Canadian Association of Palynologists
Association Canadienne des Palynologues

NEWSLETTER

Volume 20 Number 1 May 1997

From the Editor's keyboard

As I was gathering material for this issue of the *CAP Newsletter*, I was also revising a lecture entitled "The Application of Soil, Geological and Botanical Techniques in Forensic Sciences". Preparing this caused me to venture into some little-known by-ways of palynology. One of the oddest papers I have read in recent years is definitely "The Filtering Effects of Various Household Fabrics on the Pollen Content of Hash Oil (Cannabis Extract)" (*Journal of Forensic Sciences* 42:256-259, 1997) which deals with palynological assemblages that might have been purposely altered to try and purify or disguise the origin of illegal drug shipments.

This got me thinking about some of the weird applications of palynology I have tried over the last few years. I think the two strangest ones involved teeth and puddles. Several years' ago, I examined the pollen content of dental calculus scraped from bison teeth to see if the material might give clues about grazing strategies of bison whose remains are found in archaeological sites. There was lots of pollen in this material but not surprisingly I suppose, most of it was from grass, so it wasn't very informative. I've since found a paper in *Journal of Archaeological Science* in which the same approach was taken using phytoliths.

One spring, I spent several hours in the grounds and parking lot of the Provincial Museum, shaking trees and trying to photograph yellow scum around puddles after rainfall. This was to make the point that the coating on lakes east of Edmonton in the spring is not the result of sulphur release from some malfunction at the oil refineries, but the accumulation of conifer, predominantly pine, pollen. This point was reinforced when, last week, I watched pollen drift like smoke from a spruce near my house as the tree swayed in a light breeze.

I'm sure many of us have tried some odd applications of palynology over the years. If you have a good story to tell, why not write it up for the *CAP Newsletter*?

I thank Ian Campbell and the Canadian Forest Service for assistance with mailing this edition of the *CAP Newsletter*. Many thanks to the following contributors to this issue: Brian Bornhold, Elliott Burden, Ian Campbell, Rob Fensome, Judith Lentin, Francine McCarthy, Joyce Macpherson, Dallas Mildenhall, Karen Mortimer, Marlow Pellatt, Niels Poulsen, Mel Reasoner, and Zicheng Yu. Thanks also to Yves Beaudoin for technical assistance.

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As this issue of the Newsletter goes to press, pollen season is starting in Edmonton. The television is starting to run advertisements for antihistamines for pollinosis sufferers, featuring bits of white fluffy cottonwood or dandelion seed drifting across the blue sky. I have not seen it yet this year, but I fully expect to be assaulted by an ad showing goldenrod while the voice-over talks about ragweed.

We cannot blame the advertisers or media for this evidence of public ignorance. We can only blame ourselves.

Channel surfing on cable, it is easy to find at least one science show at almost any time of day or night. I urge all CAP members to recognize that the public is hungry for science entertainment. It can only be to everyone's advantage if we make ourselves as available as possible to the media. If we don't, the misinformation out there will eventually come home to roost, as a public demanding tax cuts sees us as irrelevant.

I am not suggesting that each and every one of us should become a "Bill Nye the Science Guy". I am advocating taking a non-adversarial view of the media. When you have a piece of science you think might interest the general public, make sure they hear about it. Call your local newspaper, call the *Globe and Mail*, call your institution's Public Relations Officer, but please let someone know that what you are doing is of interest to people outside the ivory towers.

Many scientists I have talked to insist that they will not approach the media, as the one time they did, they were mis-cited, misunderstood, and their work bastardized. This can happen. But in my experience, it will only happen if the scientist refuses to take a sufficiently proactive role. If the scientist leaves the reporter, who may usually cover the local arts and entertainment scene, to try and make sense of the arcana of the discipline - then only a disastrous report can be expected. The scientist must consciously become involved in assuring that the reporter understands the message. Do not waste time on detail—remember what the story is from the reporter's perspective, and that it is probably not exactly what you think it should be. That is normal, and good. You must trust the reporter to know what the public will read. The reporter does not want to distort your message, but does want to present that part of it which will catch the public eye. Your job must be to take the fifteen minute interview with the reporter, and use that opportunity to ensure the reporter understands your science.

Perhaps this diatribe will upset some of you. If so, I hope you will make the effort to put fingers to keyboard and send a Letter to the Editor.

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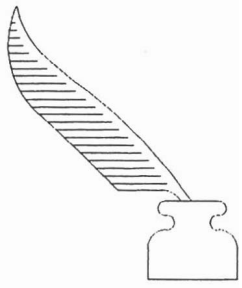

From the bureaucrat's desk

Since January 1 1997, we've gotten 13 new members (most from Canada, but 1 from Japan, 1 from Brazil, 1 from U.S.A., 1 from Egypt, and 1 from Russia)... Welcome to CAP!

Dues Due

The following are CAP members with dues owing (with the last year for which dues were received in parentheses).

Apaalse (1996), Campbell (1996), Chmura (1995), de Verteuil (1995), Eland (1996), Garneau (1996), Geurts (1994), Hallett (1996), Irwin (1995), Kumar (1996), Lease (1995), Leereveld (1995), MacDonald (1994), Mangerud (1995), McAndrews (1995), McIntyre (1994), Neumann (1995), Nøhr-Hansen (1996), Porter (1996), Rogers (1996), Sadowska (1995), Sarjeant (1994), Spooner (1996), Stancliffe (1996), Sullivan (1994), Suneby (1996), Sweet (1995), Traverse (1995), Vance (1996), Vardy (1995), Williams, G.L. (1996), Yu (1996).

Please note that CAP membership dues are CAN$10 per year, payable annually or up to three years in advance. Please make cheques payable to "CAP". Following a reminder notice, lapsed members are removed from the CAP mailing list after one year. See also the Membership Form on p. 30. Please send funds to:

Francine M. G. McCarthy
CAP Secretary/Treasurer
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ADMINISTRATIVE UPDATE

Because there has been such a turn-over in CAP membership recently, with many new members joining the Association, it seems timely to include some information on the aims and objectives of the Association and its general administration. To that end, Rob Fensome has provided a copy of the Association's By-Laws and a summary of CAP's "Administrative Year". The By-Laws can also be found at the CAP WWW presentation (at http://www.ualberta.ca/~abeaudoi/cap/cap.html). The "Administrative Year" and a copy (unsigned) of the Memorandum of Association by which the organization was formed will also be placed there soon.

BY-LAWS of CANADIAN ASSOCIATION OF PALYNOLOGISTS

GENERAL

1. In these by-laws unless there be something in the subject or context inconsistent therewith:
a. "Society" means The Canadian Association of Palynologists.
b. "Registrar" means the Registrar of Joint Stock Companies appointed under the Nova Scotia Companies Act.
c. "Special Resolution" means a resolution passed by not less than three-fourths of such members entitled to vote as are present or by proxy, where proxies are allowed, at a general meeting of which notice specifying the intention to propose the resolution as a special resolution has been duly given. Proxies must be in the form stipulated in the by-laws.

2. The name of the Society shall be "The Canadian Associaton of Palynologists" (and "L'Association Canadienne des Palynologues").

3. The objectives of the Society shall be to advance and encourage all aspects of palynology in Canada and to promote co-operation between palynologists and those engaged in related fields of study.

4. The Society is a member of the International Federation of Palynological Societies (I.F.P.S.).

MEMBERSHIP

5. The subscribers to the Memorandum of Association and such other persons as shall be admitted to membership in accordance with these by-laws, and none others, shall be members of the Society, their names shall be entered in the Register of Members accordingly.

6. The number of members of the Society is unlimited.

7. Every member of the Society shall be entitled to attend any meeting of the Society and to vote at any meeting of the Society (or by proxy for any special resolution) and to hold any office.

8. Membership in the Society shall not be transferable.

9. The following shall be admitted to membership in the Society:
a. any person who is residing in Canada, or who is a citizen of Canada, and is active in, or interested in, palynology and
b. who contributes to the support of the Society the prescribed membership fee.

10. No formal admission to membership shall be required and the entry in the Register of Members by the Secretary of the name and address of any individual shall constitute an admission to membership in the Society.

11. Membership in the Society shall cease upon the death of a member, or if, by notice in writing to the Society, he or she resigns his or her membership, or if he or she ceases to qualify for membership in accordance with these by-laws.

12. The following shall be considered a correspondent of the Society:
a. any individual who is not a citizen of Canada residing outside of Canada who is active in, or interested in, palynology and who contributes to the support of the Society the prescribed subscription.
b. any institution, inside or outside of Canada, which wishes to receive the Society's Newsletter and which contributes to the support of the Society the prescribed subscription.

13. A correspondent is not a voting member of the Society.

14. An individual who is a correspondent may become a voting member of the Society on moving his or her residence to Canada or upon becoming a Canadian citizen.

15. A member who moves his or her residence from Canada, and is not a citizen of Canada, ceases to be a member, but may become a correspondent, at the end of the calendar year in which the move took place.

