Canadian Association of Palynologists
Association Canadienne des Palynologues

NEWSLETTER

Volume 43 Number 1 May 2020

President's Message

This newsletter would normally come at a time of the year when many of us are in the midst of preparing for fieldwork, laying out plans for research during the summer, and attending national and international meetings. Instead, the COVID-19 situation has thrown a wrench into our plans, both professionally and personally. University campuses, research institutes, businesses, and government offices remain closed, and it is to be seen when life will return to "normal".

One significant aspect of academic life affected by the pandemic has been the attendance of meetings and conferences, and with it, the vital scientific and personal exchanges with colleagues. At present, we are planning to hold the 2020 CAP Annual General Meeting at the Geological Society of America (AGS) 2020 conference in Montréal, as suggested in feedback from CAP members. The AGS 2020 is scheduled from 25 to 28 October, and, at the time of writing, will be going ahead as planned. We hope that many of you will be able to attend.

I took over the mandate as President from Audrey Limoges this past January. On behalf of all CAP members as well as the CAP executive I would like to thank Audrey for her dedication to the organization. I would also like to take the opportunity to sincerely thank Jessie Holst Vincent, who has stepped down as Secretary-Treasurer, for her hard work for CAP. I thank the executive committee for their continued work for the association: Francine McCarthy (CAP Councillor to IFPS & Interim Secretary-Treasurer), Florin Pendea (Newsletter Editor), and Manuel Bringué (Website editor). Your dedication and commitment, collegiality and time-investment is very much appreciated. You all contribute greatly to CAP's success within the palynological community, both within Canada and internationally.

As in 2019, we this year again received some strong applications for the CAP Annual Research Student Award. It is thus my pleasure to congratulate our 2020 awardee Cale Gushulak from Queen's University for his research on the Holocene climate history of Ontario's northern boreal forest. I would also like to thank all applicants and the evaluation committee for contributing to this competition.

Lastly, I encourage all of you interested in any given position of the executive committee to express their interest. Notably, we are seeking applications for a new President-Elect, as well as a new Secretary-Treasurer. As you likely know, CAP, under the leadership of CAP's Councillor to IFPS, Francine McCarthy, is currently preparing a bid to host the 2024 International Palynological Congress (IPC) in Toronto. CAP welcomes suggestions on potential special sessions, workshops or field trips for this event. Likewise, we encourage all CAP members to provide feedback and ideas that will promote the field of palynology both nationally and internationally. Please do not hesitate to use our website, bi-annual newsletter and twitter account to share content and opportunities.

With best wishes for the summer!
Sincerely,
Anna Pieńkowski
Norwegian Polar Institute

CAP EXECUTIVE 2020

President: Anna Pieńkowski
President elect: vacant
Secretary-Treasurer: vacant
Website Editor: Manuel Bringué
Newsletter Editor: Florin Pendea

ISSN 1188-3596

Editor's Notes

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

V. Bryant, M. Velez Caicedo, J. Galloway, T. Lacourse, F. McCarthy, P. Mudie, A. Pieńkowski, V. Pospelova.

Deadline for Next CAP Newsletter

Please submit items for the next issue of the *CAP Newsletter* (Volume 43, Number 2, December 2020) by November 10, 2020. 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

Table of Contents

President's Message........................1
CAP Executive 1
Editor's notes 2
Meeting Updates.............................2
Postponed meetings..........................4
Dissertations...................................4
Featured article: Crawford Lake... 5
Letters: Mad Honey.........................11
Illustrated letters: Dinocysts from BC..14
Recent Publications.........................15
Palynfo...16
Membership Form...........................17

Professional Meetings Update

There is little doubt that this year's plans have been upended by the pandemic. Yet, meeting planning remains on our mind as the society is timidly opening up. Francine McCarthy has kindly prepared some important meeting updates. Thank you Francine!

25–28 October
GSA 2020
Montréal, Québec, Canada

Francine McCarthy is cohosting a topical session with Brad Hubeny at the **Annual Meeting of the Geological Society of America**, inviting contributions on the environmental and ecological history of Thoreau's iconic Walden Pond and the region. Contributions on the intersection between humans and nature, or changes since Thoreau's time are especially welcome.
Abstract submission and registration are scheduled to open in July for the meeting that is still planned as a face-to-face meeting at the Palais des congrès de Montréal, but with the possibility of adapting to virtual mode if

COVID-19 makes safely meeting in Montreal impossible. Information is updated regularly at: https://community.geosociety.org/gsa2020/home

Walden Pond: From Glaciation to Thoreau and Beyond

Walden Pond, Massachusetts, is an iconic symbol of humanity's place in Nature and one of the most famous lakes in the world, thanks to the writings of Henry David Thoreau. It is also a popular recreational destination for so many tens of thousands of visitors from the greater Boston area. Recent work suggests that inputs from swimmers now represent roughly half of the summer phosphorus budget of the lake. Field studies and sediment records from the lake document declining water quality, invasive species, and global pollution by radionuclides from cold war bomb tests. During the century and a half since Thoreau recorded local natural history observations in *Walden* and his journals, the phenology of local animals, plants, and ice have shifted significantly in response to anthropogenic climate change. Recent investigations into the ongoing story of Walden Pond therefore offer powerful examples of ways in which we have become a geologic force of nature as embodied in the term "Anthropocene." In addition, its historical and cultural significance also make those findings of potentially wide interest among scholars and the general public alike.

Over the past few years there has been a renewed interested my multiple investigators into the Holocene history of Walden Pond and how humans have altered the lacustrine system. Contributions to this session are expected to highlight a compilation of new sediment core investigations into the entire ecological history of Walden Pond, from its origin as a glacial kettle to the anthropogenic changes of recent centuries. In combination with the latest phenological data linked to Thoreau's journal entries, these long-term perspectives will provide a rich context for the modern condition in which humans have become integral components of the lake ecosystem.

IAGLR 2020 Virtual

ONLINE
June 9-11

Focusing on the future

The meeting of the **International Association for Great Lakes Research** that was scheduled June 8-12 in Winnipeg has been reorganized as a virtual meeting: **http://iaglr.org/iaglr2020/**.

Registration is only $50US and will include three days of our live virtual program including plenaries and panel discussions in addition, an online gallery of pre-recorded technical talks and posters will open on June 5 and remain available to registrants through July 5.

