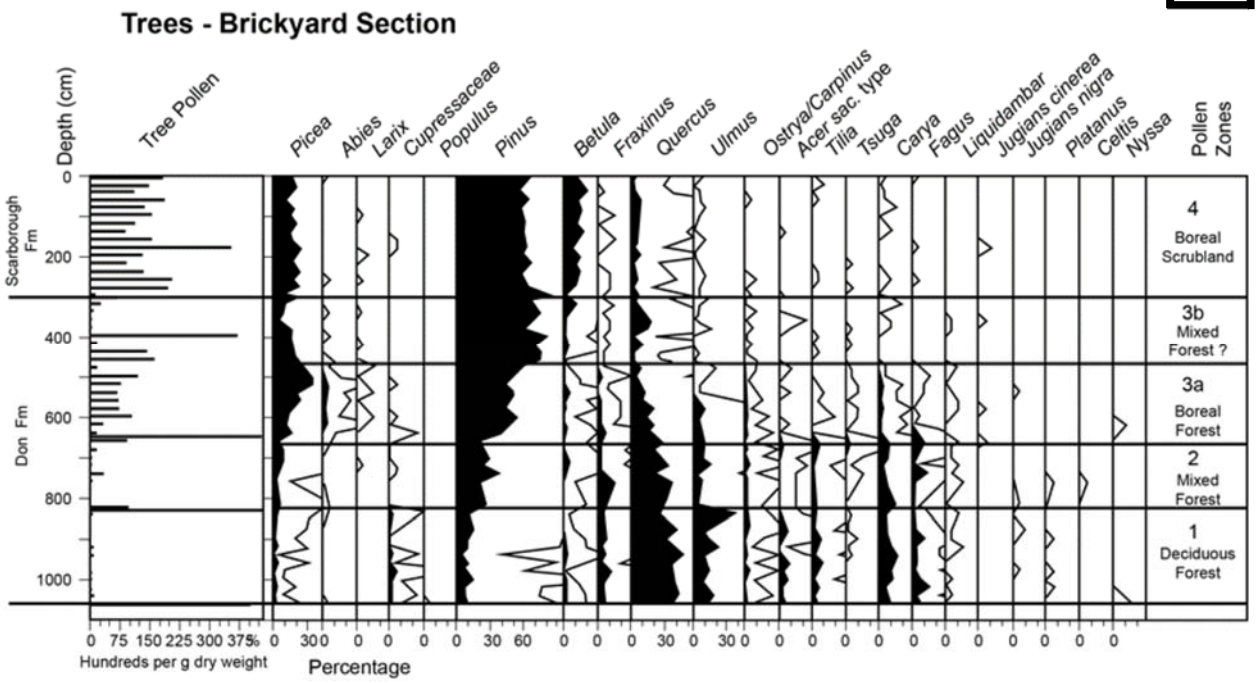


**Figure 1. a) Tree pollen diagram from exposure in the Don Brickyard** (modified from Westgate et al., 1999). Fifty of 54 pollen samples yielded the target sum of 200-tree pollen, and although the spectra are similar to those of Terasmae (1960) and Richard et al. (1999), Jock was able to find pollen in zone 3b sands that they reported as barren. Abundant *Carya* and *Quercus* characterise zones 1 and 2. In addition to pollen of thermophilous trees like *Liquidambar*, *Platanus*, *Juglans nigra*, and *Nyssa*, record deciduous forest with climate slightly warmer than today. Within two meters up-section, *Pinus* and *Picea* dominate pollen zone 3a reflecting boreal forest, but a subsequent increase in *Quercus* at the expense of *Picea* together with the presence of pollen of thermophilous hardwoods in pollen zone 3b suggests to Francine a possible succession to mixed forest at the top of the Don Fm.