FISCAL YEAR

16. The fiscal year of the Society shall be the period from 1 January in any year to 31 December in the same year.

MEETINGS

17. The annual general meeting of the Society shall be held at a time and place which the directors deem most convenient for the directors and membership during a given fiscal year. The time and place of this meeting shall be announced in the Newsletter at least two months prior to its taking place.

18. At each general meeting of the Society, the following items of business shall he dealt with and deemed to be ordinary business:
a. reading of the minutes of the preceding general meeting
b. president's report

c. secretary/treasurer report - including balance sheet, report of auditor thereon and membership report
d. I.F.P.S. representative's report
e. review of dues structure and revision of same if deemed appropriate
f. report of nominating committee and submission of other nominations
g. appointment of new nominating committee
h. appointment of auditor

19. A quorum consists of five members in good standing, without which no business may be transacted.

20. a. The President of the Society shall preside as President at every general meeting of the Society;
b. If there is no President or if, at any meeting, he or she is not present at the time of holding the same, the President-Elect shall preside as President;
c. If there is no President or President-Elect or if at any meeting neither the President nor the President-Elect is present at the holding of the same, the members present shall choose someone of their number to act as President.

21. The President shall have no vote except in the case of an equality of votes. In the case of an equality of votes, the President/Acting President shall have a casting vote.

22. At any general meeting, unless a poll is demanded by at least three members, a declaration by the President that a resolution has been carried and an entry to that effect in the book of the proceedings of the Society shall be sufficient evidence of the fact, without proof of the number or proportion of the members recorded in favour of or against such resolution.

23. If a poll is demanded in manner aforesaid, the same shall be taken in such manner as the President may prescribe and the result of such poll shall be deemed to be the resolution of the Society in general meeting.

NEWSLETTER

24. The Society shall issue to members and correspondents at least two 'Newsletters' per year, one to appear in May, one in November, and any others as considered appropriate by the directors.

25. The Newsletter shall carry the minutes of the annual meeting.

AMENDMENTS

26. a. Initiation of, termination of, or changes to affiliation with other societies or institutions must be subject to a special resolution.
b. Amendments to the by-laws must be subject to a special resolution.

27. A special resolution must be announced in the Newsletter at least two months prior to an annual meeting. Proxy forms and ballots relating to the said Special Resolution must be included in that Newsletter and be in the following form and wording:

PROXY

I, _____, a member in good standing of the Canadian Association of Palynologists, do hereby appoint the President or Acting President of the Canadian Association of Palynologists as my proxy, to vote for me and on my behalf at _____ to be held on _____ or any adjournment thereof.

Dated at _____ this _____ day of _____ 19 ___.

Member _____
(Signature of Member)

Witness_____
(Signature of Witness)

28. Each member in good standing shall have one vote.

29. Non-receipt of a Newsletter by a member shall not invalidate the result of a vote for a special resolution provided that there is reasonable proof that a Newsletter was mailed to each member at his or her last known address as recorded by the Secretary/Treasurer.

30. No less than twenty-five percent of members in good standing must take part in the vote for a special resolution in order for it to be valid and binding.

DIRECTORS

31. The directors of the Society shall be a President, a President-Elect, a Secretary/ Treasurer, a Newsletter Editor and an I.F.P.S. Councillor.

32. The President shall have general supervision of the activities of the Society and shall perform such duties as may be assigned to him or her by the Board of Directors from time to time.

33. a. Preparation of minutes, custody of the books and records (including upkeep of Register of members), and custody of the minutes of all the meetings of the Society and of the Board of Directors shall be the responsibility of the Secretary/ Treasurer.
b. The directors may appoint a person to act as Secretary/Treasurer if the latter is not present at a meeting of the Society, for the duration of the said meeting.

ELECTION OF DIRECTORS

34. Any member of the Society shall be eligible to be elected a director of the Society.

35. The nominating committee shall, at the annual meeting, present a suite of candidates who have consented to fill executive positions for the following fiscal year. Other nominations shall be accepted at the annual meeting but no later.

36. The I.F.P.S. Councillor is elected for a term spanning the time between one International Palynological Congress and the next. The President and President/Elect are each elected for a term of two fiscal years. The President-Elect automatically becomes the president at the end of the two-year term of the serving President unless he becomes ineligible to do so in accordance with these by-laws. All other directors are elected for one fiscal year at a time.

37. If unopposed, the candidates put forward by the nominating committee shall be accepted by acclamation.

38. If balloting is necessary for any of the executive positions, ballots will be included in the ensuing issue of the Newsletter. The ballots will be counted on the 30th day after the Newsletter was mailed to members.

39. In the case of a ballot each member in good standing has one vote, except the President, who has the deciding vote in the case of a tie.

40. The candidate elected to a particular executive position is the candidate with the most votes.

41. At the end of each stipulated term of office (as per by-law 36) all directors must retire unless re-elected. All directors are eligible for re-election.

42. In the event that a director resigns his or her office or ceases to be a member in the Society, his or her office as director shall ipso facto be vacated. The vacancy thus created may be filled for the unexpired portion of the term by the Board of Directors from among the members of the Society.

43. The Society may, by special resolution, remove any director before the expiration of the period of office and appoint another person in his or her stead. The person so appointed shall hold office during such time only as the director in whose place he or she is appointed would have held office if he or she had not been removed.

44. The management of the activities of the Society shall be vested in the directors who, in

addition to the powers and authorities by these by-laws or otherwise expressly conferred upon them, may exercise all such powers and do all such acts and things as may be exercised or done by the Society and are not hereby or by Statute expressly directed or required to be exercised or done by the Society by annual general meeting or special resolution.

AUDIT OF ACCOUNTS

45. The auditor for the Society shall be appointed annually by the members of the Society at the annual general meeting and, on failure of the members to appoint an auditor, the directors may do so.

46. The Society shall make a written report to the members as to the financial position of the Society and the report shall contain a balance sheet and operating account. This report shall appear in the first newsletter of the fiscal year. In every such report, the auditor shall state whether, in his or her opinion, the balance sheet is a full and fair balance sheet containing the particulars required by the Society and properly drawn up so as to exhibit a true and correct view of the Society's affairs. Such report shall be read at the annual meeting. A copy of the balance sheet, showing the general particulars of its liabilities and assets and a statement of its income and expenditure in the preceding year, audited by the auditor, shall be filed with the Registrar within fourteen days after the annual meeting in each year, as required by law.

MISCELLANEOUS

47. The Society shall file with the Registrar, with its Annual Statement, a list of its directors with their addresses, occupations and dates of appointment or election and, within fourteen days of a changes of directors, notify the Registrar of the change.

48. The Society shall file with the Registrar a copy in duplicate of every special resolution within fourteen days after the resolution is passed.

49. The books and records of the Society may be inspected by any member at any reasonable time within two days prior to the annual general meeting.

50. Contracts, deeds, bills of exchange and other instruments and documents may be executed on behalf of the Society by the President or the President-Elect and the Secretary/Treasurer, or otherwise as prescribed by resolution of the Board of Directors.

51. The borrowing powers of the Society may be exercised by special resolution of the members.

C.A.P.'s ADMINISTRATIVE YEAR

January 1: The new Executive takes office.

May: The *CAP Newsletter* appears and includes an announcement of the Annual General Meeting

September-October: Presentations at the Annual General Meeting include: President's report; Secretary/Treasurer's report; IFPS Representative's report; Newsletter Editor's report; Special committee reports (if any); Nominating Committee's report; and the Auditor's report. The Nominating Committee and Auditor for the next year are announced. The Nominating Committee's job is to look for candidates to take office in the next year plus one.

November: The *CAP Newsletter* appears, with ballots if necessary. In practice, the Newsletter usually appears in December.

Reports are filed with the Government of Nova Scotia 14 days after the Annual General Meeting, or change of Director(s), or a special resolution.

Far and wide....

PALEOENVIRONMENTAL STUDIES IN SAANICH INLET, BRITISH COLUMBIA

Scientific Party of Leg 169S
Ocean Drilling Program

In August 1996 an international team of researchers aboard the *JOIDES Resolution* undertook an unprecedented two-day drilling program in Saanich Inlet, British Columbia. Drilling at this type of site offers the opportunity to investigate the impacts of rapid global climate change on local terrestrial and oceanic productivity. It could hold important clues about possible future impacts on the region from such change and for distinguishing natural ecological variability (e.g., in fish populations and marine productivity) from that caused by urbanization and land-use.