Postponed Meetings:

CONFERENCE
XV IPC - XI IOPC
PRAGUE 2020

The **XV International Palynological Congress/ XI International Organization of Palaeobotany Conference,** ***Celebrating 200 Years of Palaeobotany*** initially scheduled September 12-19th 2020 will be held in Prague **May 1st through May 7th, 2021**; see https://www.prague2020.cz/ for updates

Le **congrès de l'ACFAS** (et le **colloque paléo** organisé par Matt Peros) qui a été annulé cette année se tiendra à Sherbrooke (Université Sherbrooke et Université Bishop's) du **3 au 7 mai 2021**: https://www.acfas.ca/evenements/congres

The **10th International Symposium on Testate Amoebae: ISTA 10 Tiny Microorganisms/ Big Data** originally scheduled August 16-20, 2020 in St. Catharines, Ontario, has been postponed to **mid-August 2021**. Anyone already on the mailing list will be provided with updates, but if you wish to be added to the list, contact fmccarthy@brocku.ca

Dissertations

Ph. D. Thesis:
Lacustrine Arcellinida (Testate Lobose Amoebae) as Bioindicators of Arsenic Contamination: A new tool for Environmental Risk Assessment

Nawaf Nasser (2019)
Department of Earth Sciences,
Carleton University

Supervisors:
Jennifer Galloway (Geological Survey of Canada)
Tim Patterson (Carleton University)

Ph. D. Thesis:
Holocene dinoflagellate cysts and other palynomorphs from Northern Hemisphere estuaries : taxonomy, distribution, geochemistry and paleoecological application

Pieter R. Gurdebeke (2019)
Department of Geology
University of Ghent

Supervisors:
Stephen Louwye (Ghent University, Belgium) Kenneth N. Mertens (Ifremer, France) and Vera Pospelova (University of Victoria, BC).

.

Featured Article:

Crawford Lake – *NOT* anoxic???

The great tragedy of science, the slaying of a beautiful theory by an ugly fact.

Thomas Henry Huxley

By ***Francine McCarthy, Brock University***
(with contributions from Brendan Llew-Williams, Autumn Heyde, Andrea Krueger, Nick Riddick, Paul Michael Pilkington, Martin Head, Calvin Chan, Jock McAndrews, Zicheng Yu and Charlie Turton)

It has long been assumed (and often asserted in the literature – e.g., Dickman, 1985; Ekdahl et al., 2007) that waters below the chemocline around 15 m in Crawford Lake are anoxic. In fact, several publications have invoked bottom water anoxia (dissolved oxygen below the threshold required to sustain aerobic aquatic eukaryotes ~0.5mL/L; Gooday et al., 2009) to explain the preservation of largely undisturbed varves (Boyko-Diakonow, 1979; Dickman, 1979, 1985) and exceptional preservation of goose pellets (McAndrews and Turton, 2007), rotifer loricae (Turton and McAndrews, 2006), cellulosic dinoflagellate thecae, and viable dinocysts in the organic fraction of varved couplets deposited nearly 200 years ago (Krueger and McCarthy, 2016). The abundance of benthic diatoms (Ekdahl et al., 2004, 2007) and desmids (McCarthy et al., 2018) in this meromictic lake is inconsistent with this interpretation, but it was generally assumed that these microscopic benthic algae were reworked into the deep basin after death.

The suggestion that the monimolimnion of Crawford Lake was oxygenated, even during phases of Iroquoian and Euro-Canadian settlement (McAndrews and Boyko-Diakonow, 1989) when cultural eutrophication increased biochemical demand, was apparently considered too radical, and a manuscript submitted to a journal by Calvin Chan, Jock McAndrews, Charlie Turton and Zicheng Yu nearly a decade ago was never published (the wise words of T.H. Huxley, quoted above, come to mind!). I was aware of Calvin's discovery of a benthic-dominated ostracod assemblage (identifications confirmed by D. Delorme of CCIW) in sediments from the deep basin (having reviewed the manuscript for the journal and recommending publication) and my then-masters student Andrea and I reported the possibility of at least periodic oxygenation as a personal communication with C. Chan (Krueger and McCarthy, 2016). While we were freeze coring Crawford Lake as part of the quest to identify a type section (GSSP – Global Boundary Stratotype Section and Point) to formally define the Anthropocene Epoch (see the editorial in the June 2019 *CAP Newsletter* by Florin Pendea and the feature in *Nature* in August 2019 by Meera Subramanian), measurements of dissolved oxygen in the water column revealed well-oxygenated water throughout this karstic basin throughout the year (Figure 1). This reminded me of Calvin's benthic ostracod data, and Brendan Llew-Williams began studying the hydrology and water chemistry of Crawford Lake as part of his MSc research in September 2019. All evidence to date points to well-oxygenated groundwater, recharged into the Gasport Fm, at the edge of the nearby Niagara Escarpment, overlain by meteoric water covering the Crawford Lake basin shallower than 15 m– with little/no mixing between these water masses (Llew-Williams, in prep.)

Dissolved oxygen is depleted through the warm season due to biochemical oxygen demand (BOD), but never falls below the threshold required for aerobic respiration. This is consistent with the observation of zo-

