Canadian Association of Palynologists
Association Canadienne des Palynologues

NEWSLETTER

Volume 36 Number 2 December 2013

President's Message

I would like to begin my last "President's Message" by welcoming the incoming President, Dr. Francine McCarthy. Francine is Professor of Earth Sciences at Brock University and is a long-time member of the Association. She previously served as CAP Secretary-Treasurer (1997-2001) and Newsletter Editor (2005-2006). I am pleased to leave the Association is such good hands, with Francine as President along with a dedicated suite of Directors.

With Francine's move to the position of President, the President-Elect position is now vacant. There are no specific duties attached to this position, but after a two-year term learning the ins-and-outs of the Association and participating in Executive committee discussions, the President-Elect assumes leadership of the Association. It has been a rewarding experience, both professionally and personally, to serve as President, and I encourage all members to consider taking on this important role.

One of the most enjoyable aspects of being President has been presenting the CAP Student Research Award, in 2012 to Andrea Price (UVic) for her work on Late Quaternary dinoflagellate cysts in the Gulf of California and in 2013 to Emily Helmer (SFU) for her work on the post-glacial paleoecology of Haida Gwaii, BC. I wish we were able to recognize more of the important contributions that students regularly make to palynology. The application deadline for the 2014 Award is March 1. Please spread the word!

I would like to thank all members of the CAP Executive for their time, efforts and support over the last two years. I wish them the best of luck, and I look forward to participating, as a member, in future CAP activities.

Terri Lacourse, Ph.D. (tlacours@uvic.ca)
CAP President, 2012-2013

CAP EXECUTIVE 2013

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

Editor's Notes

Thank you to all who contributed material for this edition of the *CAP Newsletter*: A. Beaudoin, K. Bell, K. Gajewski, J. Galloway, S. Goring, A. M. Krueger, T. Lacourse, J. McAndrews, F. McCarthy, K. Neil, M. Vetter and O. Volik. Please submit items for the next issue of the *CAP Newsletter* (Volume 37, Number 1, May 2014) by April 1, 2014.

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A great year for CAP

No doubt that 2013 was a great year for Canadian palynologists. Between Edmonton and San Francisco CAP has made important contributions to the success of two of the most important professional gatherings of the year: CANQUA and AASP-DINO 10-CAP-CIMP-NAMS. In Edmonton, CAP organized a special session on the *The Palaeoecology of Extreme Environments* and in San Francisco CAP gathered quite an audience from North American palynological community around a special session on *Palynology of Sudden Events.* Compliments to Alwynne Beaudoin, Terri Lacourse, and Mary Vetter for their hard work in organizing these two great events. Finally, I would like to thank Terri Lacourse for her dedication as CAP president during the last two years.

Attendees at the CAP AGM in San Francisco, October 2013. From left to right: S. Stolze, Th. Demchuk, F. McCarthy, K. Bell, D. Braman, T. Lacourse, P. Mudie, F. Pendea, A. Beaudoin, S. Goring, and V. Pospelova. V. Bryant was present but is not in the picture.

Photo: Olena Volik

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Notes from San Francisco:

CAP Special Session at the AASP-CAP-NAMS-CIMP-Dino10 Joint Meeting

Terri Lacourse and Alwynne Beaudoin organized and chaired a CAP Special Session entitled ***The Palynology of Sudden Events*** at the AASP-CAP-NAMS-CIMP-Dino10 Joint Meeting, which was held in San Francisco, October 20-24 2013. The conference attracted about 170 registrants, probably in part because of the participation of several scholarly societies, including CAP.

The session, which took place on the afternoon of October 21, included seven diverse and interesting presentations. Notable among these were the two invited papers, one each by Kam-Biu Liu and Florin Pendea, which looked at hurricanes and volcanic ashfalls respectively. These presentations on archetypical sudden events set the stage for the examination of the palynological signature other types of sudden events including tsunamis, rapid die-offs, abrupt climate changes, and glacial meltwater discharge. These wide-ranging and thoughtful presentations were well received by an audience of around forty people and often generated considerable questions and discussion.

The conference was held at the Hotel Whitcomb, an historic building in the Market Street district of San Francisco that was constructed soon after the 1906 earthquake. The architecture, with high ceilings and ornate public spaces, reflected its former use as San Francisco's City Hall between 1912 and

The California Academy of Sciences in Golden Gate Park showcases a large four-story high exhibition in which numerous live plants and and free-flying birds and butterflies evoke the ambiance of tropical rainforests. Trees, shrubs, and flowering plants, including many epiphytes, evoke lush and richly diverse environments. Here, a panel highlights the key role of pollinators in maintaining the biodiversity of the rainforest ecosystems.

1915. Despite the full meeting program many conference attendees also took advantage of some of the attractions of the city, with the California Academy of Sciences and Fisherman's Wharf as popular destinations.

Session Description:

What is the palynological signature of sudden events? Tsunamis, avalanches, floods,

(Continued on page 4)

forest fires, earthquakes, debris flows, and volcanic ashfalls are sudden, usually rare and unpredictable, events. Such events often leave a clear geomorphic and sedimentological signature. But can they be recognized and distinguished from palynological evidence? And, if so, can the palynological record provide evidence of patterning, magnitude, or recurrence intervals that might help better forecast and prepare for future events? This session examined the palynology of sudden events using many different palynological indicators, and from many intervals in the geologic past.

In hazy late afternoon sunshine, hundreds of California sea lions (Zalophus californianus) haul out onto floating docks at Pier 39 along Fisherman's Wharf. A huge tourist attraction, the sea lions are pungent, noisy, constantly active, and fascinating to watch as they shoot sleekly out of the water, jostle for position on the docks, bark and spar, flop down for a snooze, then slide back into the sea.

List of presentations:

Kam-biu Liu - ***Invited Speaker:*** *Palynology of hurricane events in coastal sediments*

Peta J. Mudie and David B. Scott - Palynology of Los Peñasquitos Lagoon, San Diego, California: Implications of the mid-Holocene mangrove pollen record

G. D. Wood, B. Kohl, D. G. Benson, Jr. - Provenance of reworked palynomorphs in the Pleistocene of the Gulf of Mexico: Proxy for identifying the Last Glacial Maximum (MIS 2)

Arun Kumar and Lanny H. Fisk - Recycled Carboniferous pollen and spores in the Panna Formation (Paleocene-Early Eocene) of the Mumbai Offshore Basin, India: possible megatsunami triggered turbidity current transport from the Arabian Peninsula to offshore Mumbai

I. C. Harding, D. Blake, P. J. Talling, J. E. Hunt, J. Emmings, C. J. Stevenson, R. Turner and A. Coleman - Global importance of inefficient organic carbon burial by canyon flushing marine mega-landslides (Paper was not presented)

Lanny H. Fisk, Arun Kumar, James B, Riding and Martin Röper - Observations and preliminary interpretations regarding the age and depositional environment of the late Jurassic Solnhofen Formation – evidence from palynomorphs

I. F. Pendea, V. Ponomareva and K. Mcleod - ***Invited Speaker:*** *Disaster aftermath – decoding landscape and ecosystem responses to large-scale explosive volcanism*

Alwynne B. Beaudoin and Terri Lacourse - What is the palaeoecological signature of the Mazama ashfall?

Notes from Edmonton:

CAP Special Session at CANQUA-CGRG

Alwynne Beaudoin and Mary Vetter organized and chaired a CAP Special Session at the CANQUA-CGRG meeting that was held in Edmonton in August 2013. The session, which took place on August 20, was entitled *The Palaeoecology of Extreme Environments*.

Keynote speaker Konrad Gajewski was unable to attend, but we were fortunate to have an outstanding presentation by Mary Edwards instead. Mary's flight had been delayed, so that she missed her original scheduled presentation time the previous day of the meeting, but her topic was a great fit with the CAP Special Session. So this worked out well for all concerned!

The papers were all well prepared and excellently presented. The appreciative audience of about twenty people asked many questions and the session ran long with follow-up discussion. The papers mostly dealt with northern environments and landscapes and several emphasized the recovery of palynomorphs from unpromising sediments and locales. Another theme that came through strongly was the ways in which palynology can be integrated with other studies and proxy indicators to provide a more complete picture of past environmental changes and events.