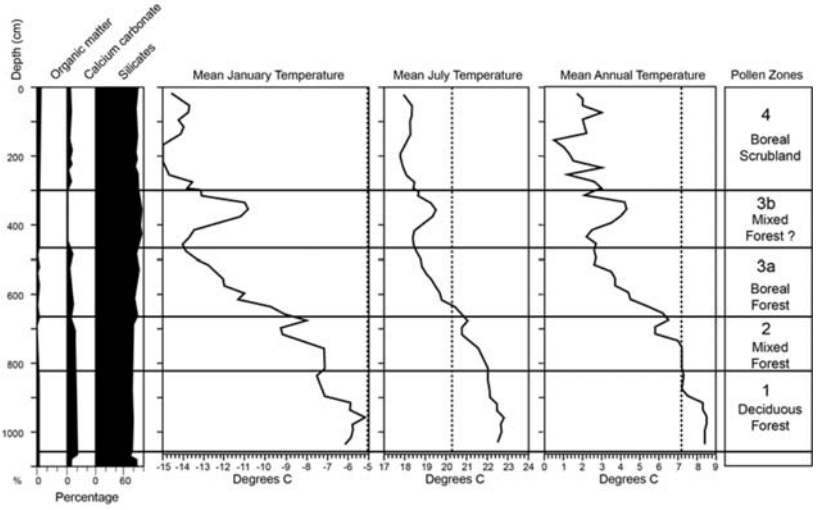


**Figure 1. b) Sediment components from Don Brickyard section derived by loss-on-ignition** (note zone 3b is leached of carbonate). Pollen preservation was generally good although density was low (<3,000 per g in leached sand of zone 3b to 10,000 to 20,000 grains per g in silt and clay). The transfer functions of Bartlein and Whitlock (1993) reconstruct declining temperatures through zones 1 and 2 and cold temperatures in zone 3a. Consistently colder January temperatures suggest greater seasonality than today throughout the section, particularly in zone 3a when a boreal forest covered the Toronto area. Modern means are indicated by dashed vertical lines.