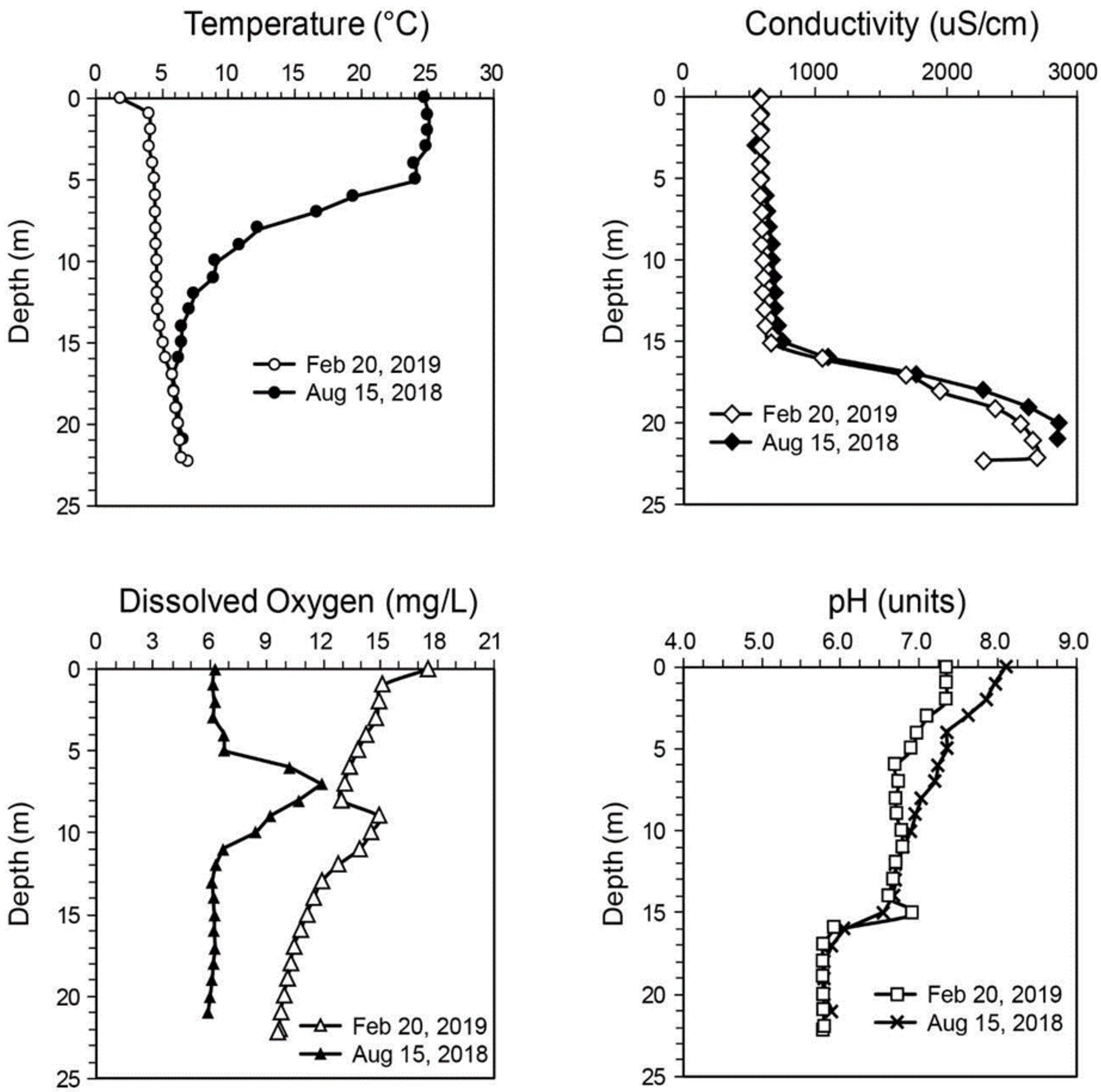


Figure 1. Measurements of temperature, conductivity, dissolved oxygen concentration and pH were taken using a Horiba multiparameter water quality meter from Crawford Lake, Ontario during freezecoring expeditions to define the Anthropocene Epoch. Surprisingly, while temperature, conductivity and pH profiles confirm the existence of a permanent chemocline between 15 and 16 m in the water column, there is no evidence of anoxia (or even hypoxia – DO less than 5 ml/l) in the monimolimnion of this deep, karstic basin.

oplankton (mainly cladocerans and rotifers- Figure 2a) in samples collected through the water column, with by far the highest concentrations just above the lakebed, suggesting that some zooplankton (particularly the cladoceran *Bosmina*) may be detritivores, or may strongly prefer grazing on benthic algae (Heyde, in prep). The DO peak in the mixolimnion identifies high rates of photosynthesis by cyanobacteria, green algae, and dinoflagellates (including the introduced *Peridinium volzii*, Figure 2b; Krueger and McCarthy, 2016), between 6 and 9 meters during mid-August, while high rates of respiration strongly deplete oxygen in the rest of the water column through the summer. A smaller but significant peak was noted just a few meters lower in mid-February, consistent with the observation of phytoplankton and zooplankton in plankton tows beneath the ice, although in much lower concentrations. DO is quickly replenished from the atmosphere throughout the mixolimnion during fall turnover, whereas the relatively constant influx through groundwater allows DO to increase in the monimolimnion through the winter, when respiration and decay are lowest.

The relatively high concentrations of relatively large ostracod valves, including the benthic *Cyprea opthalmica* and *Candona ohioensis,* in freeze cores from the deep ba-

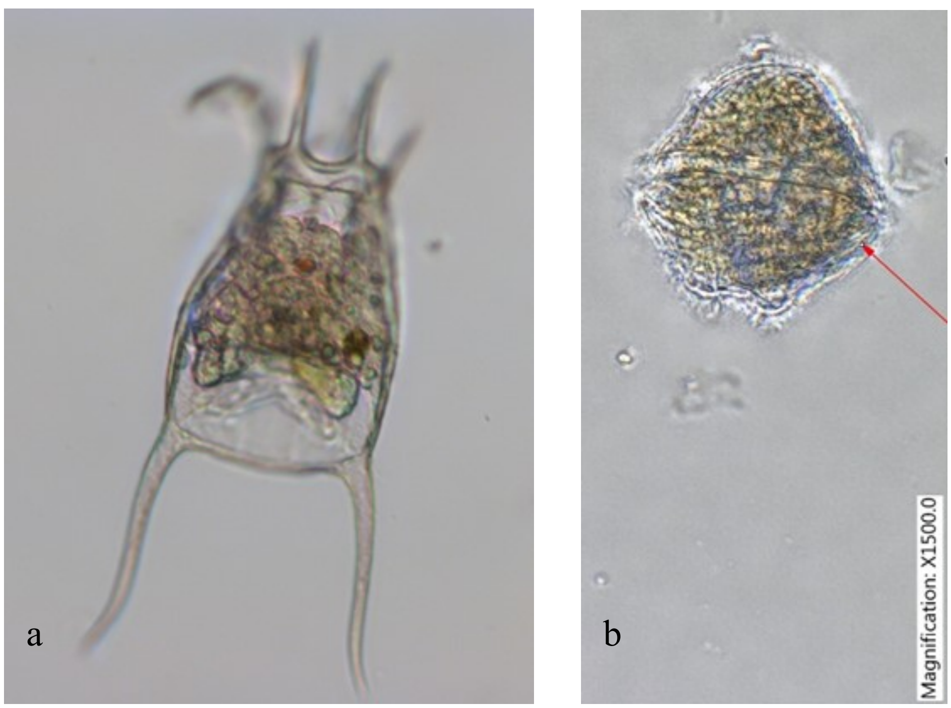


Figure 2. Zooplankton (*e.g.,* the rotifer *Keratella quadrata*) are present in the mixolimnion, where most phytoplankton (*e.g.,* the dinoflagellate *Peridinium volzii*) are found, but they were most abundant just above the lakebed in the deep basin of the meromictic Crawford Lake, confirming oxygenation of the monimolimnion (Heyde, in prep.).