The CANQUA-CGRG meeting was held on the University of Alberta campus, at the new Centennial Centre for Interdisciplinary Science (CCIS) building. The conference was also very diverse, with eighteen special sessions covering topics from coastal geomorphology to ancient DNA. It was well attended, with about 250 participants, including many from outside North America and some from as far away as New Zealand. The last time a CANQUA conference was held in Edmonton was in 1989, following the famous "Ice Free Corridor" AMQUA meeting there in 1978. The 2013 CANQUA-CGRG meeting continued the fine tradition of holding intellectually stimulating and rewarding Quaternary conferences in Edmonton.

A quiet early morning moment by the poster displays at the CANQUA Conference

Session abstract:

Extreme environments occur in many forms, from the cold temperatures of arctic and alpine areas, to the aridity of deserts and grasslands, to the salinity of salt marshes and saline lakes, or the desiccation and UV influx on exposed rock surfaces. They may persist for millennia or be restricted in time and space, such as newly exposed terrain around glacial margins or recent volcanic deposits. Extreme environments can result from various stressors, including climate, biogeochemical or physical conditions, or biological factors. Such environments present challenges for biota and their associated pa-

laeoecological records. Signals may be recorded by many proxy indicators including pollen, plant macroremains, diatoms, or dinoflagellates. The session included contributions documenting extreme environments through single and multiple indicators, or reporting the results of studies focused on these types of localities.

List of presentations:

- *Konrad Gajewski - Palynological Studies in the Canadian Arctic* (presentation scheduled but not given)
- *Mary Edwards, James Haile, Eva Bellemain, Sanne Boesenkool, Laura Epp, Andrei Andreev, Anatoly Lozhkin, Heather Binney, Julian Murton and the Ecochange A2 group - A Molecular Approach to Reconstructing the Northern Pleistocene Biota* (presentation not originally scheduled for this session but given in place of previous paper)
- *Kathryn E. Hargan, Kathleen M. Rühland, Andrew M. Paterson, Bill Keller, James Holmquist, Glen MacDonald, Sarah Finkelstein, John P. Smol - Diatoms Strengthen Our Interpretations of Past Northern Peatland Environments*
- *Jessie H. Vincent, Les C. Cwynar - Regional Variation in Lateglacial Climate Change in Nova Scotia*
- *Peter J. Barnett, Sarah A. Finkelstein - Sub-Till Organic-Bearing Sediments of the Hudson Bay Lowland: Stratigraphy and Geochronology*
- *Sarah A. Finkelstein, Peter J. Barnett - Palynology of the Organic-Bearing Sub-Till Sediments of the Missinaibi Formation, James and Hudson Bay Lowlands: Implications for Pleistocene Geochronology and Paleoenvironments*

2013 CAP Annual General Meeting Minutes

Hotel Whitcomb, San Francisco
October 21 2013

Present: Alwynne B. Beaudoin (Website Editor, AGM Recording Secretary), Kimberley Bell, Dennis Braman, Vaughn Bryant, Thomas Demchuk, Simon Goring (IFPS Councillor), Terri Lacourse (CAP President, AGM Chair), Francine McCarthy (President-Elect), Peta Mudie, Florin Pendea (Newsletter Editor), Vera Pospelova, Susann Stolze, Olena Volik. *13 members, quorum reached.*

1) Welcome, Approval of Agenda.

- Meeting opened at 5:15 pm. TL welcomed attendees. Round table introductions.
- TL reviewed the agenda. Motion to approve by Goring, seconded by Braman. Agenda approved as presented.

2) Review and approval of 2011 and 2012 AGM Minutes.

- TL explained that the 2011 AGM minutes could not be approved at the 2012 AGM because that meeting did not reach quorum. Minutes reviewed by attendees.
- Motion to approve by Pendea, seconded by Pospelova. Minutes accepted as presented.
- TL explained that because the 2012 AGM did not reach quorum, no official business could be conducted at that meeting. The minutes represent a review of ongoing business. FM and PM, who attended that meeting, agreed the notes were a fair summary of discussion. Mo-

tion to approve by McCarthy, seconded by Braman. 2012 meeting notes approved as presented.

3) President's report (T. Lacourse)

- TL reviewed her report, highlighting several issues: Emily Helmer was given the CAP Student Award for 2013.
- TL expressed concern about the low number of applicants in each competition. FP noted that four applicants is high in proportion to CAP's total membership.
- CAP should look at ways to raise the profile of the award. Suggestions to improve visibility included: get announcement into the GAC newsletter; e-mail reminder to members; get lab leads to broadcast through their labs and student networks.
- Award funds are to be directed towards the applicant's research. Discussion as to whether it would be better to give funds as just an award, not as research funds, or for professional development more broadly defined. Would the lack of restriction encourage more applicants? Several noted that experience in putting together a proposal is important and encourages a sense of achievement. The possibility of giving two awards (at Masters and PhD level) was discussed but rejected because of the small pool of applicants and because the adjudication process does not privilege the projects that are nearer completion. Decision to leave the Award process and amount as is for now, pending resolution of CAP's official status (see below).
- TL outlined the issue of CAP's official status. CAP was registered in 1986 as a Nova Scotia joint stock company, but for various reasons, including the Nova Scotia requirement that meetings be held in that province, CAP is considering a change to its registration status. M. Vetter (CAP Secretary/Treasurer) is investigating the options and tax implications. Based on information available so far, it looks as if registering federally as a non-profit may be the most viable option. However, as a non-profit, no member can benefit financially, so this might constrain CAP's ability to give student awards. MV and TL are trying to get information from other societies on how they do this. Need to deal with this big issue first, because it may have implications for the student award.
- TD noted that in the US, the main concern is with Board members not profitting, and that student awards are usually positioned as scholarships. Noted that AASP and CAP are small fish in a big sea.
- TL indicated that the Executive would continue to discuss the issue by e-mail. There are also implications for CAP's by-laws. Once options are clarified, CAP members will be notified, and there will need to be a vote on the registration, coupled with a change to the By-laws to reflect the new situation.
- TL noted CAP's high level of activity this year with the Special Sessions at CANQUA and this meeting.
- Motion to approve report by McCarthy, seconded by Pendea. Report approved as presented.

4) **Secretary/Treasurer's report (M. Vetter, *in absentia*)**

- TL presented the report and reviewed the annual financial statement. CAP is in a position to support the outreach initiatives at conferences and student award.
- Several asked about raising the amount of the student award to $500. TL advised holding off on any changes to the award until the registration issue has been resolved. Motion to approve report by

Demchuk, seconded by Pendea. Financial report approved as presented.

5) Auditor's Statement (Sarah Finkelstein)

Report was read into the record by TL.

6) **Newsletter Editor's report (F. Pendea)**

- FP summarized the year's activities. There has been a reasonable response from people sending in material for the issues. He asked about ceasing to mail out paper copies; some libraries still want them. The issue is not cost of postage. ABB noted that deposit copies are required for National Library of Canada to maintain ISSN and FM noted that the British Museum Library effectively acts as an archive for the society too. Agreed to keep mailing paper copies to these institutions.
- Motion to approve report by Goring, seconded by Braman. Report approved as presented.

7) Website Editor's Report (A. B. Beaudoin)

- ABB summarized report highlights, noting acceses remain around 500/month.
- Main addition this past year is a list of Special Sessions sponsored by CAP, including a list of papers presented each session. She asked for help in completing this list, which has missing information. FP suggested that future reports in *CAP Newsletter* include a list of speakers and paper titles as an additional record.
- FP asked if a list of pollen labs in Canada could be added to the website. ABB indicated that this is do-able and asked for input to compile it.
- Motion to approve report by McCarthy, seconded by Braman. Report approved as presented.

8. News from IFPS (S. Goring)

- Next IPC meeting is scheduled for 2016 in Salvador, Brazil. In April 2013, three new international vice-presidents were elected to IFPS, with their term until 2016.
- CAP's IFPS dues were paid on June 5.
- Next issue of *Palynos* is coming out soon. Need material from CAP to add to the newsletter. Potential contributions: reports of CAP's session at this meeting and at the recent CANQUA meeting.