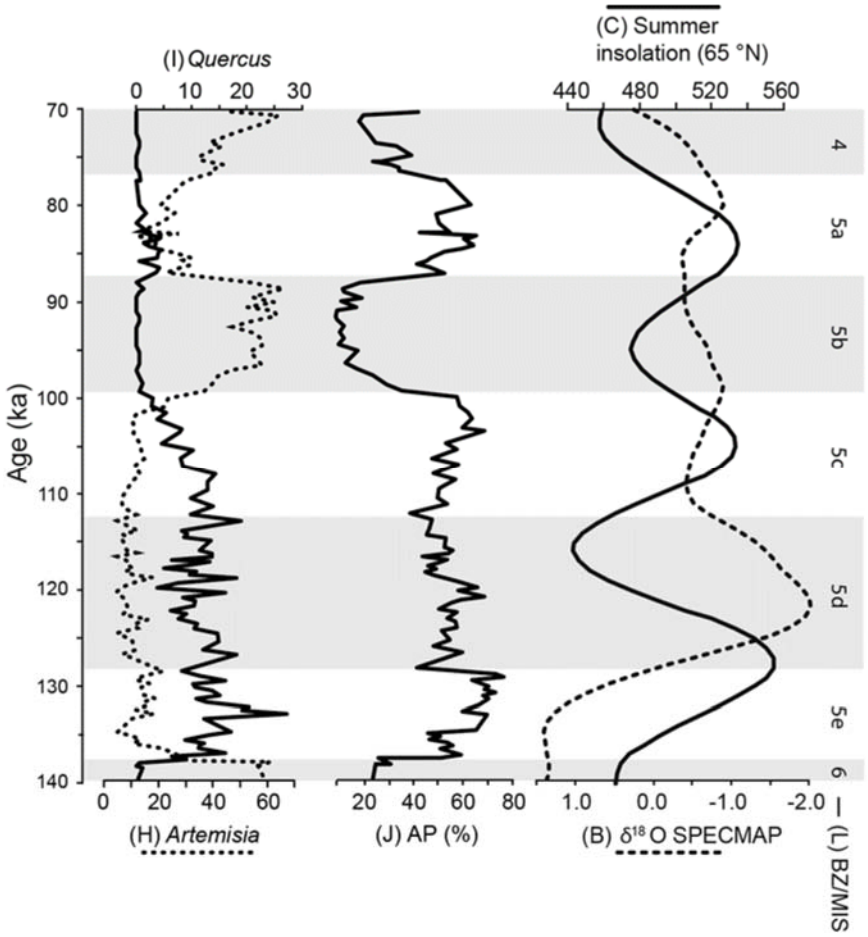


**Figure 2. Correlation of Quercus and *Artemisia* pollen data from Ziegler Reservoir fossil site/ ZRFS of central Colorado** (Anderson et al. 2014) with the SPECMAP $^{18}O$ stack of Martinson et al. (1987) and C) summer insolation calculated for 65°N, using the geochronologic framework of Manan et al. (2014) (modified after Miller et al. 2014). The Don Fm. appears to have been deposited during MIS 5e (pollen zone 1) through 5c (pollen zone 3b) and the Scarborough Fm. during MIS 5b.

central Colorado, where relatively warm climate persisted until MIS 5b. This is consistent with earlier cooling at higher latitudes following the peak warming of the last interglacial, recorded in Greenland Ice core records (NGRIP Members 2004; NEEM community members 2013) and in the global ice volume record (SPECMAP stack; Martinson et al. 1987). Deposition of the Scarborough Fm. during MIS 5b agrees with the proposal of Clet-Pellerin and Occhietti (2002) and correlates with the establishment of alpine tundra at ZRFS.

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# Dissertation

**Ph.D. Student: Jessie H. Vincent**
**Title: Rapid climate change and spruce-climate disequilibrium in lateglacial Nova Scotia**
University of New Brunswick, Biology.
Supervisor: Les C. Cwynar
Accepted: September 2015

Abstract: A network of 25 lateglacial-aged lakes was sampled in Nova Scotia to examine the relationship between climate and vegetation at the end of the last Ice Age. Nova Scotia lake sediments are sensitive to the rapid climate events that typify the lateglacial and possess some of the best records for millennial-decadal scale climate change outside the Greenland Ice Core records. The presence of spruce in lateglacial Nova Scotia has been previously estimated using the 20% spruce pollen limit. Using fossil stomates and plant macrofossils, I have refined this limit to 8%, potentially eliminating significant underestimates of the distribution of spruce. The 8% limit was then used to determine if spruce was in equilibrium with climate during the lateglacial at 4 time intervals. Evidence for spruce was found at numerous sites with chironomid inferred July temperatures as low as 13°C. Sites where the temperature was at, or above, 13°C but spruce was absent indicated that spruce was not in equilibrium with climate at that time interval as the result of a migration or population expansion lag. Significant portions of northeastern Nova Scotia and all of Cape Breton Island remained in vegetation-climate disequilibrium during the lateglacial, while a small portion of southwestern Nova Scotia also exhibited disequilibrium conditions.

While reconstructing the thermal regime in lateglacial Nova Scotia, evidence for the Older Dryas (GI-1d) and the recently discovered GI-1c2 was observed and confirmed with chironomid inferred temperature reversals >3 °C. The discovery of these two events indicates that brief cooling events typical of NW European records also occurred in North America. Furthermore, chironomid and LOI records from Nova Scotia also provide evidence for a potential decade-scale cooling event analogous to the current slowdown in the rate of global warming. These data, indicating cooling between 1.6-6.4 °C, have been correlated to over 30 marine and terrestrial sites throughout the North Atlantic and beyond.