sin (Chan et al., in prep.) illustrates that the varving mechanism is not dependent on anoxia. In fact, the only time that benthic ostracods (or desmids – Figure 3) appear to have been absent from the deep basin was in the latest 19th through earliest 20th century, probably due to extreme BOD caused by waste from the lumber mill at the south end of the lake (Figure 4). It is over this interval that cellulosic thecae of *Parvodinium inconspicuum* were preserved (See Figure 3) and that the rates of benthic diatom valve accumulation reached their lowest values (Ekdahl et al., 2004, 2007). There is no evidence, however, that waters below the chemocline were anoxic – or even hypoxic – except for this relatively short (ca. 50 year) interval, begging the question "*Why do annual organic-inorganic/ dark-light couplets accumulate in the deep basin of Crawford Lake – and not on most of the lakebed, which is shallower than 15 m?"*

Our group in Earth Sciences and Biological Sciences at Brock University, in collaboration Krysten Serak and Emily Farlam-Williams in Tim Patterson's lab at Carleton, and Cale Gushulak and Matthew Marshall and Graham Mushet in Brian Cumming's Lab at Queen's, continues to investigate this unusual meromictic lake with well-oxygenated bottom water to understand the hydrological, geochemical, and biological controls on varve accumulation in the deep well-oxygenated basin of this meromictic lake. For Crawford Lake to be in strong contention to be chosen as the Anthropocene GSSP, the annual resolution afforded by the varves (Waters et al., 2015, 2018) must be shown to be likely to continue to accumulate in the future – at least until this 24 m-deep basin is filled, which I estimate to be nearly

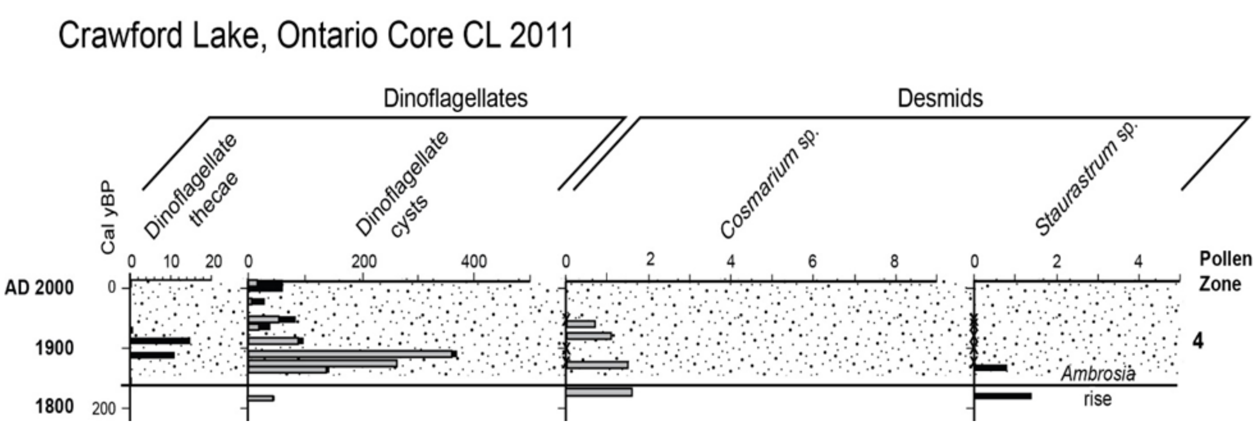


Figure 3. Surprisingly rare bottom water anoxia, in the latest 19th through earliest 20th century, is recorded by the absence of half-cells of the benthic desmids *Cosmarium depressum, C. pseudopyramidatum, C. rectangulare* and *C. variolatum*, and by the exceptional preservation of cellulosic thecae in addition to cysts of dinoflagellates. The prevalence of benthic diatoms and ostracods throughout the past millennium, with this exception of these few decades, suggests that sufficient oxygen typically reaches the monimolimnion through groundwater/ base flow to support aerobic metabolism, except when decay of huge amounts of lumber waste overwhelmed the ecosystem (Llew-Williams, in prep.; Heyde, in prep.). Modified from McCarthy et al. (2018)