9. Election of CAP Executive Directors

- Several Executive members (Beaudoin, Vetter, and Pendea) have volunteered to continue in their positions for another term. TL's term ends at end of this calendar year. Francine McCarthy will take over as President at start of 2014.
- TL noted that new Executive members are often installed by acclamation, as per By-laws, because there is typically only one candidate.
- TL reported that the President-Elect position will be vacant as of January. The position has no specific duties other than to become familiar with what's going on in preparation of becoming President and to participate more generally in CAP activities. Are there potential volunteers? If none step forward, search will be initiated.
- TL thanked Executive for support and wished the incoming President well. Meeting attendees thanked TL for her service to CAP.

10. Location of 2014 Annual General Meeting.

- TL summarized the possibilities: GAC/MAC in May in Fredericton, AMQUA in August in Seattle, AASP and IPC in Argentina at end of September, GSA meeting in October in Vancouver. Discussion

around these options with concensus emerging that GSA would be the best venue - most likely to attract CAP members from all segments of discipline.
- TL suggested a lunchtime AGM might be best, possibly with food provided for attendees. Also useful to poll ahead of meeting as to who might attend.
- Motion to meet in Vancouver moved by McCarthy, seconded by Goring. Carried. CAP Executive will contact GSA organizers about the possibility of holding the 2013 AGM in conjunction with GSA in Vancouver.

11. Other business:
- FP suggested that, to encourage members, CAP membership should be free to all students who want to be members. He felt that a certain proportion would continue as members later. Since this would entail a change in the By-laws, it was agreed to postpone this discussion and roll it into a general review of the By-laws at a later date, which will be done as a consequence of dealing with the registration issue.

12. Adjournment
- Motion to adjourn moved by Pendea, seconded by Pospelova. Carried. TL thanked attendees. Meeting adjoured at 6:15 pm.

Dissertation Abstracts

Freshwater dinoflagellates as proxies of cultural eutrophication: a case study from Crawford Lake, Ontario

Andrea Margaret Krueger (MSc, 2012)
Supervisor: Francine McCarthy
Brock University

Crawford Lake, Ontario, provides an ideal natural laboratory to study the response of freshwater dinoflagellates to cultural eutrophication. The anoxic bottom waters that result from meromixis in this small (2.4 ha) but deep (24 m) lake preserve varved sediments that host an exceptional fossil record. These annual layers provide dates for human activity (agriculture and land disturbance) around the lake over the last millennium by both Iroquoian village farmers (ca. A.D. 1268-1486) and Canadian farmers beginning ~A.D. 1883. The well-established separate intervals of human activity around Crawford Lake, together with an abundance of available data from other fossil groups, allow us to further investigate the potential use of the cyst of freshwater dinoflagellates in studies of eutrophication. Cyst morphotypes observed have been assigned as *Peridinium willei* Huitfeldt-Kaas, *Peridinium wisconsinense* Eddy and *Peridinium volzii* Lemmermann and *Parvodinium inconspicuum* (Lemmermann) Carty. The latter two cyst-theca relationships were determined by culturing and by the exceptional preservation of thecae of *P. inconspicuum* in varves deposited at times of anthropogenic reductions in dissolved oxygen.

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Graduate Student opportunities

Dissertation Abstracts

Human-Ecosystem Interactions in Relation to Holocene Climate Change in Port Joli Harbour, Southwestern Nova Scotia, Canada

Karen Neil (MSc thesis 2013)
Supervisor: Konrad Gajewski
University of Ottawa

A high-resolution pollen record from Path Lake (43°87'00"N, 64°92'42"W, 10m asl) in Port Joli Harbour, Nova Scotia, Canada, was used to provide a paleo-ecological perspective on Holocene climate and vegetation variability within the context of local archaeological research. Pollen assemblages in the early Holocene reflect a post-glacial forest dominated by Pinus, Tsuga, Betula and Quercus. Shallow water aquatic and wetland taxa increased after 3400 cal. yr. BP in response to wetter climatic conditions. Increased settlement intensity of native inhabitants coincides with late-Holocene climate change at a regional scale, suggesting that environmental conditions may have influenced prehistoric human activities. European settlement, after 350 cal. yr. BP, was marked by a rise in Ambrosia, and peak charcoal accumulation rates after this time showed evidence of human disturbance on the landscape. This study suggests that environmental changes affected human exploitation of the landscape, and that human activity altered forest composition in the late Holocene.

I am seeking two highly motivated graduate students (MSc or PhD) to join my Quaternary paleoecology lab in the Department of Biology at the University of Victoria. Potential research topics include Holocene development of temperate rainforest in Pacific Canada, the past effects of tephra deposition on plant communities, and vegetation-climate-carbon links in BC peatlands using fossil pollen, testate amoebae and geochemical analyses.
A number of other projects are also available as is the possibility of developing a unique research plan. Funding for research and salary is guaranteed.

Ideal candidates will have prior experience in paleobiology and/or plant ecology, a strong academic record, and excellent communication skills. The expected start date is May or September 2014. Interested students should contact me about their research interests and send a CV and unofficial transcripts. More information about graduate studies at the University of Victoria can be found at:

www.uvic.ca/graduatestudies/ and www.uvic.ca/science/biology/graduate/prospective/index.php.

Terri Lacourse
University of Victoria
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Featured article:

NPP- or "what the heck are these things in my slides?"

Francine McCarthy
Brock University

We've all processed samples in order to study our palynomorphs of choice- typically pollen and embryophyte spores- only to find our slides full of other acid-resistant particles and debris. The debris is interesting in itself, with lots of potential insights to be gleaned from the palynofacies, but today I am writing about the recurring particles that are obviously *SOMETHING* that I always planned to identify "someday", if only to satisfy my own curiosity. I was fortunate to become involved with a group of palynologists, mainly from Europe, who actually focus on these non-pollen palynomorphs (usually referred to as NPP or "extrafossils") through Jean Nicolas Haas, and I attended my first NPP workshop in Innsbruck in 2005. I've been focussing on NPP ever since- I even fit Antonella Miola's NPP workshop in Padua into my honeymoon in 2008! The recent publication of special volumes edited by van Geel (2006) and Haas (2010) has helped to highlight the potential of non-pollen palynomorphs for paleoenvironmental and geoarcheological studies, but the vast majority of these palynomorphs are still ignored.

A number of students in my lab have done some interesting NPP work since my "conversion"- Donya Danesh (now a PhD candidate in Brian Cumming's lab at Queen's) and Olena Volik (about to defend her MSc thesis on December 19) studied Lake Simcoe, Andrea Krueger (whose MSc thesis abstract appears in this newsletter) worked on the amazingly well- preserved microfossils in the varves at Crawford Lake, and Matea Drljepan is currently studying an interesting, highly-impacted site near Boston, Massachusetts. In addition, my colleague Kenneth Mertens, now in the Palynology Lab at UQAM, has taken a strong interest in the cysts of freshwater dinoflagellates (Mertens et al., 2012), and we made interesting discoveries by combining germination studies and DNA analyses with traditional palynology (McCarthy et al., 2011; McCarthy et al., 2013)- of which I will write more I a future newsletter. I've summarized some highlights from my students' work in Lake Simcoe and in Crawford Lake, Ontario, below.

NPP, particularly the remains of various groups of phytoplankton, are abundant and well-preserved throughout Lake Simcoe, in sediments dating back to glacial Lake Algonquin. NPP assemblage changes correlate with vegetation change recorded in the pollen record over the last 14,000 years, illustrating the sensitivity of NPP to large-scale environmental change (Figs. 1, 2). NPP record changes in physical limnology and nutrient availability that are attributed to changes in the watershed and to hydrological events that affected Lake Simcoe since deglaciation, including the drawdown of Lake Algonquin, the early Holocene drought and mid Holocene hemlock crash (both have a very similar NPP signature, supporting the hypothesis that drought caused the decline in hemlock) (Volik, submitted).