# Looking for discussants and/or collaborators on a Pliocene pollen manuscript

Jock McAndrews is asking for discussants or collaborators for a preliminary pollen diagram on a lake sediment core that spans 200,000 years of the middle Pliocene (Gao et al. 2012): is it unique in Canada? The authors find it difficult to generate detailed text, especially an interpretation. On the next page is a new draft of an abbreviated pollen diagram that includes a Holocene level plus reconstructed July temperature. Also, they have many images of the generally well-preserved temperate plant pollen.

Gao C., J.H. McAndrews, X. Wang, J. Menzies, C.L. Turton, B.D. Wood, J. Pei, and C. Kodors. 2012. Glaciation of North America in the James Bay Lowland, Canada 3.5 million years ago. Geology 40: 975-978.

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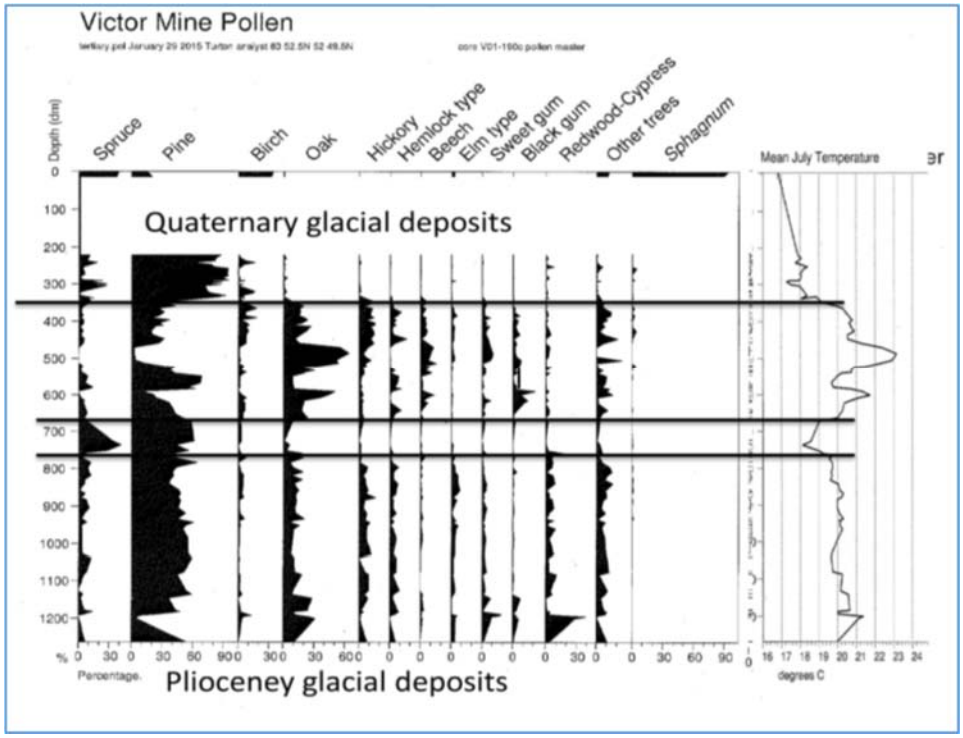
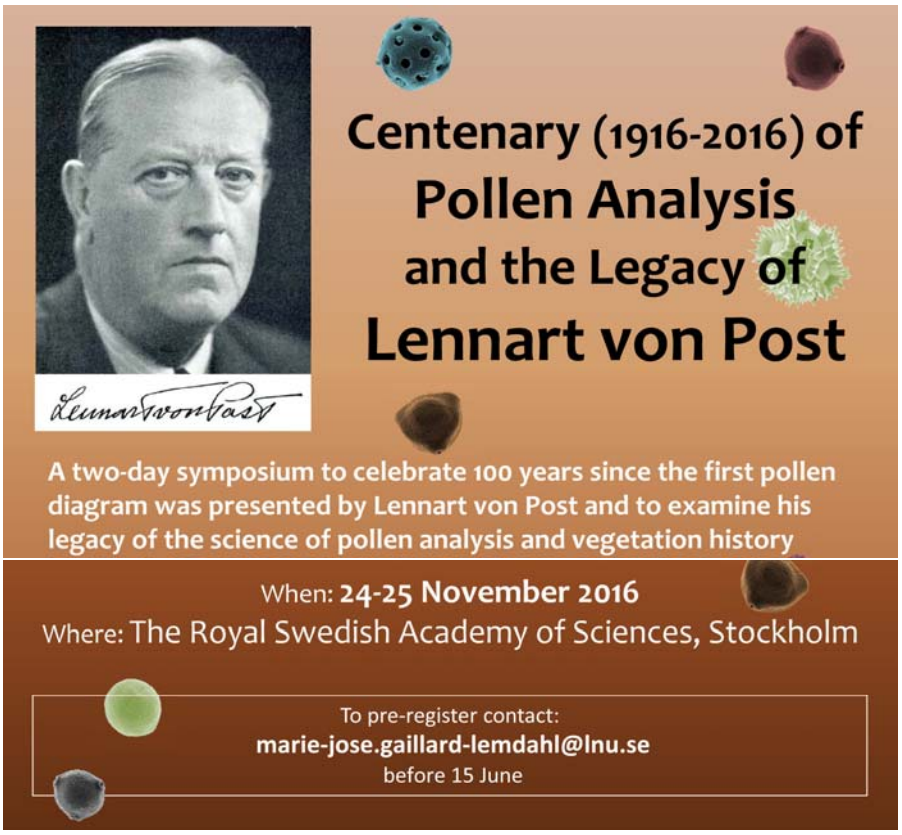