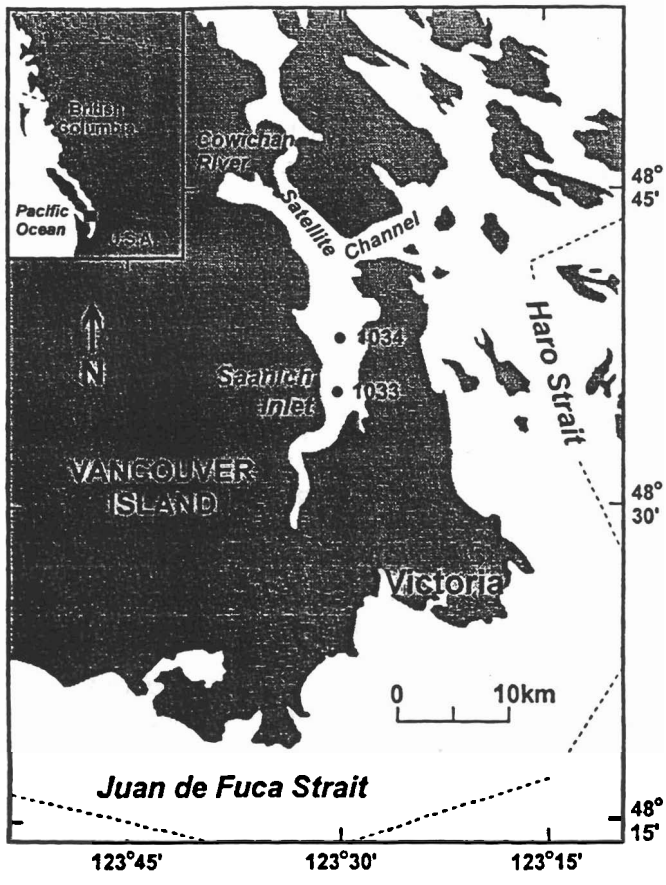
The program (Leg 169S) was one of the scientific initiatives of the international Ocean Drilling Program and included participants from Canada, the U.S., the U.K., and Germany. Canadian researchers represented universities and both federal and provincial governments, and were funded through the Natural Sciences and Engineering Research Council, the Geological Survey of Canada (Natural Resources Canada), and the provincial government of British Columbia.

The drilling area, Saanich Inlet, is a fjord located just north of Victoria, British Columbia on Vancouver Island (see map overleaf). The youngest sediments of this inlet have been extensively studied over the past several decades by a host of investigators — sedimentologists, organic and inorganic geochemists, palynologists and marine ecologists — largely because of the anoxic bottom water conditions and the consequently well preserved record of annual and seasonal sediment accumulation.

The principal objective of the drilling program was to obtain an ultra-high-resolution record of climate, oceanography, terrestrial vegetation and oceanic productivity since deglaciation, 12,000 to 14,000 years ago. The Saanich Inlet sites are important companions, in many respects, to the high-resolution Quaternary paleoenvironmental sites drilled in Santa Barbara Basin (Leg 146) and Cariaco Basin (Leg 165), and contribute substantially to Initiative I of the Ocean Drilling Program's new Long-Range Plan, *Understanding Natural Climate Variability and the Causes of Rapid Climate Change*.

Secondary objectives included elucidation of earthquake frequency in the region; the specific roles of bacteria and viruses (and their interaction) in the diagenesis of anoxic sediments; the history of forest fires, both natural and related to native land-use practices; organic and inorganic geochemical processes; shallow and deep water circulation; the depositional fabric of organic-rich laminated sediments; glaciomarine depositional processes during the latest Pleistocene; and the record of magnetic field variations and magnetic properties, particularly as they relate to past environmental conditions.

Two sites (1033 and 1034) were triple- and quadruple-piston cored in water depths of 230 and 200 m along the axis of the fjord. Maximum sub-bottom depths sampled were 105 and 118 m at the two sites, respectively. Two principal sediment units were cored: Unit 1, a predominantly very well laminated sequence of olive-gray diatomaceous muds, 55 m thick at the more southerly site and 80 m at the more northerly and



Unit 2, an underlying sequence (older than about 12,000 years) of dense, massive to vaguely laminated terrigenous gray muds, with occasional dropstones, graded sandy beds, sand lenses and inclined to contorted sandy and silty horizons.

The laminated sequence consists generally of pairs of thin, dark gray terrigenous muds (less than 1-2 mm thick) and very light olive laminae of diatom ooze. From earlier studies, these are known to be related to late fall and winter, and late spring and summer deposition, respectively. Thickness of these "varves" varies considerably, as do their individual components, from less than 3 mm to more than 1.5 cm. This variability reflects significant changes in amount and seasonal distribution of precipitation and associated erosion rates in nearby watersheds, and in primary productivity in the inlet. Initial observations suggest variability on decadal and century timescales.

Superimposed on this idealized varve structure are finer scale variations, readily apparent in x-radiography; these sub-millimeter scale laminae are believed to record changes in surface productivity, possibly related to tidal cyclicity, and in runoff from the surrounding watersheds. The laminated sequence contains abundant wood and charcoal as well as fish debris, consisting of scales, vertebrae and other skeletal material.

A prominent white volcanic ash horizon 1.5 to 2 cm thick was encountered at sub-bottom depths of about 37 m and 52 m at the southerly and northerly sites, respectively. Accelerator Mass Spectrometer radiocarbon dating confirmed this to be the Mazama Ash, deposited following the eruption of Mount Mazama (Crater Lake, Oregon) about 7645 years ago.

The well preserved laminations of Unit 1 are interrupted periodically by thin (less than 2 mm), light gray, clay laminae, possibly reflecting abnormal flood events in the region and thicker massive intervals from a few centimeters to a few tens of centimeters thick. The massive units are conjectured to be the result both of episodic debris flows from fjord sidewalls, probably triggered by large earthquake events, and of intervals of more oxygenated bottom waters. The latter would have permitted the establishment of a minimal benthic faunal community capable of destroying seasonal and annual laminae over the course of years to decades until anoxia resumed. Distinguishing between these two mechanisms and determining the causes of bottom water overturn are the subjects of several ongoing studies.

The lowermost part of Unit 1 consists of progressively less well laminated olive-gray organic

rich muds with depth. It contains a rich bivalve fauna, suggesting a period of about 2,000 to 3,000 years of well oxygenated bottom waters in the fjord during the earliest Holocene. The reasons for better deep-water circulation in Saanich Inlet during the early Holocene, compared to today, are undoubtedly related to the oceanographic regime along the outer British Columbia and Washington coasts (e.g., frequency and intensity of upwelling and El Niño events), the freshwater budget in the inlet and adjacent waters, and the sill depth. The precise conditions which permitted oxygenated waters to flow into the deeper parts of Saanich Inlet at that time are a subject of current investigation.

In the early Holocene, after the initiation of diatomaceous mud deposition, there was a brief return to accumulation of largely structureless, gray, terrigenous clays, similar to those of Unit 2 deposited during the late Pleistocene. This is represented at both sites by a 40-cm thick interval characterized by an extremely sharp lower contact and a gradational upper transition back into diatomaceous muds. Initial AMS radiocarbon dating suggests that this interval represents at most a few hundred years of significant landscape instability in the region.

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[Editor's note: Palynologists Rolf Mathewes and Richard Hebda are involved in this project. This article provides additional details on the project as a follow-up to the report provided by Rolf Mathewes in the last issue of the *CAP Newsletter*. The item is reproduced with permission of Brian Bornhold, and Karen Mortimer, Editor, *DELTA Newsletter.*]

PALYNOLOGY AT MEMORIAL UNIVERSITY

Since last reporting to this newsletter, the palynology programme at Memorial University has continued to expand into new, uncharted areas of study.

Randy Batten, our most recent arrival from the Biology programme at MUN, was immediately thrown into the unknowns of palynology. His masters thesis on Chitinozoa from the petroliferous shelf and basin strata of western Newfoundland will build on sporadic reports published over the last 30 years to become the first comprehensive biostratigraphic study of this fossil group on the island. Partial funding to support Randy's studies comes from a scholarship provided by the Canada Newfoundland Offshore Petroleum Board.

After taking a partial leave of absence to conduct thesis studies, **Helen Gillespie** has returned to her regular duties in the Department of Earth Sciences. Helen's masters thesis on acritarch biostratigraphy of the upper Ordovician Winterhouse Formation is well on its way towards completion. Detailed analysis of outcrop has resulted in the definition of distinctive acritarch zones which can be readily linked to core and cuttings from hydrocarbon exploration wells recently drilled in western Newfoundland. This high resolution biostratigraphy contributes towards our understanding some of the dynamics of Ordovician Taconic forelands in one of Canada's least explored hydrocarbon basins. Funding for this project comes from Pan Canadian Petroleum of Calgary.

A recently completed Honours thesis by **Michael DeLorme** explored the thermal properties of "basement" rocks from a number of sites on the Grand Banks. Core samples revealed a surprisingly complex picture of an incompletely understood biostratigraphy. Many samples contained fossil evidence indicating significantly

different ages from previous reports. In addition, thermal properties suggest some sites on the Grand Banks still contain significant thicknesses of Paleozoic strata which lie within the oil window.

Doctoral studies by **Terry Christopher** on the environmental geology of the St John's urban area are nearing completion. Canada's oldest European city has had a lengthy history of urban and industrial growth. Terry's thesis reports on the impact of 500 years of settlement, therein laying the groundwork for policy decisions by governments interested in protecting urban watersheds in boreal regions. Everyone involved with supervision of Terry's study is looking forward to seeing this important work in the public domain. In addition to University scholarship support, Terry's study contains substantial in-kind support from the Newfoundland Department of Mines and Energy.