The largest impact on NPP in both the main basin of Lake Simcoe and in Cook's Bay resulted from anthropogenic activities in the

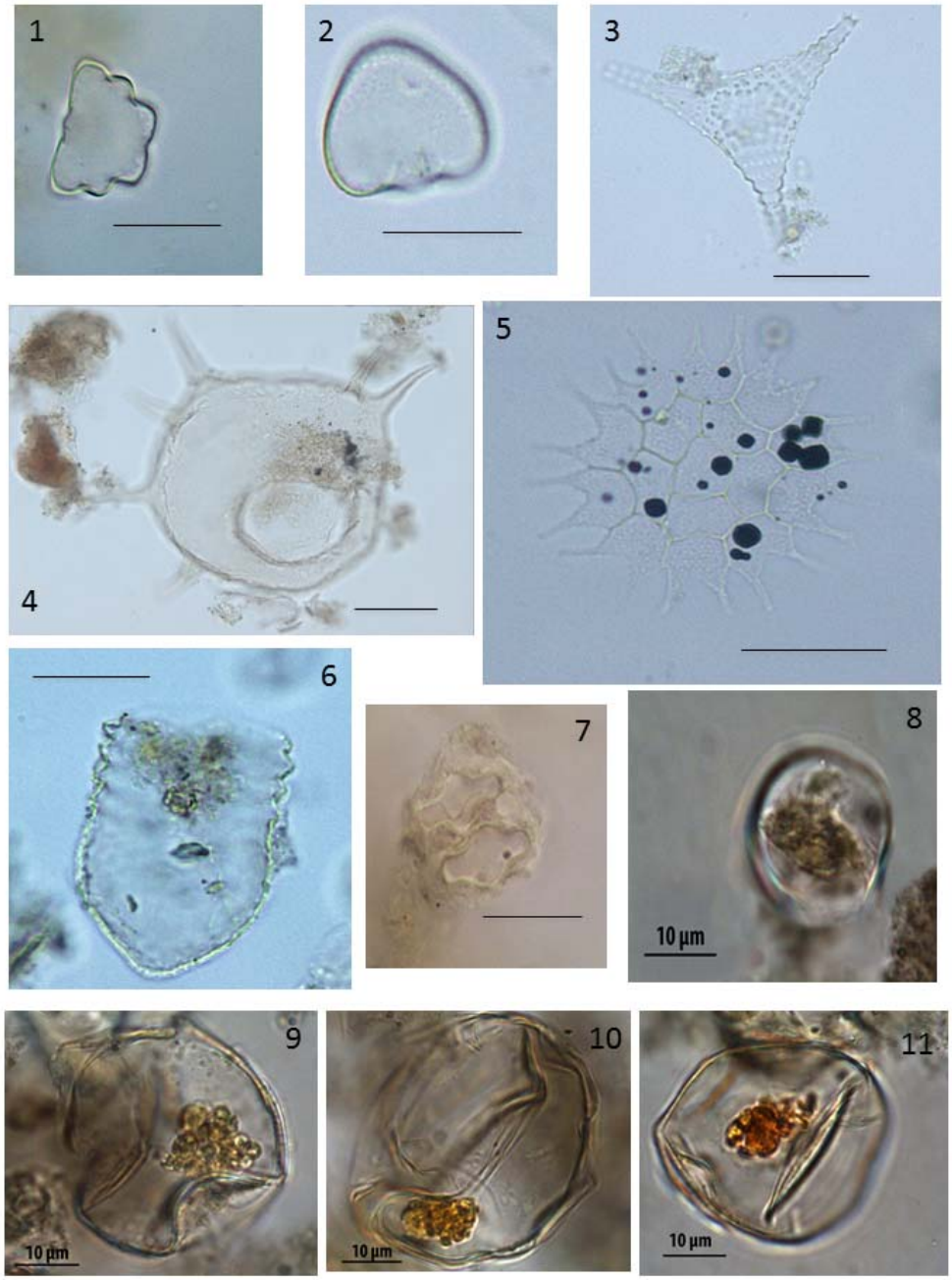

Fig. 1. Common NPP in palynological preparations from Cook's Bay, Lake Simcoe; scale bars represent 10µm except in figure 4 the scale bar represents 20µm (from Danesh et al., 2013). Specimens 1 – 3 are desmids, 7 – 11 are dinoflagellates, and 4 and 6 are protozoans.
1. *Euastrum* sp. (95-96 cm) mid-view, 2. *Cosmarium* sp. (95-96 cm) high-view, 3. *Staurastrum* sp. (95-96 cm) mid-view, 4. *Centropyxis constricta* (95-96 cm) mid-view, 5. *Pediastrum* (84-85 cm) mid-view, 6. *Codonella cratera* (24-25 cm) mid-view, 7.*Saccharum* sp. (30-31 cm) mid-view, 8. *Parvodinium inconspicuum* (14-15 cm), 9. *Peridinium wisconsinensis* (14-15 cm), 10. *Peridinium willei* (29- 30 cm), 11. *Peridinium volzii* (29-30 cm).

catchment (Fig. 3). By comparing the NPP assemblage changes with pollen and elemental analysis, we were able to identify the impact of a number of major human activities: initial Euro-Canadian settlement, the draining of the Holland Marsh (that still produces a significant percentage of the vegetables grown in the province), and the post-war boom that saw population in the area increase five-fold since the 1950's, with large rapidly-growing urban centres like Barrie, Orillia, Newmarket, and Aurora in the Lake Simcoe catchment (Danesh et al., 2013).

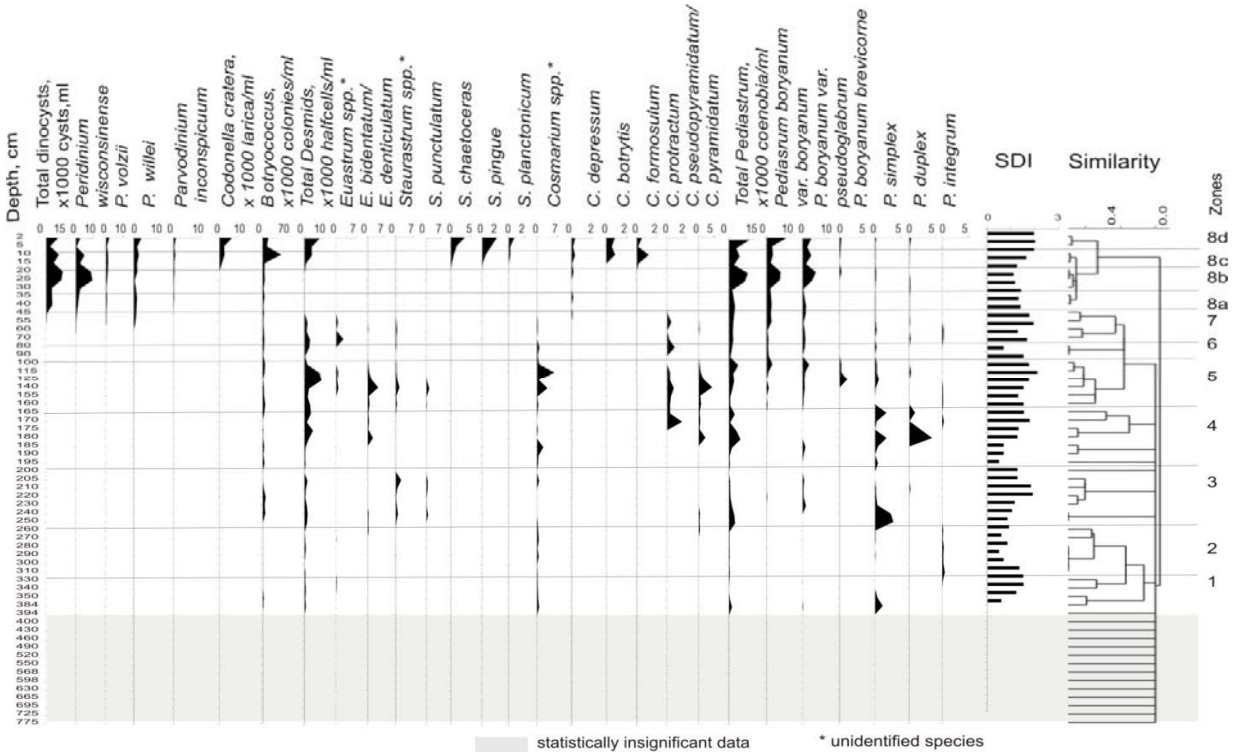

Fig. 2.a) **Assemblages of algal NPP in the upper 380 cm of core LS07 PC5 from the main basin of Lake Simcoe;** samples below this, attributed to glacial Lake Algonquin, were barren of NPP (from Volik, submitted).