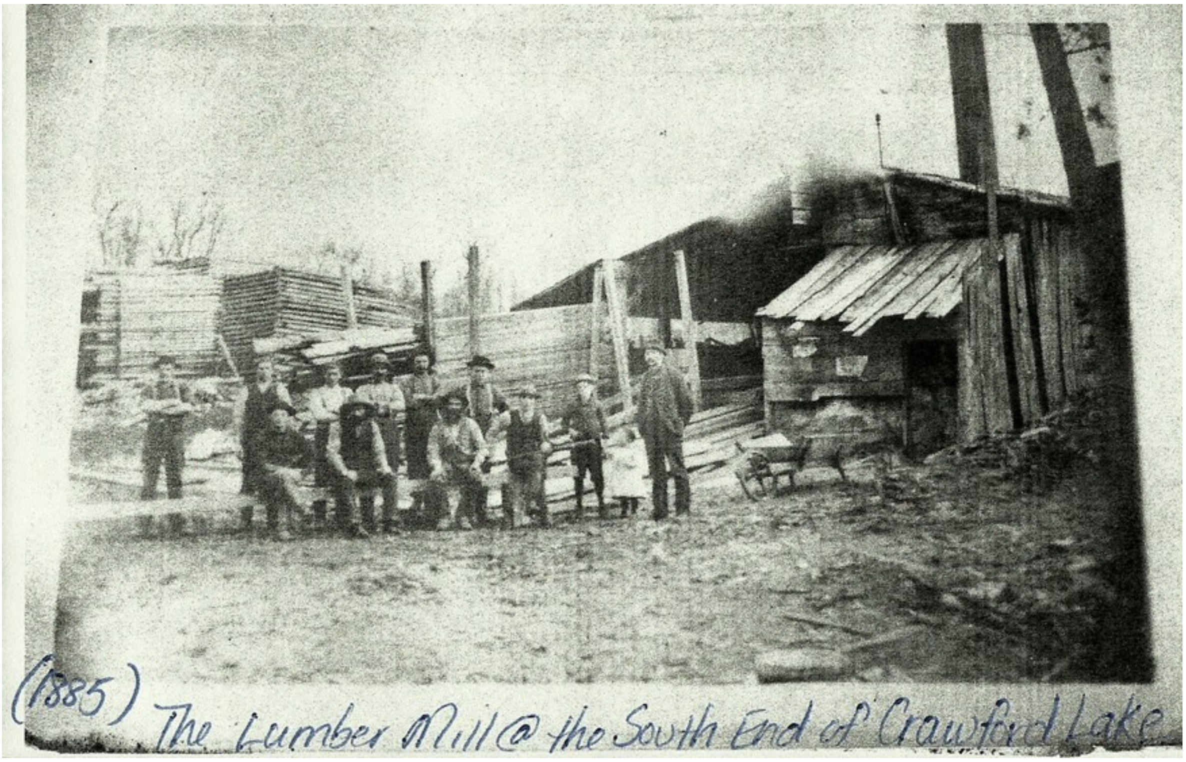


Figure 4. Cultural eutrophication peaked in the late 19th C when a lumber mill operated at the south end of the lake, providing lumber for megaprojects such as the Welland Canal. The only other short intervals of bottom water anoxia occurred in the 13th and 14th centuries, when population of the Iroquoian village appears to have peaked – benthic diatoms were sparse in several samples (Ekdahl et al., 2004, 2007) and a few thecae of the dinoflagellate *Parvodinium inconspicuum* were seen in palynological slides (Krueger and McCarthy, 2016). Photo credit: Crawford Lake Conservation Area, Conservation Halton.

29000 years at the average rate of accumulation over the past millennium!

References Cited

Boyko-Diakonow, M., 1979. The laminated sediments of Crawford Lake, southern Ontario, Canada. In: Schluchter, C. (Ed.), Moraines and Varves. A. A. Balkema, Rotterdam, pp. 303-307.

Dickman, M.D. 1979. A possible varving mechanism for meromictic lakes. Quaternary Research 11:113-124.

Dickman, M.D. 1985. Seasonal succession and microlamina formation in a meromictic lake displaying varved sediments. Sedimentology 32:109-118.

Ekdahl. E.G., J.L. Teranes, C.A. Wittkop, E.F. Stoermer, E.D. Reavie and J.P. Smol. 2007. Diatom assemblage response to Iroquoian and Euro-Canadian eutrophication of Crawford Lake, Ontario, Canada. Journal of Paleolimnology 37:233-246.

Ekdahl, E.J., J.L. Teranes, T.P. Guilderson, C.L. Turton, J.H. McAndrews, C.A. Wittkop and E.F. Stoermer. 2004. A prehistorical record of cultural eutrophication from Crawford Lake, Canada. Geology 32:745-748.

Gooday, A., Jorissen, F., Levin, L., Middelburg, J., Naqvi A., Rabalais, N., Scranton, N. and J. Zhang. 2009. Historical records of coastal eutrophication-induced hypoxia. Biogeosciences Discussions 6: 2567-2658.

Heyde, A., in prep. The fossil record of consumers in sediments from Crawford Lake – insights into anthropogenic impact on trophic structure around the proposed Holocene-Anthropocene boundary. M.Sc. thesis, Biological Sciences, Brock University.

Krueger, A.M. and F.M.G. McCarthy 2016. Great Canadian Lagerstätten 5: Crawford Lake – a Holocene lacustrine Konservat-Lagerstätte with two-century-old viable dinoflagellate cysts. Geoscience Canada 43:123-132.

Llew-Williams, B., in prep. The physico-chemical characterization of water masses in Crawford Lake, Ontario, and Old Crow Flats, Yukon. M.Sc. thesis, Earth Sciences, Brock University.

McAndrews, J.H. and M. Boyko-Diakonow. 1989. Pollen analysis of varved sediment at Crawford Lake, Ontario: evidence of Indian and European farming. In: Fulton, R.J. (Ed.), Quaternary Geology of Canada and Greenland, Geology of Canada, vol. 1. Geological Survey of Canada, Ottawa 528–530.

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. Palynology 31:9-18.

McCarthy, F.M.G., Riddick, N. L., Volik, O., Danesh, D.C., and A.M. Krueger 2018. Algal palynomorphs as proxies of human impact on freshwater resources in the Great Lakes region. Anthropocene 21:16-31

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

Waters, C.N., Fairchild, I.J., McCarthy, F.M.G., Zalasiewicz, J., Turney, C.S.M., and M. Williams 2018. How to date natural archives of the Anthropocene. Geology Today 34: 182-187

Letters from our distinguished members

Do US Beekeepers need to worry about Mad Honey?

By **Vaughn M. Bryant**
Texas A&M University

Every year I get a few honey samples from beekeepers in Washington State or Florida and occasionally from some location in the mountainous areas of the Appalachian Mountains wanting to know if their honey might be "mad honey." So far, none of those samples has checked out as being mad honey, but the possibility does exist not only in those states but in other regions of the US as well.

Mad honey in the US comes from the nectar of certain species of rhododendron plants upon which honeybees can forage. Worldwide, there are over 1,000 species of rhododendrons and a few other genera in the plant family Ericaceae, which also produce toxic nectar and leaves. Most rhododendron species are native to the Northern Hemisphere, but some are also native to a few areas of Southeast Asia including Australia. Most species of rhododendron and their near relatives such as *Kalmia* (laurel) are toxic to both humans and livestock.

The reasons that US beekeepers don't need to worry too much about their bees producing mad honey is that you need a fairly unique set of circumstances to produce mad honey. First, honeybees that have access to toxic species of rhododendron. In the US, there are toxic species in the western area including *Rhododendron occidentale* (western azalea) that grows from Oregon down through Southern California. There is also *R. macrophyllum* (California rosebay) that grows from British Columbia down to Central California, and *R. albiflorum* (white rhododendron) that grows in British Columbia, Alberta, Washington State, Montana, Oregon, and Colorado. Toxic members of the Ericaceae plant family in the Eastern US, which are very similar to rhododendrons, include mountain laurel (*Kalmia latifolia*) and sheep laurel (*K. angustifolia*). Mountain laurels are common in regions from the panhandle of Florida up through most states in the Eastern United States northward to Maine and into areas of neighboring Canada.