Not to be outdone, **Alexei Smirnov** is completing his doctoral dissertation on environmental geology of rural outport Newfoundland communities. In examining modern and post-glacial records of pollen, chemicals, weather, vegetation, trees, oceanographic properties and fish, Alexei has developed a comprehensive database tracking natural phenomena which affect the sustainability of the maritime based economy of some of Newfoundland's rural fishing communities. At this time of fisheries crisis and stock collapse, this study offers insights and guidance into future policy decisions. Alexei's study is supported from a major Tri-Council Green Plan grant to Memorial University to study the science, social science and economics of sustainable growth in Newfoundland outports.

Though technically retired, **Dr Joyce MacPherson** continues to explore the palynology of strata deposited at the end of the last ice age. In the office many, if not most days, Joyce is putting the final touches on a study of Holocene sequences in and around St. John's.

Elliott Burden, while on sabbatical leave, has spent the better part of this past year researching, writing, and speaking on a variety of topics, including Proterozoic cyanobacteria of northern Labrador, middle Cretaceous angiosperms of Alberta, and modern pollen and dinoflagellates of Trinity Bay. Significant on the agenda is the imminent release from confidentiality of the palynomorph and graptolite biostratigraphy and thermal maturation history of hydrocarbon prospects in Paleozoic strata in western Newfoundland. Both Elliott and co-author Henry Williams are looking forward to discussing the implications of this work to future petroleum exploration in this area.

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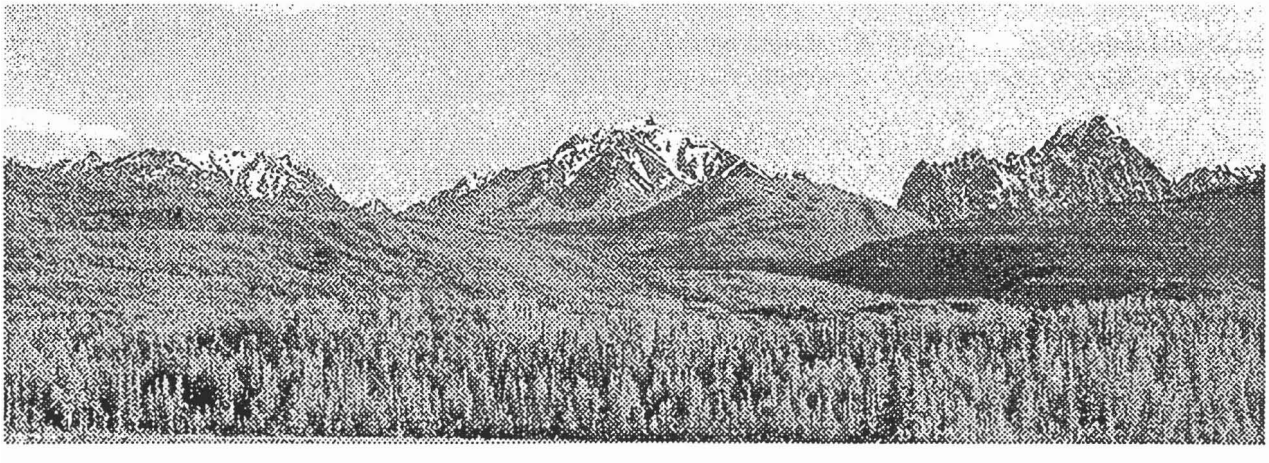

Essay

Years ago, the *AASP Newsletter* that I was editing had a series of articles on the K-T boundary. I am of the firm belief that the transition across the boundary was not profound for palynomorphs and that to use the extinction of dinosaurs as an event was the silliest of circular arguments, since the end of the Cretaceous is defined by the extinction of some dinosaurs (deep breath needed here!) Anyway, I have just read a most interesting paper on this topic. It has 22 authors, so I guess we could say that it is authorative! Here is the abstract:

The Cretaceous-Tertiary Biotic Transition by N. MacLeod, P. F. Rawson, P. L. Forey, F. T. Banner, M. K. Boudagher-Fadel, P. R. Bown, J. A. Burnett, P. Chambers, S. Culver, S. E. Evans, C. Jeffery, M. A. Kaminski, A. R. Lord, A. C. Milner, A. R. Milner, N. Morris, E. Owen, B. R. Rosen, A. B. Smith, P. D. Taylor, E. Urquhart and J. R. Young.

Abstract: Mass extinctions are recognized through the study of fossil groups across event horizons, and from analysis of long-term trends in taxonomic richness and diversity. Both approaches have inherent flaws, and data that once seemed reliable can be readily superseded by the discovery of new fossils and/or the application of new analytical techniques. Herein the current state of the Cretaceous-Tertiary (K-T) biostratigraphical record is reviewed for most major fossil clades, including: calcareous nannoplankton, dinoflagellates, diatoms, radiolaria, foraminifera, ostracods, scleractinian corals, bryozoans, brachiopods, mollusks, echinoderms, fish, amphibians, reptiles and terrestrial plants (macrofossils and palynomorphs). These reviews take account of possible biasing factors in the fossil record in order to extract the most comprehensive picture of the K-T biotic crisis available. Results suggest that many faunal and floral groups (ostracods, bryozoa, ammonite cephalopods, bivalves, archosaurs) were in decline throughout the latest Maastrichtian while others (diatoms, radiolaria, benthic foraminifera, brachiopods, gastropods, fish amphibians, lepidosaurs, terrestrial plants) passed through the K-T event horizon with only minor taxonomic richness and/or diversity changes. A few microfossil groups (calcareous nannoplankton, dinoflagellates, planktonic foraminifera) did experience a turnover of varying magnitudes in the latest Maastrichtian-earliest Danian. However, many of these turnovers, along with changes in ecological dominance patterns among benthic foraminifers, began in the latest Maastrichtian. Improved taxonomic estimates of the overall pattern and magnitude of the K-T extinction event must await the development of more reliable systematic and phylogenetic data for all Upper Cretaceous clades. *Journal of the Geological Society*, London, Vol. 154, 1997, pp. 265-292.

I am disappointed by the last sentence in the abstract because it feels like a cop-out. The conglomeration of data and information presented in the paper do not require this little escape route. For example, their comments on my favorite hobby horse CIRCULAR ARGUMENTS FOR DATING - "If rocks are dated using particular index fossils then the validity of the age assignment for the rock unit cannot be used to date unambiguously orgination or extinction events for those fossils. For example if dinosaurs or ammonites are regarded as being confined to Mesozoic strata, then any dinosaur-bearing or ammonite-bearing unit will necessarily be assigned a Mesozoic age regardless of its true (i.e., possible Tertiary) chronological age."

The paper discusses dinoflagellates and pollen data and is "must" reading for all those interested in extinction events at any point in geological time.

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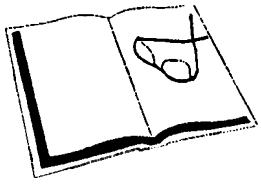

On the shelf

RECENT PUBLICATIONS BY CANADIAN PALYNOLOGISTS - 7

Clapperton, C. M., M. Hall, P. Mothes, M. J. Hole, J. W. Still, K. F. Helmens, P. *Kuhry, A. M. D. Gemmell, 1997. A Younger Dryas Icecap in the Equatorial Andes. *Quaternary Research* 47:13-28.

Edwards, T.W.D., B. B. Wolfe, and G. M. *Macdonald, 1996. Influence of Changing Atmospheric Circulation on Precipitation $\delta^{18}O$-Temperature Relations in Canada During the Holocene. *Quaternary Research* 46(3):211-218.

Fréchette, B., M. A. Bouchard, and P.J.H. *Richard, 1996. Polliniferous Till of the Nunavik Peninsula, Northern Quebec. *Géographie physique et Quaternaire* 50(3):331-340.

*Gajewski, K., S. Garralla, and V. Milot-Roy, 1996. Postglacial Vegetation at the Northern Limit of Lichen Woodland in Northwestern Quebec. *Géographie physique et Quaternaire* 50(3): 341-350.

Haberyan, K. A., S. P. Horne, and B. F. *Cumming, 1997. Diatom Assemblages from Costa Rican Lakes: An Initial Ecological Assessment. *Journal of Paleolimnology* 17:263-274

*Head, M. J., 1997. Thermophilic Dinoflagellate Assemblages from the Mid Pliocene of Eastern England. *Journal of Paleontology* 71(2):165-193.

*Head, M. J., 1996. Paleoecological and Taxonomic Revision of Late Cenozoic Dinoflagellates from the Royal Society Borehole at Ludham, Eastern England. *Journal of Paleontology* 70(4): 543-570.

Helmens, K. F., N. W. Rutter, and P. *Kuhry, 1997. Glacier Fluctuations in the Eastern Cordillera of Colombia During the Last 45,000 Radiocarbon Years. *Quaternary International* 38/39: 39-48.

Hutchinson, I., J. J. Clague, and R. W. *Mathewes, 1997. Reconstructing the Tsunami Record on an Emerging Coast: A Case Study of Kanim Lake, Vancouver Island, British Columbia, Canada. *Journal of Coastal Research* 13:545-553.

*Kuhry, P., 1997. The Palaeoecology of a Treed Bog in Western Boreal Canada: A Study Based on Microfossils, Macrofossils and Physico-chemical Properties. *Review of Palaeobotany and Palynology* 96:183-224.