One of the best NPP records is preserved in Crawford Lake, where meromixis has produced a Holocene Lagerstätte. Microfossils that are rarely preserved elsewhere, such as rotifer lorica (Turton and McAndrews, 2007), are abundant, in addition to more readily fossilizable microfossils, such as diatoms (Ekdahl et al., 2004, 2007) and pollen (McAndrews and Boyko-Diakonow, 1989; Boyko-Diakonow 1979; Boyko, 1973) (Fig. 4). The absence of bioturbation allowed annual couplets consisting of a white calcite-rich layer and a dark organic-rich layer to accumulate over the past ca. 2000 years (Dickman, 1979; Yu, 2003), and varve counting provides a very precise chronology, allowing the microfossil record to be compared with historic and archeological data. Iroquois (~AD 1286 – 1486) and Euro-Canadian (since ~ AD 1820) agriculture and land clearing are recorded by microfossils like corn pollen and smut (*Zea* and *Ustilago maydis*), sunflower (*Helianthus*) and ragweed (*Ambrosia*) (McAndrews, J.H., Boyko-Diakonow, M. 1989; McAndrews and Turton, 2010). As we saw in an issue of the CAP

newsletter several years ago, increased nutrient input to Crawford Lake may be largely attributable to Canada geese (*Branta canadensis)* that grazed on the fields in the fall, and then roosted at Crawford Lake depositing dung pellets rich in seeds, pollen and spores from cultivated crops (McAndrews and Turton, 2007). This cultural eutrophication produced permanent changes in the limnology of the lake when the 200- 300 Iroquois first settled the area ~15o m from the lake in the 13th C (Byrne and Finlayson, 1998), affecting both primary producers and herbivores (e.g., Ekdahl et al., 2004, 2007; Turton and McAndrews, 2006), and increased BOD further depleted the bottom waters of oxygen, although episodic reduction in benthic anoxia in the interval between the two phases of human settlement in the catchment may have interrupted varve formation(Chan, unpublished benthic ostracode data), explaining the observation that ~10% of the varves are missing in the Post-Iroquoian Zone when compared to AMS dates Ekdahl et al. (2004, 2007).

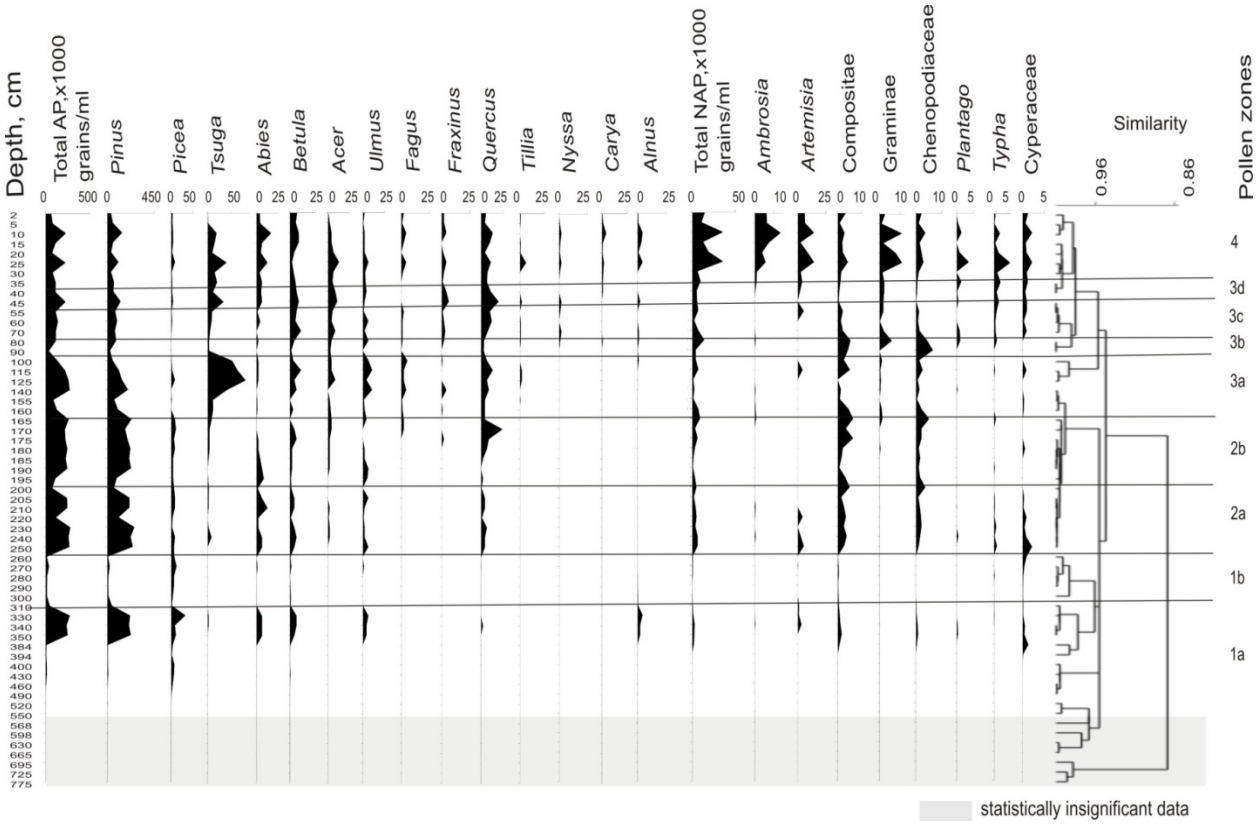

Fig. 2.b) **Pollen in core LS07 PC5, zoned following McAndrews (1994).** Most pollen zone boundaries are associated with changes in the NPP record, illustrating the sensitivity of these little-known fossils to changes in physical limnology and nutrient availability (Volik et al., submitted).

We recently documented the fossil record of dinoflagellates in the varved sediments from a freeze core collected in February, 2011 using a "frigid fingernail" sampler with the help of Jock McAndrews, Charlie Turton, Jean Nicolas Haas, Calvin Chan, Sarah Finkelstein, and others (Krueger, 2012;

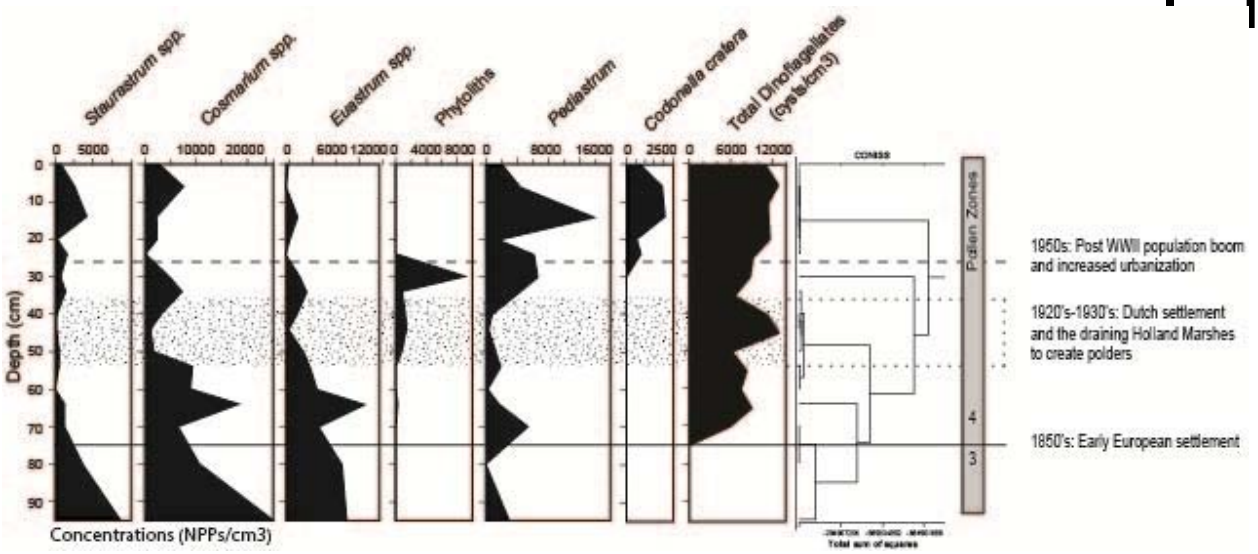

Fig. 3. **Up-core changes in the abundant NPP preserved in the upper metre in Cook's Bay** were related to human impact the Lake Simcoe catchment using elemental and pollen analysis; stippling highlights the influx of sediment and limiting nutrients associated with the drainage of the Holland Marsh to produce polders for agriculture (Danesh et al., 2013).