Any ideas on this Pliocene pollen diagram? If so, please contact Jock McAndrews at

jock.mcandrews@utoronto.ca



# Palynfo

## *Jean Nicholas Haas The new President of the IFPS*

I first met Jean Nicolas Haas at the Royal Ontario Museum where he spent time in Jock McAndrews' lab as a post-doc, studying the flora of southern Ontario and its response to postglacial climate change. I subsequently joined his botany students from the University of Innsbruck (where he is Associate Professor and Research Group Palynology and Archaeobotany) to show them around some Niagara field sites a few times and visited Innsbruck when I attended my very first NPP Workshop, which turned out to be a pivotal event in my palynological career.

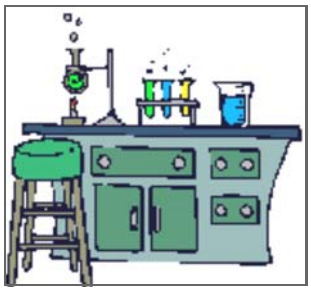
It was when he worked in Jock's lab that he joined CAP and has been an active and valuable member or our organization, including participating in our Awards Committee and acting as our representative to IFPS- and he was recently named as its President, so **congratulations Jean Nicolas!**

*A reminder that he has organized a special session at the IPC in Salvador, Brazil:*

***SS32 – 100 Years after Lennart von Post: Advances, Achievements and the Future of Quaternary Palynology.*** *Organizer: Jean Nicolas Haas*

*Quaternary palynology dealing with the analysis of microfossil remains from all kind of sediment archives has a more than centennial long tradition, which was than first put on new illustrative and interpretative tracks by the Swedish geologist Lennart von Post in 1916. This session aims at highlighting general advances in the field of Quaternary palynology since the pioneer work of von Post such as new methodological achievements, statistical techniques, as well as general palynological issues concerning the interpretation of Quaternary flora and vegetation change related to natural, climatic or anthropogenic impact. Palynological research with a high potential for a future impact on scientific research, teaching and human society in general are especially welcomed, such as for example on seasonal to decennial dated high-resolution archives, land-sea intercomparisons, past pollen productivity estimates, palynological transfer function, quantification and calibration tools, pollen-database related continental scale reconstructions, quantification of local to regional natural hazards, understanding of extreme environments, on rare but special sediment archives, or on deposits with poor microfossil preservation.*

Francine McCarthy
CAP President
Brock University



# Lab News: Brock University

Brock University has a dynamic group of researchers studying a variety of lacustrine and marine palynomorphs, primarily in sediments of Quaternary age.