*Kuhry, P., and D. H. Vitt, 1996. Fossil Carbon/Nitrogen Ratios as a Measure of Peat Decomposition. *Ecology* 77:271-275.

Last, W. M., and R. E. *Vance, 1997. Bedding Characteristics of Holocene Sediments from Salt Lakes of the Northern Great Plains, Western Canada. *Journal of Paleolimnology* 17: 297-318.

*MacPherson, J. B., 1996. Delayed Deglaciation by Downwasting of the Northeast Avalon Peninsula, Newfoundland: An Application of the Early Postglacial Pollen Record. *Géographie physique et Quaternaire* 50(2): 125-184.

Moser, K. A., G. M. *MacDonald, and J. P. *Smol, 1996. Applications of Freshwater Diatoms to Geographical Research. *Progress in Physical Geography* 20(1): 21-52.

*Spooner, I. S., L. V. Hills, and G. D. Osborn, 1997. Reconstruction of Holocene Changes in Alpine Vegetation and Climate, Susie Lake, British Columbia, Canada. *Arctic and Alpine Research* 29(2):156-163

*Spooner, I. S., G. D. Osborn, R. W. Barendregt, and E. Irving, 1995. A Record of Early Pleistocene Glaciation on the Mount Edziza Plateau, Northwestern British Columbia. *Canadian Journal of Earth Sciences* 32(12):2046-2056.

Stager, J. C., B. *Cumming, L. Meeker, 1997. A High-Resolution 11,400-Yr Diatom Record from Lake Victoria, East Africa. *Quaternary Research* 47:81-89.

*Vance, R. E., 1997. The Geological Survey of Canada's Palliser Triangle Global Change Project: A Multidisciplinary Geolimnological Approach to Predicting Potential Global Change Impacts on the Northern Great Plains. *Journal of Paleolimnology* 17: 3-8.

*Vance, R. E., and S. A. Wolfe, 1996. Geological Indicators of Water Resources in Semi-arid Environments: Lake Levels and Sand Dune Activity in the Southwestern Interior of Canada. In *Geoindicators, Assessing Rapid Environmental Changes in Earth Systems*, edited by A. R. Berger and W. J. Iams, pp. 251-263. A. A. Balkema, Brookfield, Vermont.

*Vardy, S. R., B. G. Warner, R. Aravena, 1997. Holocene Climate Effects on the Development of a Peatland on the Tuktoyaktuk Peninsula, Northwest Territories. Quaterary Research 47:90-104.

*Yu, Zicheng, J. H. *McAndrews, and U. Eicher. 1997. Middle Holocene Dry Climate Caused by Change in Atmospheric Circulation Patterns: Evidence from Lake Levels and Stable Isotopes. *Geology* 25:251-254.

*Yu, Zicheng, J. H. *McAndrews, and D. Siddiqi. 1996. Influences of Holocene Climate and Water Levels on Vegetation Dynamics of a Lakeside Wetland. *Canadian Journal of Botany* 74:1602-1615.

[Note: * Denotes a CAP member]

NEW BOOKS

Ludvigsen, Rolf (editor), 1996. *Life in Stone: A Natural History of British Columbia's Fossils.* UBC Press, Vancouver, British Columbia. 320 pp., 335 b&w photographs and drawings. $65 Can., Hbk., $27.95 Can., Pbk.

Edited by palaeontologist Rolf Ludvigsen, *Life in Stone* is the first book to focus on British Columbia's fossils. Information from the publisher indicates that it consists of 24 chapters, each written by a specialist for a general audience, and each devoted to a separate fossil group which is particularly well represented in the Province.

Most of the fossils decribed in the book are body fossils of animals or plants, such as shells, bones, teeth, wood, or foliage, typically found in sedimentary rocks or preserved as carbonized impressions of leaves and needles or permineralized wood. The other major category of fossils are trace fossils, including footprints, burrows, borings, and bite marks which offer clues about the behaviour of ancient animals.

The book includes a chapter on "Quaternary Plants: Glimpses of Past Climates and Landscapes" by palynologist Richard Hebda. Other chapters with a micropalaeontological focus include "Mesozoic Radiolarians of Haida Gwaii" by Elizabeth S. Carter, and "The Microscopic World of Conodonts" by Michael J. Orchard. Naturally, there is a chapter on British Columbia's most famous fossiliferous deposit, the Burgess Shale. Other featured fossils include trilobites, dinosaurs, ammonoids, molluscs, fish (several chapters), insects, plants (several chapters), and Quaternary vertebrates. [Editor's Comments].

For more details or to order, contact:

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Proctor, M., P. Yeo, and A. Lack, 1996. *The Natural History of Pollination*. Timber Press, Portland, Oregon. 479 pp. ISBN 0-88192-352-4 (Hbk.), ISBN 0-88192-353-2 (Pbk). US$42.95 (Hbk), US$24.95 (Pbk). Also published in U.K. as part of The New Naturalist Library by HarperCollins Publishers at £16.99 (Pbk.)

The jacket blurb indicates that this is a brand new, fully updated edition of the natural history classic first published in the New Naturalist series in 1973 as *The Pollination of Flowers. The Natural History of Pollination* describes all the ways in which pollination is brought about: by wind, water, birds, bats and even mice and rats; but principally by a great diversity of insects in an amazing range of ways, some simple, some bizarre. This book is a unique introduction to a complex yet easily accessible subject of great fascination.

The book consists of sixteen chapters, each focussing on a different aspect of pollination. It is abundantly illustrated throughout with drawings and black and white photographs; there is a separate section of colour plates. Only one chapter focusses on wind and water pollination, perhaps the main mechanisms of concern to palaeoecologists. Most of the book concentrates on pollination by insects, especially bees, butterflies and moths, beetles and flies. Among the flowers, orchids get a whole chapter to themselves! The book also includes chapters dealing with other issues related to pollination, such as plant breeding, plant populations and genetics, together with a brief survey of the history of pollination studies and pollination through geological time. My main complaint is the small size of the type which, especially in the figure captions, is hard to read. [Editor's Comments]

For further details or to order, telephone 1-800-327-5680 (toll-free in US and Canada) for credit card orders or in Canada call Cavendish Books at 1-800-665-3166.

JOURNAL SPECIAL ISSUES

***Insect Vision and Flower Recognition*: A Special Double Issue of *Israel Journal of Plant Sciences*. Vol. 45, No. 2/3, 1997. Editors: A. Dafni, M. Giurfa and R. Menzel**

Among the fourteen papers in this issue are several that may be of interest to palynologists, including:

Menzel, R., A. Gumbert, J. Kunze, A. Shmida, and M. Vorobyev. Pollinators' Strategies in Finding Flowers.

Weiss, M. R., and B. B. Lamont. Floral Color Change and Insect Pollination: A Dynamic Relationship.

Dafni, A. and P. G. Kevan. Flower Size and Shape: Implications in Pollination.

The special price for personal copies of *Insect Vision and Flower Recognition* is US$40. To order, contact:

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Articles from the 2nd Symposium on *Pollens And Pollinosis: Current Problems* held in Lublin, Poland, 1-2 December 1995. *Annals of Agricultural and Environmental Medicine*, 1996, Vol. 3, No. 2.

Part 1: Pollens consists of thirteen articles, mostly concentrating on the measurement, distribution, and relationship to weather indices of airborne and allergenic pollen in eastern Europe (Poland, Hungary and Russia). Other contributions come from Scotland (one article on monitoring) and India (one article on pollen in honey). *Part 2: Pollinosis* consists of seven articles dealing with the medical aspects of allergies. For more details see http://galen.imw.lublin.pl/users/gmf/index.htm

palyno bytes

CLICK!! SAID THE GEOLOGIST TO THE BUG

A "standard" image capture, storage and retrieval system

Palynology and many other biological and geological disciplines depend on photographic documentation of the objects observed. We built the system described below using "standard" computer and video hardware and software components, which are cheap, easily installed and friendly in use. We prefer this solution to custom designed products, which often are difficult to use and expensive to update in the modern day fast developing computer world.

I (Niels) asked one of my colleagues (HC), who is one of the GEUS computer experts, to help me selecting a video camera, a picture grabbing system and an image catalogue for my PC to replace the classical camera and film technique. In addition the annoying tendency of old prints and film to fade and become mouldy has been solved by storing images on CD-ROM from which they may be recovered on any PC, MAC or UNIX computer system.

The system we created is not unique, and parts of it may be omitted or replaced by other products. We present this experience in the hope that it may help other colleagues to acquire some useful and cheap equipment.

The image path from the microscope to the CD-ROM starts with a standard surveillance video camera (price a few hundred US dollars) with a resolution of 460 TV lines in colour. All settings on the video camera are used in "auto" mode. The video camera comes with a C/CS mount. It is installed on the microscope on a video camera tube.The additional lenses usually required for a photo camera are not needed. Even the "family video camera" may be used, if it has a removable lens.