The second needed condition to produce mad honey depends on nature. In areas, mentioned above, there has to be large areas of toxic rhododendron or laurel growing in locations where they are the dominant vegetation. If only a few rhododendron plants are available and other plants are in bloom, the bees will favor the other plants. For some honeybees, the toxic properties of the rhododendron nectar make foraging on the plants an unwelcome necessary when nothing else is in bloom or when an early freeze kills less tolerant flowering plants. If other plants are late to bloom, or are depleted by human construction, honeybees are often forced to forage on these toxic plants. Fortunately, for the bees, most of the nectar in the flowers is diluted with water so the effects of toxicity are usually not fatal for the bees. However, when lots of nectar from these plants is carried back to the hive, where worker bees fan the nectar to reduce the water content, then the result is an increased toxicity of the resulting honey.

Although mad honey poising of people in North America is rare, it sometimes does occur. The main problem is that poisoning from mad honey is often misdiagnosed as being a heart attack or stroke because the main effects include very low heartbeats (bradycardia) and low blood pressure (hypotension). Other common side effects include a tingling sensation in hands and feet, loss of coordination, nausea, weakness, and occasionally convulsions. If correctly diagnosed, because the patient confessed to eating mad honey, the frequent therapy is to use atropine. Depending on the concentration of the toxic ingredients in mad honey (grayanotoxin: a neurotoxin) and the amount of honey eaten, symptoms can occur within minutes or hours. Mad honey poising is rarely fatal and most will recover within 24 hours.

So, why do people eat mad honey? Occasionally, it is by mistake, but today most mad honey is purchased on purpose and consumed for a variety of reasons. One can buy mad honey on the internet, but if so, one cannot guarantee the product is actually mad honey. Most of the mad honey comes from a limited region of Turkey along the Southeastern Black Sea coastal region. There are at least 23 purported reasons to eat mad honey! In areas of Turkey, mad honey is purportedly used for treatments of gastric pains, bowel disorders, hypertension, a cure for cancer, but most often it is used for its suspected hypnotic effects and increased sexual ability. All people are susceptible to the potentially effected by eating mad honey, but the severity of affliction depends on many factors. Both sexes seem to be effected equally, but most cases that reach hospitals are of individuals between the ages of 20-48.

Several years ago, I was fortunate to get a sample of "real mad honey." The sample was obtained by a friend who actually knew a beekeeper in the Black Sea area. I did not eat any of the sample but I did put a drop on my tongue and found it caused a tingling sensation, evidence that it was probably real mad honey. I also found that one could tell the potential potency of mad honey by conducting a pollen analysis.

There are no pollen coefficient values for rhodendrum pollen in honey because it is rarely found in honey samples, except in mad honey. However, we know from the size and shape of the pollen grains and nectar production in the flowers that the pollen is highly underrepresented in honey samples, similar to the underrepresented pollen in sourwood honey. Using "probable" coefficient values for rhodendrum pollen in samples, it appears that as little as 3% pollen in the total sample suggests that more than 50% of the nectar actually came from the nectar of those plants. The higher the percentage of pollen, the more potent the mad honey. The sample I analyzed had about 3% pollen and as mentioned above, it did produce a tingling sensation on my tongue.

Why do we know so much about mad honey? Because humans have known about its properties and effects since at least 401

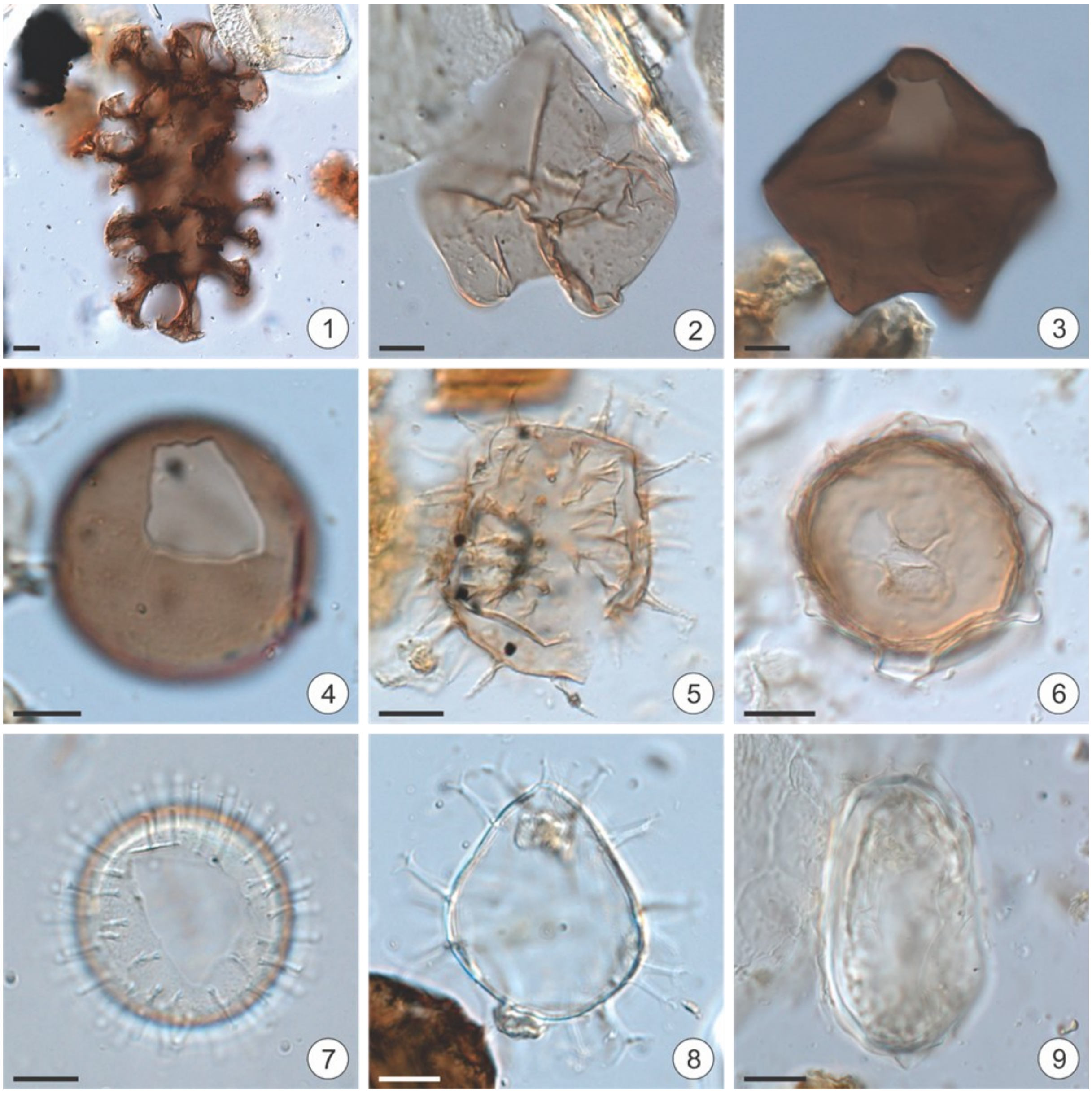
BC. A Greek army was in Colchis located in the Southeastern region of Pontus (Black Sea) chasing the Persians. The Persians invited the Greek generals to a meeting to discuss a truce. When the Greek generals arrived they were killed by the Persians. Xenophon arose from the ranks of the Greek army to lead them home. They marched along the southeastern shore of the Black Sea where Xenophon camped his 10,000 soldiers in a healthy place. They plundered food and drink from the locals and among the foods were large jars of honey, which the Greeks enjoyed with their food. Xenophon reports that after feasting, his soldiers acted like intoxicated mad men. Soon they collapsed all over the ground and did not recover for three or four days after which they resumed their march to Greece. They had fallen prey to the toxic effects in honey produced by the nectar of common rhododendron (*Rhododendron ponticum*), which is a dominant flowering plant in that region of Turkey.