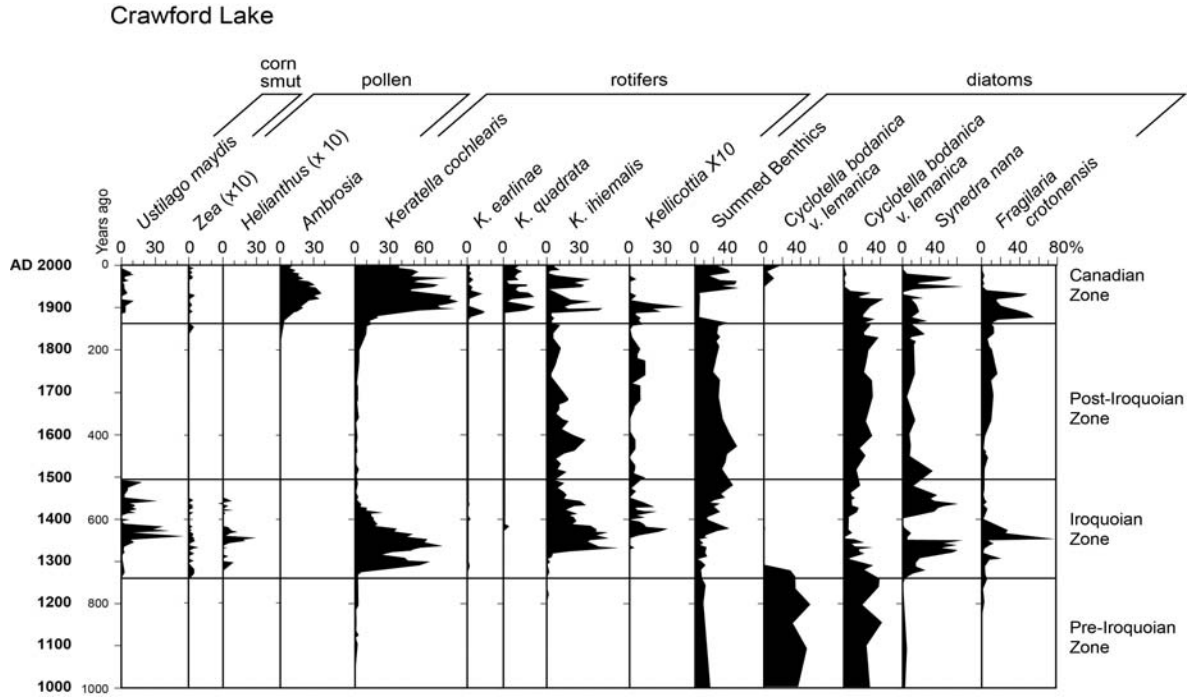

Fig. 4. **Summary of microfossils in varved sediments from Crawford Lake,** showing evidence for two separate phases of human settlement in the catchment (e.g., corn smut- a pathogenic fungus that attacks corn, and pollen associated with agriculture and land disturbance, e.g. corn, sunflower and ragweed; from McAndrews and Turton, 2007, 2010) and for cultural eutrophication of the lake (rotifer lorica from Turton and McAndrews, 2006 and diatoms, from Ekdahl et al., 2007). Although there is microfossil evidence of improved water quality since the site was taken over by the Halton Region Conservation Authority in 1972, the lake has not returned to pre-disturbance conditions.

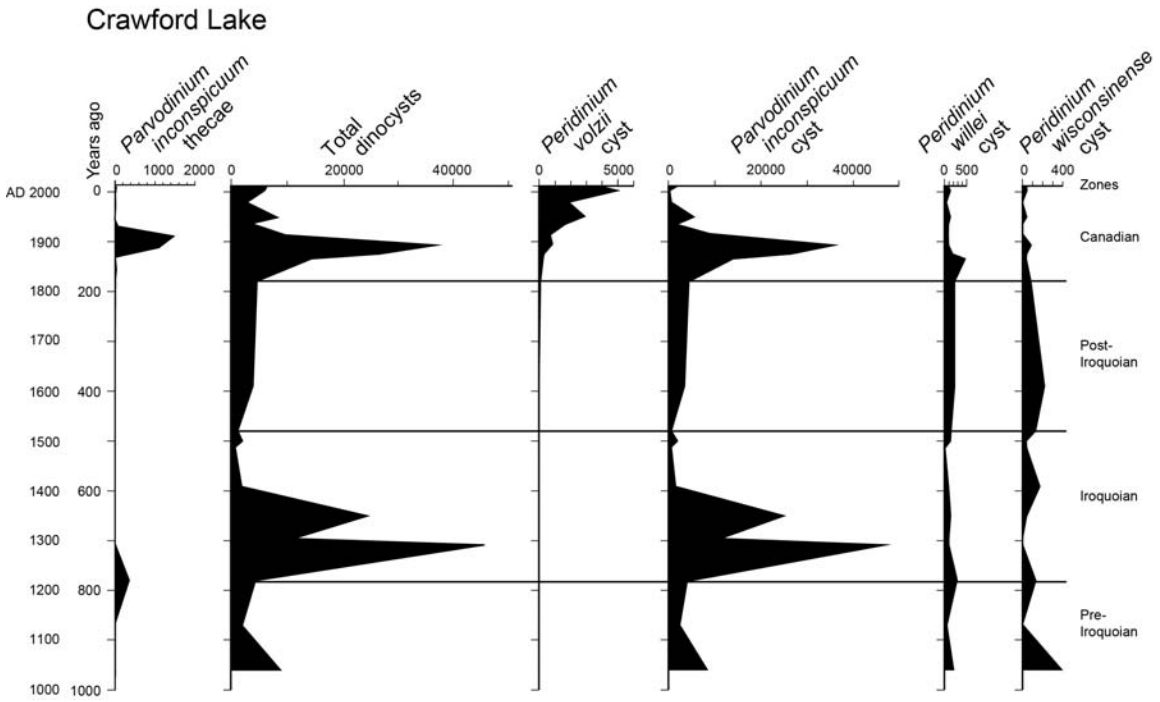

Fig. 5. **Cysts and rarely fossilized thecae of dinoflagellates (shown as absolute abundances per ml sediment measured by liquid displacement) in varved sediments from a freeze core collected in February, 2011** (Krueger, 2012). Peak dinocyst abundances near the base of the Iroquoian zone suggest that the peak impact on the lake ecosystem was shortly after the village of 200- 300 people was settled (Byrne and Finlayson, 1998), and peak impact in the Euro-Canadian phase coincides with operation of the lumber mill in the south end of Crawford Lake during the late 19th C (Crawford Lake Conservation Area, 2011). The presence of thecae in varves dated to ~1220 and 1850-1910 A.D. suggests extreme anoxia at these times and a slightly earlier data for occupation of the Iroquoian village than previously published.

McCarthy and Krueger, 2013). As mentioned in a previous issue of the CAP newsletter, film footage of coring from the ice surface and subsampling can be viewed at: *http://www.theweathernetwork.com/news/storm_watch_stories3&stormfile=ontario_lake_holds_climate_c_040411*.

Peak abundances of dinoflagellate cysts were associated with the two phases of human settlement, and cellulosic thecae of *Parvodinium inconspicuum* (Lemmermann) Carty were exceptionally preserved in the mid-13th and late 19th C. (Fig. 5). Reports of fossilized cellulosic dinoflagellate thecae are extremely rare and always associated with exceptional conditions, such as preservation in amber (Masure et al., 2013). The affinity of the abundant tiny (c. 16–20 mm in diameter), unornamented cysts in these sediments was confirmed when two samples excysted during an unplanned hiatus in palynological processing, and meiosis was observed in *Parvodinium inconspicuum* (Fig. 6). Small (c. 30 ×40 mm), slightly ovate cysts previously recorded as "*P. willei* small" were attributed to *Peridinium volzii* Lemmerman when their thecae were observed in the germinated samples (Krueger, 2012; McCarthy and Krueger, 2013). The affinities of the other two common cysts, *Peridinium willei* Huitfeld Kaas and *Peridinium wisconsinense* Eddy, had previously been established (Wall and

Dale, 1968; McCarthy et al., 2011; McCarthy et al, 2013) through controlled germination and LSU and SSU rDNA analysis of single cysts. I hope that the examples I provided will inspire you to pay more attention to the palynomorphs you may have been considering a nuisance until now - they may have lots to tell!