The output of the video camera should match the input on the video grabber card and may be composite or Y/C. A Y/C (super-video) output is to be preferred, as this gives a slightly better quality than composite video. Composite video signals can easily be converted to super-video and vice versa. This, however, requires a converter, which is an additional cost.

The video signal is transferred to the computer by a MRT Video Port Pro video grabber card. This card is a "credit card" size card (PCMCIA) which we use both on a laptop computer directly and on the stationary PC by an adapter socket.

In the computer, there are several software possibilities for capturing the images (single video frames). There is an "invisible" program (TWAIN) that allows all TWAIN-aware programs to capture images directly. Programs from Microsoft, Adobe and Corel and our image database program, MiniCat by Prostar are among the TWAIN-aware. Secondly we have a dedicated image capture and processing programme that comes with the card, MRT Image Wizard (Version 3.2). We have tested this programme. It consists of two separate screen-capture programmes: a very simple "MRT Image Office" and a more advanced program "Image Wizard". The latter allows not only pre- and post image capture image processing, adjustment of colour, contrast, light etc., but also many advanced processing functions, for example, image sharpening, softening, rotation, negative-to-positive conversion, sculpturing and edge thinning and thickening. A "stacking" feature allows the digitisation and addition of multiple images to

suppress noise and enhance light recovery from the microscope if required.

After processing images are stored in the MiniCat Catalogue Builder programme that allows the addition of text to the images. Images may be displayed as "thumbnail images" for easy comparison of multiple images or as slide shows to display more detail. A text search system is built in. Images stored in this database are compressed automatically. The program necessary to view the database is built into the resulting file and may be distributed freely along with the database on a floppy or CD-ROM. The processed images are also stored on CD-ROM outside the database to ensure that they may be retrieved by any computer that supports this standard, including DOS or Windows based PC's, MAC's or any UNIX box.

To prepare plates for publication programmes as Fractal Imager and Corel Photopaint have been chosen. Text processing programmes like Word for Windows also have facilities for the inclusion of images.

To store images on CD-ROM a Hewlett Packard CD burner was acquired. It comes complete with SCSI adapter card and two sets of software, the simplest possible by HP and an advanced version, Eazy CD Pro by Adaptec.

The CD burner solves the problem of storing images for 20 years without any degradation in quality on a medium that will not be too exotic by then because of the wide distribution of the CD medium. The recording surface of a CD-ROM is vulnerable to scratches though and should be handled carefully. It is possible to have the surface lacquered to protect it.

The system is functioning very well, and we will of course help with additional comments and addresses, if others should be interested in using a similar video system set up.

The MiniCat programmes from Prostar Interactive Media can be found at http://www.minicat.com. Other relevant web addresses are: Fractal Imager by Iterated Systems (http://www.iterated.com/); Hewlett Packard CD-burner 4020 (http://www.hp.com/); MRT Video Port Professional (http://www.mrtmicro.com/); Syquest EZ135 removable hard disk (http://www.syquest.com/)

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CAUGHT IN THE WEB

The Nanoworld Home Page (http://www.uq.oz.au/nanoworld/nanohome.html) from the Centre for Microscopy and Microanalysis at the University of Queensland is well worth checking out. It contains a large library of SEM images, including some of pollen. The images are large and take a while to download, but the wait is usually worth it.

It's a bit limited as yet but another site to keep an eye on is **Great Canadian Scientists** (at http://fas.sfu.ca/css/gcs/main.html). It contains biographies and background information on selected Canadian scientists. No palynologists there yet but it's good to see Canadian science getting some promotion.

If you're looking for maps on-line, a good place to start is the **Maps and References** list provided by the Centre for Global and Regional Environmental Research at the University of Iowa (http://www.cgrer.uiowa.edu/servers/servers_references.html). It focusses on the US but has links to many on-line data sources.

And finally, don't forget to drop by the **CAP WWW presentation** (http://www.ualberta.ca/~abeaudoi/cap/cap.html) and see what's new.

Yu, Zicheng, 1997. *Late Quaternary Paleoecology of the Southern Niagara Escarpment, Ontario, Canada: A Multiple Proxy Investigation of Vegetation and Climate History.* Unpublished Ph.D. dissertation. Department of Botany, University of Toronto, Toronto, Ontario. 380 pp. Supervisor: J. H. McAndrews.

Multiple proxy data from Crawford Lake and Twiss Marl Pond revealed a complete vegetation and climate history since deglaciation at ~13,000 ^{14}C BP. Fossil pollen and plant-macrofossils indicate that *Dryas integrifolia* - *Alnus* cf. *crispa* sparse tundra or periglacial desert was succeeded by *Salix herbacea* - *Juniperus* - Cyperaceae dense tundra. Afforestation started at ~12,000 BP, dominated by *Picea* woodland until 10,000 BP. Holocene vegetation changed from *Pinus*-dominated forest at 10,000-7500 BP, through mixed *Tsuga*-hardwood forest at 7500-4800 BP, then to a *Fagus-Acer* hardwood forest for most of the last 4800 years. *Tsuga* shows non-recovery from its 4800 BP decline and a second more destructive decline at 2700 BP. Plant macrofossils and conifer stomata refined the postglacial vegetation reconstruction, especially *Thuja* and *Juniperus* history.

The Younger Dryas cooling event (YD) at 10,920-10,000 ^{14}C BP was indicated by a 1-3‰ negative excursion in δ^{18}O, an increase in minerogenic matter and high concentrations of erosion-derived elements (Al, Na, K, Ti and V) from four cores at two sites. The Preboreal Oscillation (PB) at 9650 ^{14}C BP was indicated by *Picea* recurrence and a decrease (0.4‰) of δ^{18}O. A probable pre-YD cooling event shortly before 11,000 BP was indicated by a 0.8‰ decrease of δ^{18}O. The sequence, magnitude and timing that matched in detail with records from the Atlantic Seaboard indicate that these oscillations were an expression of global climate changes rather than local meltwater-induced cooling.

Multiple data documented differential responses of natural systems. The δ^{18}O was the first among the proxies to show the Bølling-Allerød (BOA) warmth, as early as ~12,500 BP, indicating rapid response of δ^{18}O in precipitation to climate. The *Picea* woodland established after peaks of δ^{18}O and carbonate, suggesting a lag response of upland vegetation. Warmth-loving aquatics also indicate BOA warmth. Increased openings of forest and accelerated soil erosion were in response to YD cooling, but there were no forest transformations, due to insensitive *Picea*-dominated non-ecotonal vegetation. However, the *Picea-Pinus* ecotonal vegetation responded to the PB event. Proliferation of *Pediastrum* during the YD interval and abrupt declines in abundance of freshwater gastropods at the Holocene warming and tundra-*Picea* transition suggest that aquatic biota were sensitive to changing environments.

Sediment hiatuses, detritus layers and in-washed stream moss layers in five cores at Crawford Lake show the lake level was low at ~4800-2000 BP, caused by decreased effective moisture. The negative shift of 2.4‰ in δ^{18}O between ~5000 and 2000 BP indicates a change in δ^{18}O of source meteoric water. In the late mid-Holocene, the isotopically-heavy moisture from the Gulf of Mexico, the major moisture source for the study area, might have been reduced, probably due to more frequent blockage by the eastward extension of dry North Pacific air with

depleted ^{18}O. This hypothesis implies that the $\delta^{18}O$ of paleo-precipitation in the mid-Holocene reflected moisture-source history more strongly than paleo-temperature.

Reasoner, Mel A., 1996. *Late Quaternary Alpine and Subalpine Lacustrine Records: Canadian and Colorado Rocky Mountains.* Unpublished Ph.D. dissertation. Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta. xiii + 132 pp. Supervisor: N. W. Rutter.

This is a paper-format thesis and consists of the following five papers:

Reasoner, Mel A., 1993. Equipment and Procedure Improvements for a Lightweight, Inexpensive, Percussion Core Sampling System. *Journal of Paleolimnology* 8:273-281.

This paper describes improvements for an inexpensive, lightweight percussion core sampling system and presents examples of recovered core. The system has proven most effective in remote settings where the weight of a coring system may be a constraint. Cores of up to 5.5 m in length have been recovered and the system has functioned successfully in water depths to 200 m. The system weighs approximately 25 kg and costs less than $450.00 (U.S.).

The percussion corer is designed for operation from a stable ice pack surface. The core barrel assembly is lowered through the water column and driven into sediment with a weighted driver. A secondary line is used to raise and drop the driver. The driver is guided to the core barrel assembly by the main line. Cores are retrieved by a simple pulley system anchored to the ice pack.

Reasoner, M. A., G. D. Osborn and N. W. Rutter, 1994. Age of the Crowfoot Advance in the Canadian Rocky Mountains: A Glacial Event Coeval with the Younger Dryas Oscillation. *Geology* 22:439-442.