Nearly four centuries later (65 BC) a Roman army led by Pompey the Great marched along the same route taken by Xenophon into Persia. When they reached the area of Colchis, they plundered and feasted on wine and honey, as Xenophon's troops had done. However, this time it had fatal consequences. The Heptokometes of Turkey had planted large supplies of mad honey for the Romans to find and eat, which they did. After feasting, the Romans, like the previous Greeks of Xenophon's army, collapsed and could not fight. The Heptokometes troops returned and killed about 1,000 of Pompey's men.

In 946 AD, Russians chasing Olga of Kiev fell for the same trick the Heptokometes used on the Romans. Mead made with mad honey was given to the Russians by some of Olga's allies, with the same results. Once in a stupor from drinking the tainted mead, Olga's troops fell on the Russians and killed all five thousand. The same thing happened again in 1489 when Russians left tainted mead, which the Tatar soldiers found and believed was in an abandoned Russian camp. The Russians returned and easily killed 10,000 Tatar soldiers who were still in a stupor.

As mentioned earlier, American beekeepers should have little concern about accidently producing mad honey. It is possible, but extremely rare. Nevertheless, we do have young men and women who seek some type of exotic pleasure and purchase mad honey on the internet. Occasionally, I read about some individual who is reported to have been admitted to a US hospital because of mad honey poisoning. Because mad honey is easier to obtain in Turkey, their hospitals annually report a number of cases of mad honey poisoning. In 2002, there were 19 patients admitted for mad honey poisoning. By 2007, the reported number for the previous five years was 120.

Illustrated letters from the Palynological Community



Dinoflagellate cysts from the Holocene of Kyuquot Sound, British Columbia, Canada (see Gurdebeke, 2019 in the Dissertations section on page 4**).**

1. Cyst of *Polykrikos schwartzii* sensu Matsuoka et al. (2009), 15-595; 2. *Votadinium pontifossatum,* 15-600; 3. *Quinquecuspis concreta*, 15-593; 4. *Brigantedinium simplex*, 15-609; 5. *Echinidinium granulatum*, 15-684; 6. Cyst of *Protoperidinium americanum*, 15-684; 7. *Operculodinium centrocarpum* sensu Wall & Dale 1966, KS, 15-609; 8. *Spiniferites bentorii*, 15-609; 9. Cyst of *Alexandrium* sp., 15-684. All images by PRG. Scale bars = 10 µm.

Recent Publications

*denotes a CAP member

*Bringué, M., *Pospelova, V., Tappa, E.J. and Thunell, R.C. 2019. Dinoflagellate cyst production in the Cariaco Basin: a 12 year-long sediment trap study. Progress in Oceanography171: 175-211.

*Galloway, J.M., Vickers, M., Price, G.D., Poulton, T.P., Grasby, S.E., Hadlari, T., Beauchamp, B., Sulphur, K. 2019. Finding the VOICE: Organic carbon isotope chemostratigraphy of the Late Jurassic-Early Cretaceous of Arctic Canada. Geological Magazine: 1-15 (in press, published online first): doi:10.1017/S0016756819001316

Gurdebeke, P.R., Mertens, K.N., *Pospelova, V., *Van Nieuwenhove, N., Louwye, S. 2020. *Islandinium pacificum sp. nov*., a new dinoflagellate cyst from the upper Quaternary sediments of the NE Pacific (Dinophyceae, Peridiniales). Palynology 44 (1): 80-93.

Gurdebeke, P.R., Mertens, K.N.,* Pospelova, V., Matsuoka, K., *Li, Z., Gribble, K.E., Gu, H., Bogus, K., Vrielinck, H., Louwye, S. 2020. Taxonomic revision, phylogeny, and cyst wall composition of the dinoflagellate cyst genus *Votadinium* Reid (Dinophyceae, Peridiniales, Protoperidiniaceae). Palynology 44(2): 310-335.

Luo, Z., Mertens, K.N., Nézan, E., Gu, L., *Pospelova, V., Thoha, H., Gu, H. 2019. Morphology, ultrastructure and molecular phylogeny of cyst-producing *Caladoa arcachonensis* gen. et sp. nov. (Dinophyceae) from France and Indonesia. European Journal of Phycology, 54(2), p. 235-248.