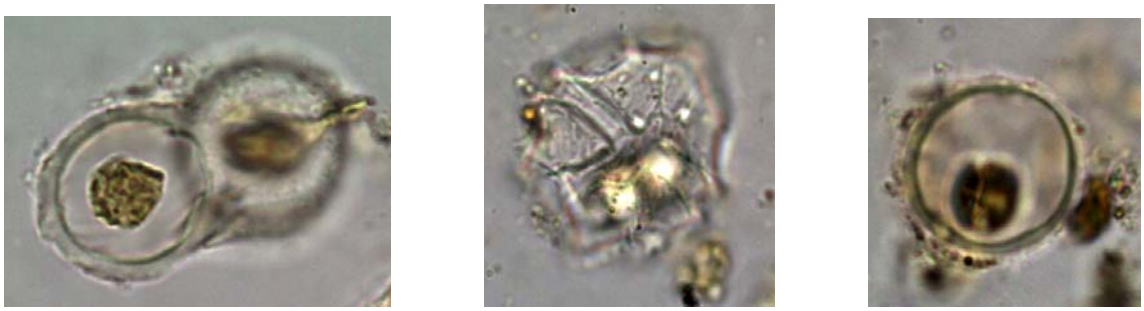

Fig. 6. Two samples (the oldest one from varves deposited ca. 1820 A.D.) germinated and meiosis was observed in *Parvodinium inconspicuum* (Lemmermann) Carty, producing a peanut-shaped zygote (*left*) as previously documented by Pfiester et al. (1984). This, together with the exceptional preservation of cellulosic thecae with viable cell contents (*centre*) allowed the identity of tiny (c. 16–20 mm diameter), unornamented cysts (*right*) that are abundant in the sediments from Crawford Lake to be determined (Krueger, 2012; McCarthy and Krueger, 2013)

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** denotes a CAP Member*

Compiled by
Alwynne Beaudoin & Florin Pendea

PALYNFO

CONFERENCE FUNDING FOR STUDENTS

Dear CAP members,

The IFPS has agreed to support student participation at the upcoming 4th International Palaeontological Congress (IPC) to be held in Mendoza, Argentina 28th September – 3rd October 2014 (details on the following website: [http://www.ipc4mendoza2014.org.ar].
A budget of $4000 US Dollars has been set aside from IFPS funds to be awarded to students (M.Sc. or Ph.D.) presenting palynological results (talk or poster). Each student will be awarded $500.00 to be presented at the conference.

The IFPS has also agreed to support student participation at the upcoming Ninth European Palaeobotany Palynology Conference (EPPC) to be held in Padova, Italy 26th-31st August 2014 (details on the following website: [http://www.geoscienze.unipd.it/9th-european-palaeobotany-palynology-conference]. For this conference funding up to $2000 US Dollars has been set aside from IFPS funds to be awarded to four students (M.Sc. or Ph.D.) presenting palynological results (talk or poster).

Students wishing to apply should e-mail a covering letter (no more than one page of A4) along with their talk/poster abstract to Jim Riding (IFPS Secretary-Treasurer). The covering letter should briefly explain which IFPS affiliated society the student is a member of and the nature of their palynological contribution to the meeting. Applications for IFPS support should arrive before 1st April 2014.

Please forward applications to:
Dr Jim Riding [jbri@bgs.ac.uk]
(Secretary-Treasurer IFPS)
British Geological Survey

PALYNFO

Obituary

Dr. Leonard V. Hills (1933-2013)

Dr. L.V. Hills, Professor Emeritus at The University of Calgary passed away on August 4th, 2013. Len was one of the Founding Fathers of the Department of Geosciences, and taught from 1966 through 1996, but continued to be active in undergraduate and graduate activities right up to his passing.

Len was born in Judah, Alberta in 1933 a short distance from the Peace River. He attended class through Grade 9 in a single teacher school and helped out extensively on the family farm. His interest in geology began as a geophysical crewmember in 1951, and shortly thereafter he enrolled at the University of British Columbia where he received his B.Sc. (Honours) in 1960, followed by a M.Sc. in 1962. He then began his Ph.D. studies at the University of Alberta under the guidance of Dr. Charles Stelck. Len subsequently graduated in 1965. After working for a very short time as an exploration palynologist with Shell Canada, he joined the young geoscience faculty at the University of Calgary in 1966 where he remained active until most recently.

During his time at The University of Calgary, Len taught 18 different courses in Geology at both the undergraduate and graduate level. He directly supervised 15 Ph.D.'s, 80 M.Sc.'s and 41 undergraduate theses: it is further documented though, that he served as supervisor or examiner on well over 330 Ph.D. and M.Sc. committees in Geology, Biology and Archeology. In 1995 Len was awarded the University of Calgary Graduate Students Association Teaching Excellence

Award. In 2003 Len was awarded the Order of University of Calgary for all his teaching efforts. During his tenure at the University, he was also an Adjunct Scientist at the Royal Tyrrell Museum of Palaeontology, and an Adjunct Professor in the Faculty of Environmental Design (U. of C.).

Over his academic career, Len published over 200 peer-reviewed articles, mostly in Geology but also on topics in Biology and Archeology. Len is likely best known as co-author of the Jansonius & Hills Genera Card File of Fossil Spores and Pollen. He also co-authored many articles which appeared in Palynology, and co-authored an AASP Foundation Contributions Series. Len was co-Chief Organizer of the 1984 International Palynological Congress which was held in Calgary. Many of Len's Ph.D. and M.Sc. students have gone on to extremely successful careers in palynological research, and in the petroleum industry worldwide. Len served as President of the Canadian Society of Petroleum Geologists in 1979, Editor of the CSPG Bulletin from 1967-1976, he edited CSPG Memoirs 2 and 3, a 1978 CSPG fieldguide on the rock formations of southern Alberta (among many other fieldguides), the Lexicon of Canadian Stratigraphy (v.2: 1981) and the 1989 Geophysical Atlas of Western Canada Hydrocarbon Pools. He was honored with the CSPG President's Award in 1980 for outstanding service to the Society, and was made an Honorary Member of the CSPG in 1996.

Len's scholarly passions and interests extended well beyond palynology. From the years 1978 through 1982 he was Editor of the journal Arctic (the journal of the Arctic Institute of North America). For his duties he was named a Fellow of the Institute in 1980. Len was also longtime Chair of the Northern Studies Committee and assisted numerous students obtain funding through the Northern Scientific Training Program. After his retirement from full time teaching, he became very involved with the Calgary Chapter of the Archeological Society of Alberta investigating Pleistocene animal trackways, and studying the interaction of humans with the extinction of horses and camels in North America. Len was very interested in the migration pathways of the trumpeter swan through southern Alberta, particularly as they migrated through the small lakes and ponds near his home just west of Calgary: his work was documented through numerous interviews for the major TV networks in Calgary. During geological fieldtrips for the students, Len's teaching went well beyond geology involving aspects of geography, archeology, and Alberta history. Since his youth when he learned to hunt, he was a lover of the outdoors. One story which sticks in my mind was when he went hunting on a snowy Saturday late in the Fall. He said he found a tree stump and sat down to simply admire his wondrous natural surroundings: it was several hours later when he finally realized he was completely covered with snow. He did not find any game, but he said it was still a great day.

For those of us who were fortunate to have studied under Len, we all know the efforts he put forward and the sacrifices he made for us. For those who were fortunate to cross Len's path in life, they were most likely rewarded with one of his wonderful stories over a cup of coffee. The University of Calgary has lost an exemplary Professor, the geological community has lost a great colleague, and many of us have lost a great friend and mentor.