A suite of sediment core samples was recovered from two lakes, Crowfoot and Bow Lakes, that are adjacent to the Crowfoot moraine type locality, to identify and radiocarbon date sediments related to the Crowfoot Advance. The Crowfoot moraine system, widely recognized throughout northwestern North America, represents a glacial advance that is post-Wisconsin and pre-Mazama tephra in age. An interval of inorganic sediments bracketed by AMS radiocarbon dates of *ca.* 11,330 and 10,100 ^{14}C yr B.P. is associated with the Crowfoot moraine. The Crowfoot Advance is therefore approximately synchronous with the European Younger Dryas cold event (*ca.* 11,000 - 10,000 ^{14}C yr B.P.). Furthermore, the termination of the Crowfoot advance also appears to have been abrupt. These findings illustrate that the climatic change responsible for the European Younger Dryas event extended beyond the northern Atlantic basin and western Europe. Equilibrium-line altitude (ELA) depressions associated with the Crowfoot advance are similar to those determined for the Little Ice Age advance, whereas Younger Dryas ELA depressions in Europe significantly exceed Little Ice Age ELA depressions.

Reasoner, Mel A., in prep. Postglacial Vegetation and Climate History of the Upper Bow Valley, Banff National Park, Canada.

A palaeoenvironmental reconstruction for the upper Bow Valley in the central Canadian Rocky Mountains is based on radiocarbon and tephra dated core samples from Crowfoot Lake, Alberta. The type Crowfoot terminal moraine forms the western shore of the lake and late Neoglacial terminal moraines are situated approximately 200 m further West. Meltwaters from the

Crowfoot advance and subsequent glacial events fed directly into the southern Crowfoot basin. The site is situated in the upper subalpine forest close to ecotonal boundaries associated with alpine timberline. Consequently, the Crowfoot Lake record provides a sensitive record of glacial activity and vegetation change in the upper Bow Valley that spans >11,300 ^{14}C years.

Bow Valley ice had receded upvalley from the Crowfoot Lake basin shortly before *ca.* 11,330 ^{14}C yr BP. Inorganic sediments associated with the Crowfoot advance were deposited in the basin during the Younger Dryas Chron (11,330 - 10,100 ^{14}C yr BP). Prior to *ca.* 10,100 ^{14}C yr BP, the local vegetation in the upper Bow Valley was a sparse shrub - herb community dominated by *Artemisia* and Poaceae. The pre - 10,100 ^{14}C yr BP portion of the palaeobotanical record does not appear to chronicle climate changes in the area, however, little time was available for vegetation response between deglaciation of the upper Bow Valley and the onset of the Crowfoot advance. Dramatic changes in the paleobotanical records concomitant with the abrupt onset of organic sedimentation in the lake basin reflect the establishment of an open Pinus dominated forest at ca. 10,100 ^{14}C yr BP. By *ca.* 4165 ^{14}C yr BP *Picea* and Abies were dominant components of the local closed forest and subordinate xerophytic taxa were in decline. Further, the consistent presence of *Selaginella selaginoides* (local) and *Tsuga heterophylla* (regional) after *ca.* 4165 ^{14}C yr BP suggest increases in precipitation. The Crowfoot Lake paleobotanical records indicate sharp declines in all local arboreal taxa at *ca.* 905 ^{14}C yr BP along with increases in several taxa common to modern alpine tundra and subalpine meadow. Declines in local arboreal taxa at this time likely reflect expansions of valley floor meadows and descending alpine timberline in the drainage. In addition, this late Holocene vegetation response is approximately coincident with renewed glaciogenic sedimentation in the basin.

Menounon, Brian, and Mel A. Reasoner, in press. Evidence for cirque glaciation in the Colorado Front Range during the Younger Dryas Chronozone. *Quaternary Research*.

Late Pleistocene glacial chronologies developed for the Front Range Mountains of Colorado include two or more cirque advances locally known as the Santana Peak Advances. Sediment cores were recovered from Sky Pond, an alpine lake (3320 m a.s.l.) located less than 100 m downvalley from a moraine that exhibits late Pleistocene to early Holocene relative age features and appears to correlate to the Santana Peak deposits. One of the cores penetrated 45 cm of basal diamict and recovered overlying sediments that are predominantly gyttja. An accelerator mass spectrometry (AMS) age of 12,040±60 ^{14}C yr BP was obtained from directly above the basal diamict and is similar to other reported ages for cirque deglaciation in the Front Range Mountains. The lower portion of the gyttja contains an interval of clastic sediments that show characteristics consistent with glacial activity in alpine catchments. Radiocarbon ages obtained from below and near the upper contact of this clastic interval are 11,070±50 and 9970±80 ^{14}C yr BP respectively. An additional AMS age of 10,410±90 ^{14}C yr BP was obtained from within the clastic interval in a second core. The most likely source for this interval of clastic sediments is a moraine situated directly upvalley from Sky Pond, and consequently, it appears that the deposition of this moraine was coeval with the European Younger Dryas event (11,000 - 10,000 ^{14}C yr BP). Similarities in soil development, weathering features, and altitude between this moraine and the type Satanta Peak moraines suggest that the moraines are correlative. These findings are in agreement with a growing body of evidence that suggests a relatively minor advance of alpine glaciers occurred in the North American Rockies during the Younger Dryas Chron.

Beaudoin, A. B., and M. A. Reasoner, 1992. Evaluation of Differential Pollen Deposition and Pollen Focussing at Three Holocene Intervals in Lake O'Hara, Yoho National Park, British Columbia, Canada: Intra-Lake Variability in Pollen Percentages, Concentration and Influx. *Review of Palaeobotany and Palynology* 75:103-131.

Pollen spectra from three discrete intervals, dated by tephras and radiocarbon, are examined in a lake-wide series of nineteen cores from Lake O'Hara, Yoho National Park. These represent three different pollen assemblage zones recognized in the record of a single core (LOH25). The three sample sets provide lake-wide pollen assemblages at *ca.* 2350, *ca.* 6800, and *ca.* 10,100 yr BP. These spectra are used to investigate two aspects of pollen accumulation: 1. whether pollen taxa have been differentially deposited in sediments in different parts of the lake basin, and 2. whether the entire assemblage has accumulated to a greater extent in deeper parts of the basin ("pollen focussing"). Percentages of the ten major taxa in the assemblages show remarkable basin-wide consistency within each sample set, suggesting that in this case a single core provides a representative pollen record. Multivariate statistical analyses (discriminant function analysis and analysis of variance) on pollen percentage, concentration, and influx data confirm that sample sets are distinctly different and supports zonation of the pollen record from a single core. Minor components of the assemblages (< 1% of the pollen sum), mainly NAP, show great variability within and between sample sets and are therefore not reliable for interpretation of vegetation history. Lack of evidence for differential pollen deposition confirms that qualitative inferences based on major components of the pollen sum are probably reliable despite core location within the lake basin. The data do not display consistent evidence for greater pollen accumulation at deeper water sites implying that pollen focussing has not been a major process. Sedimentation rates are variable across the basin at each level, suggesting that pollen concentration and particularly pollen influx data may be unreliable for interpretation of vegetation history from a single core, without much greater chronologic control.

Pellatt, Marlow G., 1996. *Postglacial Changes in Vegetation and Climate near Treeline in British Columbia.* Unpublished Ph.D. dissertation. Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia. 177 pp. Supervisor: Rolf W. Mathewes.

Plant macrofossils and pollen were studied in sediments from six small subalpine lakes on the Queen Charlotte Islands and in the northern Cascade Mountains of southwestern British Columbia. Two major climatic intervals are inferred from treeline shifts on the Queen Charlotte Islands, and three climatic intervals are detected from sites on Mount Stoyoma in the Cascades. The two main climatic intervals on the Queen Charlotte Islands correspond with the early Holocene xerothermic period and neoglaciation. The three main climatic intervals on Mount Stoyoma correspond with the early Holocene xerothermic period, the mesothermic period, and neoglaciation.

Paleobotanical evidence from subalpine lakes on the Queen Charlotte Islands documents the local presence of western hemlock and Sitka spruce between 9600 and 6650 radiocarbon years before present (^{14}C yr BP), indicating warmer than present conditions during the early Holocene xerothermic period. Following this warm period (after 6000 ^{14}C yr BP) the establishment of subalpine forest begins, with conditions similar to present developing by 3500 ^{14}C yr BP. This cool

ing corresponds with glacial advances observed in southwestern British Columbia and the Rocky Mountains.

Similar vegetation and climate changes were inferred from lake sediments on Mount Stoyoma in the northern-most Cascades, supporting the contention that regional climatic changes, rather than local site factors, were responsible for the major observed patterns. Warm and dry conditions are indicated prior to Mazama tephra deposition (6800 ^{14}C yr BP), during the early Holocene xerothermic period. Increasing precipitation between 6800 and 3500 ^{14}C yr BP corresponds with the mesothermic period. Modern subalpine communities become established around 3500 ^{14}C yr BP.

Surficial sediment samples from forty-two lakes, distributed from sea-level to the subalpine of coastal British Columbia, were analysed for pollen and spores. Pollen analysis revealed characteristic differences among the assemblages of the Coastal Western Hemlock, Mountain Hemlock and Engelmann Spruce-Subalpine Fir biogeoclimatic zones. Cluster analysis and detrended correspondence analysis correctly group the sites according to their biogeoclimatic zones and geographic origin. Canonical correspondence analysis groups the study sites into biogeoclimatic zones in relation to annual precipitation, growing season precipitation, annual snowfall, annual temperature and growing degree days. These modern samples are useful in identifying possible analogues for Holocene fossil pollen assemblages.