*Mathewes, R.W., *Lacourse, T., Helmer, E.F., Howarth, C.R., and Fedje, D.W. 2020. Late Pleistocene vegetation and sedimentary charcoal at Kilgii Gwaay archaeological site in coastal British Columbia, Canada, with possible proxy evidence for human presence by 13,000 cal BP. Vegetation History and Archaeobotany 29: 297-307.

*McLachlan, S.M.S., *Pospelova, V., *Hebda, R.J. 2019. Areoligeracean dinoflagellate cysts from the upper Campanian (Upper Cretaceous) of Hornby Island, British Columbia (Canada). Palynology 43(4): 669-689.

Miller, C.B., Parsons, M.B., Jamieson, H.E., Arkanaki, O.H., Gregory, B.R., *Galloway, J.M. 2019. Influence of late Holocene climate on soild-phase speciation and long-term stability of arsenic in sub-arctic lake sediments. Science of the Total Environment 709: 136115.

Miller, C.B., Parsons, M.B., Jamieson, H.E., Swindles, G.T., Nasser, N.A., *Galloway, J.M. 2019. Lake-specific controls on the long-term stability of mining-related, legacy arsenic contamination and geochemical baselines in a changing northern environment, Tundra Mine, Northwest Territories, Canada. Applied Geochemistry 109: 104403.

Nasser N.A., Patterson, R.T., Roe, H.M, *Galloway, J.M, Falck, H., Sanei, H. 2020. Use of Arcellinida (testate lobose amoebae) Arsenic tolerance limits as a novel tool for biomonitoring Arsenic contamination in lakes. Ecological Indicators 1;113:106177.DOI: https://doi.org/10.1016/j.ecolind.2020.106177

Nasser, N.A., Cullen, J., Patterson, C.W.,

Patterson, R.T., Roe, H.M., *Galloway, J.M. 2019. Inter-annual Arcellinida (testate lobose amoebae) assemblage dynamics within lacustrine environments. Limnologica 76: 60–71. DOI: https://doi.org/10.1016/j.limno.2019.03.006.

Nasser, N.A., Gregory, B.R., Steele, R.E., Patterson, R.T., *Galloway, J.M. 2019. Behind the Organic Veil: Assessing the Impact of Chemical Deflocculation on Organic Content Reduction and Lacustrine Arcellinida (Testate Amoebae) Analysis. Microbial Ecology: 1–16. DOI: https://doi.org/10.1007/s00248-019-01429-0.

Nasser, N.A., Patterson, R.T., *Galloway, J.M., Falck, H. 2020. Intra-lake response of Arcellinida (testate lobose amoebae) to gold mining-derived arsenic contamination in northern Canada: Implications for environmental monitoring. PeerJ 8: e9054. DOI 10.7717/peerj.9054

Neil, K., and *Lacourse, T. 2019. Diatom responses to long-term changes in climate and sea level rise at a low elevation lake in coastal British Columbia, Canada. Ecosphere 10(9): e02868.

Obrezkova, M.S., *Pospelova, V. 2020. Distribution of diatoms and dinocyst in surface sediments from the East Siberian and Chukchi Seas. Paleontological Journal 53(8): 790-794. https://doi.org/10.1134/S0031030119080148.

Romero, O.E., Baumann, K.-H., Zonneveld, K.A.F., Donner, B., Hefter, J., Hamady, B., *Pospelova, V., Fischer, G. 2020. Flux variability of phyto- and zooplankton communities in the Mauritanian coastal upwelling between 2003 and 2008. Biogeosciences, 17:187-214.

Swindles, G.T., Morris, P.J., Mullan, D.J., Payne, R.J., Roland, T.P., Amesbury, M.J., Lamentowicz, M., Turner, T.E., Gallego-Sala, A., Sim, T., Barr, I.D., Blaauw, M., Blundell, A., Chambers, F.M., Charman, D.J., Freurdean, A., Galloway, J.M., Gałka, M., Green, S., Kajukało, K., Karofeld, E., Korhola, A., Lamentowicz, Ł., Langdon, P., Marcisz, K., Mauquoy, D., Mazei, Y.A., McKeown, M., Mitchell, E.A.D., Novenko, E., Plunkett, G., Roe, H.M., Schoning, K., Sillasoo, Ü., Tsyganov, A.N., van der Linden, M., Väliranta, M., Warner, B. 2019. Widespread drying of European peatlands in recent centuries. Nature Geoscience 12: 922-928.

Wang. N., Mertens, K.N., Krock, B., Luo., Z., Derrien, A., *Pospelova, V., Liang, Y., Bilien, G., Smith, K.F., De Schepper, S., Wietkamp, S., Tillmann, U., Gu, H. 2019. Cryptic speciation *in Protoceratium reticulatum* (Dinophyceae): evidence from morphological, molecular and ecophysiological data. Harmful Algae 88, 101610, 15pp. https://doi.org/10.1016/j.hal.2019.05.003.

Palynfo

Phytoliths from the Upper Cretaceous Battle Formation of Western Canada

Call for Collaboration

We are currently working on the phytolith record from the Upper Cretaceous of the Pairies, hoping to understand some of the vegetation changes that took place at the end of the Cretaceous, when the place was subtropical. If there is anyone working phytoliths and could give us a hand with phytolith identification, you can contact me at Maria.velez@uregina.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 $15 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 for a reduced amount of $40. To join or renew, please fill out this membership form (by hand or in Adobe Reader®) and send your payment *via* either: a) a cheque (Canadian bank only) or money order payable to CAP along with your form, or b) an Interac e-Transfer to:

Dr. Francine McCarthy, Interim CAP Secretary-Treasurer,
Dept. of Earth Sciences, Brock University, St Catharines, ON, L2S 3A1, CANADA

Name: ______________________________

Affiliation: ______________________________

Address: ______________________________

____

Tel: ____________________ Fax: ____________________

E-mail: ______________________________

Research interests: ______________________________

____

Do you want to make a donation towards the Annual CAP Student Research Award?

Yes ☐ No ☐ Amount: ________________

New membership ☐ Renewal ☐ Total amount enclosed: ________________

If you are the head of a palynology laboratory in Canada, may we include your name/address/ research interests/webpage in the online "Directory of Canadian Palynology labs" on the CAP website? Yes ☐ No ☐

Lab page URL: ______________________________

Do you permit your name/address/email address to be included in the printed "World Directory of Palynologists" being compiled by IFPS? Yes ☐ No ☐