Respectfully submitted:
Thomas D. Demchuk (Houston, TX)
Dennis Braman (Drumheller, AB)
Hans Speelman (Calgary, AB)
Art Sweet (Calgary, AB)

2013 REPORTS OF CAP EXECUTIVE DIRECTORS

CAP PRESIDENT'S REPORT

As you may know, CAP was initially registered as a Joint Stock Company (i.e., an official incorporation) in Nova Scotia in 1986, although the Association had been active since 1978. The Association was registered in Nova Scotia because the then Secretary/Treasurer (Rob Fensome) resided in Nova Scotia. The Association has continued under that arrangement since 1986, filing financial statements and AGM minutes each year, without issue. However, in March 2013, the Nova Scotia Registry informed the Association that our registration status requires us to hold Annual General Meetings in that province each year. No exceptions to this requirement can be made, despite the fact that the Association functions as a national non-profit society. Clearly, it is not practical to hold Meetings in Nova Scotia each year. The Executive Committee is currently exploring the Association's registrations options (e.g., as a federally registered non-profit organization) and considering the tax implications of these options, with Mary Vetter (current Secretary/Treasurer) leading these important efforts. The Executive Committee will keep the membership appraised of this issue and plans to report on the appropriate path forward in 2014.

Below is a brief report on other major CAP activities since the last Annual General Meeting, which was held May 29, 2012, in conjunction with the GAC-MAC Joint Meeting in St. John's.

In March 2013, CAP awarded its Annual Student Research Award for the fifth time. The Award is valued at $300 and the recipient's membership is also extended at no charge for an additional three years. An adjudication committee consisting of Alwynne Beaudoin, Sarah Finkelstein, and myself (as Chair) evaluated the applications we received based on three main criteria: 1) quality of the research statement; 2) importance and novelty of the research; and 3) excellence of the applicant. After considerable deliberation, we decided to confer the 2013 Award to Emily Helmer (Department of Biological Sciences, Simon Fraser University) for her M.Sc. research entitled "*High Resolution Record of Post-Glacial Paleoecology in Haida Gwaii*." One concern I have about the Award is the low number of applications we receive each year: only two to four applications in each of the five years we have held a competition. Moving forward, the Association should consider ways to raise the profile of the Award and garner more interest from students in palynology.

CAP sponsored a Special Session at the 2013 CANQUA meeting in August, entitled "*The Paleoecology of Extreme Environments*" and chaired by Alwynne Beaudoin and Mary Vetter. Members should see a report on this session in an upcoming *CAP Newsletter*.

Over the last year and a half, Alwynne Beaudoin and I have served on the Organizing Committee of the joint 2013 AASP-CAP-Dino10-NAMS Conference in San Francisco. The Co-Chairs of this committee and main conference organizers are Lanny Fisk (AASP President-Elect) and Joyce Lucas-Clark. In addition to trying to help with conference organization, Alwynne and I organized a session on "*The Palynology of Sudden Events*" with two invited speakers: Kam-biu Liu (Louisiana State U.) and Florin Pendea (Lakehead U.).

Many thanks to all members of the Executive Committee for their dedicated efforts in running our Association. My term as President will end this December. It has been my pleasure to serve the Association in this capacity, and previously as President-Elect (2010-2011) and Newsletter Editor (2006-2011).

Respectfully submitted,
Terri Lacourse
CAP President, 2012-2013
October 11, 2013

STATEMENT BY APPOINTED AUDITOR

I have reviewed the financial statements for CAP

and it is my opinion that the documents and report submitted represent a full and fair account of the financial affairs of the Canadian Association of Palynologists for the period May 2012 to October 11, 2013. I consider the financial affairs of CAP to be in good order.

Sarah A. Finkelstein
Associate Professor
Dept of Earth Sciences, University of Toronto, Toronto, ON October 11, 2013

CAP Newsletter Editor's Report

Since my last report, two issues of the CAP Newsletter have been produced. The December 2012 Newsletter (Vol. 35, No. 2) had 18 pages and was distributed to CAP members on January 1, 2013. Most notably, the December 2012 newsletter featured an article on programming interfaces in paleoecology by S. Goring (University of Wisconsin) and dissertation abstracts by K.R. Miskelly (University of Victoria) and S. Goldsmith (University of Calgary). "Members in the News" section brought in another great story about Dr. V. Bryant's activity in the field of melissopalynology, while the Mystery Grain section invited members to weigh in on a NPP frequent in peat deposits. As per CAP Bylaws, this issue also included minutes of the 2012 CAP Annual General Meeting.

The May 2013 Newsletter (Vol. 36, No. 1) was distributed to members on May 28, 2013. It consisted of 13 pages and included an article on the 2012 CAP Student Research Award winner Emily Helmer from Simon Fraser University as well as dissertation abstracts by P. Keizer and Nathalie Paquette, both from University of Ottawa. The President's Message, New Labs, Recent Publications, and Palynfo sections brought up-to-date information to the Canadian palynological community. This issue also featured a beautiful Palynolit piece by Alwynne Beaudoin from Suttcliff's "Chronicles of Robin Hood".

I would like to remind our members that our past Newsletters are available in electronic format on the CAP website. Contributions for the next issue of the Newsletter will be accepted until November 15, 2013.

Respectfully submitted,

Florin Pendea
CAP Newsletter Editor
October 4, 2013

CAP Website Editor's Report

I have continued to maintain the website since the last AGM. During the past year, accesses to the presentation have usually hovered around 500 each month.

The presentation provides various resources and information about CAP to the palynological community. I continue to update time-sensitive sections, such as the conference listing and various announcements. Information about the CAP Student Research Award and the application process, as well as a year-to-year record of the Award recipients, is also included. Back issues of recent *CAP Newsletters* (though not the latest issue) are archived, making them available to members over the long-term. I have maintained the author listing and index to past *CAP Newsletter* issues.

There has been one significant addition to the website this year. In response to a request for information, I have added a page providing details of the many sessions that CAP has sponsored at conferences through the years. The page can be found at http://www.scirpus.ca/cap/cap_sessions.htm. It is still incomplete and I would appreciate help to fill in the blanks for some sessions.

I would be happy to include more CAP-related material in the web presentation, especially more images. I would be pleased to receive suggestions or content for new components to broaden its appeal. If CAP members agree, I am prepared

to serve as the Association's Website Editor for another year.

Respectfully submitted,
Alwynne B. Beaudoin
CAP Website Editor
September 14, 2013

CAP SECRETARY/TREASURER'S REPORT

Membership Report:
As of 4 October 2013, CAP has 65 members in good standing who have paid dues for 2013 or who have received a free membership as a result of winning a CAP Student Award. The chart

Year	Members
2004	43
2005	36
2006	47
2007	51
2008	58
2009	66
2010	64
2011	66
2012	65
2013	65

above shows our membership over the past ten years. I would like to extend a special welcome to our new members in 2013: Zhen Li, SKLEK, East China Normal University, Shanghai, (Zhen is currently living in Canada) Ayobami Babalola Oyelami, Global Energy Company, Lagos, Nigeria, Jessie Vincent, University of New Brunswick, Fredericton, NB.

Financial Report:
For the period ending 4 October 2013, the balance in the CAP account is $6,843.83 (compared to $6,982.72 at the 2012 AGM). Of this amount, $590 represents pre-paid memberships for future years. IFPS dues ($1.50 USD per member) have been paid through 2013. In general, membership receipts during the year balance expenditures.
The closing balance includes 59 prepaid annual memberships in the amount of $590.00 for the years 2014-2021. This will affect the income from this source for the years indicated. 2013 IFPS dues have been paid.

Recommendations:
CAP's financial position allows us to continue to support, in a modest way, outreach initiatives at conferences (*e.g.* coffee breaks) and sponsor sessions.

Respectfully submitted by

Mary A. Vetter
CAP Secretary/Treasurer
October 4, 2013

Financial Statement 2013

Financial Statement: 16 May 2012 – 4 October 2013			
	Income	**Expenses**	**Balance**
Opening balance			**$6,982.72**
Bank interest	$1.02		
Memberships	$586.76		
CAP Annual Registration Fee		$28.59	
2013 IFPS membership dues		$98.08	
2013 CAP Student Award		$300.00	
CANQUA coffee break sponsorship		$300.00	
Closing balance	$587.78	$726.67	**$6,843.83**

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:_____

_____

_____

Tel:_____ FAX:_____

E-mail:_____

Web page URL:_____

Research interests:_____

_____

_____

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 ☐