Martin Head is looking for good students who are interested in research (PhD and MSc) in Plio-Pleistocene marine palynology and paleoenvironmental analysis. He presently has four research students:

Saif Al-Silwadi is examining the dinoflagellate cyst record of the Rees Borehole in Belgium to elucidate the Pliocene sequence stratigraphy and paleoenvironmental analysis of the southern North Sea Basin (in collaboration with Stephen Louwye).

Walid Abomriga is constructing a high-resolution dinoflagellate cyst record across the Early–Middle Pleistocene boundary (Marine Isotope Stages 20–18, ~773 ka) at Central North Atlantic IODP Site U1313 (in collaboration with Patrizia Ferretti).

Mukudzei Dube is also studying Central North Atlantic IODP Site U1313, focusing on the structure of Marine Isotope Stage 21 (Early Pleistocene, 866–814 ka) based on a high-resolution dinoflagellate cyst record (also in collaboration with Patrizia Ferretti).

Ese Balota is examining dinoflagellate cysts of the Early–Middle Pleistocene boundary (Marine Isotope Stage 19, ~773 ka) from the Chiba Section, Japan (in conjunction with Okada Makoto and other Japanese colleagues).

Francine McCarthy currently has three research students with another planning to start an MSc in Earth Sciences in September:

Andrea Krueger, doing her PhD in Biological Sciences: *Freshwater Dinoflagellates and their Cysts: Investigating the Ecological and Taphonomic Controls on Dinocyst Assemblages*.

Nick Riddick, soon to defend his MSc thesis in Earth Sciences: *The Utility of Microfossils in Geoarchaeology: A Case Study from Lake Simcoe, Ontario and Methodological Considerations*

Justin Pentesco, has just started his NSERC USRA project: *Non-pollen palynomorphs as proxies of seismicity-induced mass wasting*

Paul Michael Pilkington will be studying non-pollen palynomorphs, probably with applications to water quality in the Great Lakes

Mike Pisaric has five research students and postdoctoral fellow (commencing July 2016):

Rebecca Gunter should defend her MSc thesis in Earth Sciences by September 2016. Rebecca is examining the impact of dust loading from the Dempster Highway near Fort McPherson, Northwest Territories on small subarctic lakes.

Tyler Prince is developing a fire history using macroscopic charcoal from a small lake near Carcross in the southern Yukon Territory.

Caitlin Garner is studying the impacts of recent fires on benthic macroinvertebrate communities living in small streams around Yellowknife in the Northwest Territories.

Zachary Harmer is studying landuse and landcover changes in the Niagara Peninsula in southern Ontario and their effects on water quality in the region.

Dana Harris will be commencing her program in September 2016 and will study cellular development in jack pine trees during the short growing season near Yellowknife, Northwest Territories.

PDF Jean-Phillipe Martin recently defending his PhD at the Université du Québec à Montréal and will commence a postdoctoral position at Brock in July 2016. JP will be working on a recently funded Cumulative Impacts Monitoring Program (CIMP) research grant that will be studying the history of drought or drought-like conditions in the southern Northwest Territories using dendrochronological records developed from climate-sensitive jack pine (Pinus banksiana) trees. JP's work is in partnership with the Northwest Territories Power Corporation.

# Recent Publications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Coleman, K.A., Palmer, M.J., Korosi, J.B., Kokelj, S.V., Jackson, K., Hargan, K., Courtney Mustaphi, C., Thienpont, J.R., Kimpe, L.E., Blais, J.M., Pisaric, M.F.J. and Smol, J.P.(2015). Tracking the impacts of recent warming and thaw of permafrost peatlands on aquatic ecosystems: a multi-proxy approach using remote sensing and lake sediments. *Boreal Environment Research*. 20: 363-377

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Head, M.J., Gibbard, P.L. and van Kolfschoten, T. (eds.), (2015) Guest

editorial: The Quaternary System and its formal subdivision. Special volume of *Quaternary International*, 383: 1–3.

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## Call for Papers - Annual Meeting of the Geological Society of America, Denver, Colorado,

## 25-28 September 2016

Dear colleagues,

We cordially invite you to submit an abstract to the topical session "T2. Reconstructing environmental controls on societal change from prehistory to present day" at the 2016 GSA Annual Meeting in Denver, Colorado, USA (25-28 September 2016).

This session welcomes papers reconstructing the nature and degree of environmental change and its influence on societal change through the Holocene. It will bring together researchers across disciplines in the Earth and Archaeological Sciences.

Abstracts can be submitted online at http://www.geosociety.org/meetings/2016/sessions/topical.asp. Submission deadline is 12 July 2016.

For more information about the meeting, including registration, venue, travel grants etc. please go to http://community.geosociety.org/gsa2016/home.

Rationale for Session:

Societal change in prehistoric to recent times is strongly influenced by both, rapid and long-term changes in the Earth system. Extreme events and natural hazards such as volcanic eruptions, earthquakes, tsunamis, wildfires, landslides, storms, floods, or droughts, can have severe impacts on the vulnerable fabric of human societies and the environmental context in which they exist. Subtle changes in the Earth system occurring on decadal to centennial time scales also exert important controls on human behavior and societal development. This is particularly true for natural shifts in climatic conditions during prehistoric times, impacting migratory patterns, settlement histories, and farming practices. The session will explore recent advances in the understanding of Earth system changes and their impacts on human societies by bringing together students and experts in the fields of anthropology, archaeology, climate science, geology, geography, and paleoenvironmental research.

We are looking forward to seeing you in Denver!

Susann Stolze, INSTAAR, University of Colorado Boulder

Michelle Goman, Sonoma State University

# Obituary
## Saying goodbye to Al Traverse

Alfred Traverse died on September 15, 2015 at the age of 90 in State College Pennsylvania, where he spent many decades as a Professor of Botany and Adjunct Curator of the Herbarium at Penn State. He and his wife Elizabeth (Betty) also had their own arboretum there, and as an ordained Anglican (Episcopalian) Priest, he also had his own parish for a long time. His effectiveness as an educator is evident in the popular and well-attended classes in palynology he taught throughout his career at Penn State, in the professional palynologists (Paul Strother, martin Farley and Fred Rich, to name a few) he mentored who went on to careers in such diverse sub-fields as Paleozoic acritarchs and Holocene paleoenvironments. He was also one of a mere handful of recipients of AASP's Teaching Medal.

Many people don't realize that Al had Canadian roots, born in Port Hill, Prince Edward Island on Labour Day, 1925 of United Empire Loyalist stock where lived until his family moved to the Michigan in 1928. He was a long-time member of CAP and even maintained an account at the Royal Bank of Canada throughout his life, which I discovered when he visited St. Catharines as external examiner of Kevin Gostlin's MSc defense (in the days when budgets allowed for in-person visits by examiners) and asked to be driven to the local branch to transact some business. His work on the transport and sedimentation of palynomorphs, culminating in the volume he edited entitled *Sedimentation of Organic Particles*, was a great inspiration to me and his report of dinoflagellate cysts in of the Oligocene Brandon lignite of Vermont in his dissertation (Harvard University, 1951) illustrates the breadth of his research interests that went beyond the classical bota-

ny that always remained his chief love. His encyclopedic knowledge of palynology is enshrined in the two editions of *Paleopalynology*, a staple in most palynological laboratories. The palynological world lost a giant when he died.

Francine McCarthy
Brock University

# PALYNFO

**Websites**

Check out **Vaughn Bryant's** new video on his work: http://youtu.be/Yqk0ptFfGzE.

The LandCover6k Subgroup 9 blog/webpage is now available at https://lc6ksubgroup9.wordpress.com/. This webpage is intended to facilitate communication between palynologists estimating pollen productivity or working on vegetation reconstructions using fossil pollen records. For more information or to get involved, please contact Dr. M. Jane Bunting at m.j.bunting@hull.ac.uk.

**North American Modern Pollen Database (NAMPD)**

Modern pollen sample networks are critical to the work of paleoecologists and they represent considerable effort in collection, analysis and publication. The North American Modern Pollen Database (NAMPD; Whitmore et al., 2005; Williams et al., 2006) is a collection of modern pollen and matched environmental data from researchers working in North America and Greenland that has been widely used for biogeographic, paleoecological and paleoclimatological research.

Currently the NAMPD can be accessed and downloaded as an Excel database at http://www.lpc.uottawa.ca/data/modern/index.html or http://www.geography.wisc.edu/faculty/williams/lab/Downloads.html, and is also being progressively uploaded to the Neotoma Paleoecology Database, along with parallel surface sample uploads from active research projects. A major contribution of the NAMPD relative to the Neotoma data store is the development of a standardized taxonomy and the addition of environmental data. However, Neotoma provides a direct mechanism for data submission through Data Stewards, and as such, the two datasets contain a partial but not complete overlap of pollen sample sites.

The Excel spreadsheet is very easy to obtain, subset and manipulate, for any purpose such as computing a transfer function, simply by sorting and selecting needed columns of data. The pollen already has matched climate data; therefore it is not necessary to interpolate these from available datasets; however it represents an additional set of decisions that need to be taken into account by the analyst. For example, the number of taxa is limited and some rare and aquatic taxa are not included. The choice of bioclimatic data also represents a choice among several available datasets.

The NAMPD was created a number of years ago, but, because of the effort involved in continually updating the database, the NAMPD hasn't been updated for several years. **The organizers of the NAMPD are therefore interested in knowing if the NAMPD continues to be a useful resource for paleoecologists.** They have created a survey available at http://goo.gl/forms/n0kvAFlKW9 with questions regarding, for example, current use of the database, potential data contributions and suggestions for improvement. All palynologists are welcome and encouraged to complete the short survey. This will help the organizers immensely with decision-making regarding the future of this resource.

Any additional comments/questions can be sent to Konrad Gajewski (gajewski@uottawa.ca), Simon Goring (goring@wisc.edu) or Michelle Chaput (mchap036@uottawa.ca).

# CAP MEMBERSHIP FORM

Canadian Association of Palynologists / Association Canadienne des Palynologues (CAP) membership is open to all members of the palynological community in Canada and others with an interest in Canadian palynology. The Association is dedicated to the advancement and encouragement of all aspects of palynology in Canada and the promotion of co-operation between palynologists and those engaged in related fields of study. Membership dues include two issues a year of the *CAP Newsletter*, to which all members are invited to contribute. CAP is affiliated with the International Federation of Palynological Societies (IFPS) and members receive two issues of the IFPS newsletter (*PALYNOS*) each year.

CAP membership dues are $10 per year in Canadian or US funds payable at the beginning of the year. Lapsed members are removed from the mailing list after one year, following a reminder Members may, if they wish, pay for up to three years in advance. To join, please fill out the the membership form, by hand or in Adobe Reader®, and send it with a cheque (drawn on a Canadian or US bank) or money order payable to CAP to:

Dr. Mary Vetter, CAP Secretary-Treasurer, Luther College, University of Regina, Regina, Saskatchewan, S4S 0A2 CANADA

Name:_____

Affiliation:_____

Address:_____

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Tel:_____ FAX:_____

E-mail:_____

Web page URL:_____

Research interests:_____

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New membership ☐ Renewal ☐ Amount enclosed:_____

May we include your name/address/research interests in the on-line "Directory of Palynologists" in the CAP World Wide Web page? Yes ☐ No ☐