Announcements

APPLIED BIOSTRATIGRAPHY OF ASIA-PACIFIC BASINS

A masters degree in applied science

The demands of the modern exploration industry require the ability of biostratigraphers to apply contemporary techniques to fossil data and integration of results with a broad range of geological information. An understanding of basin analysis techniques for applied stratigraphy is fundamental to the efficient use of paleontological data. This course is designed to give specialized training in biostratigraphy, particularly with respect to the needs of the hydrocarbon exploration industry in the Asia-Pacific region. The course is run jointly by Massey University and the Institute of Geological and Nuclear Sciences in New Zealand. It runs from July 1 to June 30 the following year and consists of two compulsory papers (Applied Micropaleontology, and Applied Stratigraphical Techniques) and a Research Thesis on a topic of the student's choosing. For this, students are encouraged to work on material from their own local area. For further information, please contact:

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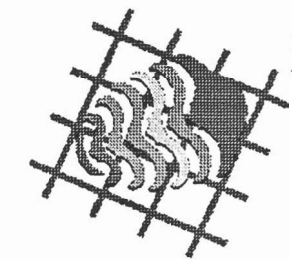

Palaeontologica Electronica

(An Electronic Paleontological Journal)

"All the paleontology fit to print."

The first electronic paleontological journal *Palaeontologica Electronica* is now accepting papers for volume 1. *Palaeontologica Electronica* is an internationally-sponsored, peer-reviewed general paleontological journal of the widest possible scope. Technical contributions in the form of papers, editorials, book reviews, announcements, etc. from any branch of paleontology (e.g., micropaleontology, palynology, invertebrate paleontology, paleobotany, vertebrate paleontology) or related biological discipline and on any topic will be welcome within its pages. These contributions will come from members of the professional paleontological and biological communities in the same way that contributions to standard print-based paleontological journals are authored and submitted. All technical papers will be reviewed by professional paleontologists and biologists (using advice from an international panel of associate editors), edited to be accessible to non-specialists, and published as html documents accessible to all with Internet connections via the World Wide Web (WWW). The publication of descriptive taxonomic papers—especially those having to do with the naming of species and higher taxa—will not be encouraged in *Palaeontologica Electronica* at the present time because the current codes of zoological and botanical nomenclature do not recognize electronic publications (though we expect this situation to change in the foreseeable future). All other types of formal paleontological and biological papers will be considered.

Unlike traditional print-based journals, *Palaeontologica Electronica* will be highly graphical in both format and content. Authors will be encouraged to make use of color in their figures and tables and to include high-resolution digital images as illustrations. Moreover, *Palaeontologica Electronica* will encourage active experimentation with animation, 2D and 3D modelling of morphologies, online access to databases, and the creation of online data analysis tools. There will be NO PAGE LIMIT and NO PAGE CHARGES for articles published in *Palaeontologica Electronica*, though all articles will be edited to optimize their information content. This freedom from normal print-publishing overheads is made possible because of the unique advantages of the digital format and because there will be no analogue to the paper, typesetting, and distribution costs. Each volume of *Palaeontologica Electronica* will also be available free-of-charge via the WWW for one publishing year. After this time, archive copies will be available to individuals and institutions on CD-ROM from the Paleontological Society and the Palaeontological Association.

Authors wishing to submit manuscripts for review may consult the WWW addresses listed below for Author Guidelines. We would prefer that manuscripts be submitted to either of the executive editors as electronic word processor documents (MS-Word or WordPerfect for Macintosh or Windows platforms preferred), with figures submitted in GIF, TIFF, JPEG, or EPS graphics formats (minimum resolution for review: 200 dpi). Tables may be submitted as tab-delimited text files, or as MS-Excel worksheets (both Macintosh or Windows versions accepted). If you cannot match these formats please contact the editors for alternatives. Hard-copy manuscripts will be accepted for review, but will require additional time to process. [Note: if you need to submit a hard-copy manuscript please contact one of the executive editors prior to the actual submission.] Manuscript files may be sent as compressed archives on 3.5" floppy disks to the executive editor's surface mail addresses, as e-mail

attachments (by prior arrangement with the editor) or deposited in a public ftp site (by prior arrangement with the editor).

Additional information about *Palaeontologica Electronica* and Author Guidelines are available from the following WWW addresses: http://www.ucmp.berkeley.edu/Paleonet/pe/glines.html (North America), http://www.nhm.ac.uk/paleonet/pe/glines.html (UK and Europe)

The sponsors of *Palaeontologica Electronica* are: Paleontological Society*, Palaeontological Association*, Cushman Foundation for Foraminiferal Research, Research Sociedad Espanola de Paleontologìa, British Micropalaeontological Society, Canadian Association of Palynologists (*Designates Tier 1 sponsors; remainder constitute Tier 2 sponsors).

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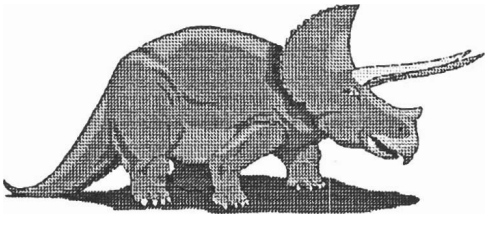

CAP 1997 ANNUAL GENERAL MEETING

The CAP 1997 Annual General Meeting will be held during the AASP Meeting at Woods Hole. The AGM will be held on Monday, 15 September 1997. The meeting time has been set provisionally for 8 pm; if scheduling allows, the time may be changed to 7 pm. Please check the program at the conference for exact time and room assignment for the AGM. CAP Members wishing to place items on the agenda should contact CAP Secretary/Treasurer Francine McCarthy or President-Elect Rob Fensome prior to the meeting. All CAP Members and Correspondents are invited to attend. Other interested palynologists are also welcome to attend the AGM.

CANADIAN PALEONTOLOGY CONFERENCE

The annual Canadian Paleontology Conference will be held between September 27-29, 1997, at the Department of Geological Sciences, University of Saskatchewan, Saskatoon. The meeting will consist of a two day field trip through southern Saskatchewan visiting fossil localities, followed by a one day technical session of oral and poster presentations. The abstract deadline is June 27. For further information, please contact:

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DINO 6

Trondheim, Norway
June 7-12 1998

Objectives and scope: This international meeting is aimed at integrating biological, biochemical and geological research on dinflagellates. The main gaol is to bring together specialists with various backgrounds but related research interests in studies of modern and fossil dinoflagellates. The conference will focus on all aspects of dinoflagellate research including lifecycles, morphology/taxonomy, biochemistry, growth and productivity, ecology, biostratigraphy, and dinoflagellate distribution in recent and ancient environments. Themes of direct interest to both biologists and geologists are emphasized. These include: dinoflagellate evolution; productivity of recent and ancient seas; biogeography and ocean circulation (present and past); dinoflagellates and the climatic record; dinflagellate habitats; calcareous dinoflagellates; biochemistry and fossil biomarkers; and harmful dinoflagellates. Robert Fensome and Max Taylor are special theme convenors for "Dinoflagellate evolution (taxonomy, molecular phylogenetics, life cycles etc.)". A workshop on Neogene and Quaternary dinoflagellates, organized by Martin J. Head, Kari Grøsfjeld, Niels Poulsen, and Anne de Vernal, and a two-day workshop on calcareous dinoflagellates, organized by Helmut Willems, Dorothea Janofske, and Karin Zonneveld, will be held in connection with the meeting.

Call for papers: Papers which highlight new developments in dinoflagellate research and demonstrate aspects of general interest to both biologists and geologists are invited. In this context, studies that can serve as a link between the present day dinoflagellate distribution and the paleo-record are particularly welcome. It is intended that examples from around the world and from a variety of recent and ancient environments will be presented. A number of keynote speakers have been invited to address selected themes. Among these fifteen presentations are the following which feature CAP members: Sarah P. Damassa and Graham Williams on "Paleobiogeography of North Atlantic Paleogene dinoflagellates", and Martin J. Head and Niels Poulsen on "Neogene dinoflagellates and acritarchs: biostratigraphy and climate change".

Field trip: A pre-conference field excursion is planned for June 7. This will include a plankton survey in the Trondheimsfjord, and sediment sampling at selected sites in the outer fjord area. Plankton samples and palynological preparations from the sea-bed sediment will be available for examination during the conference. The field trip will also demonstrate new equipment developed for remote sensing of phytoplankton concentrations/blooms in the open sea.

Other details: The second circular will be distributed in October 1997. The deadline for submission of abstracts and registration for the field trip is January 15 1998. Conference registration will be $250 USD ($125 USD for students) prior to the meeting.

Organization: Dino 6 is organized jointly by the Norwegian University of Science and Technology (NTNU), the Geological Survey of Norway (NGU), IKU Petroleum Research, and OCEANOR - Oceanographic Company of Norway.

More information can be found on the conference website (at http://www.ntnu.no/vmuseet/dino6). For more details or to obtain registration information, please contact:

Dino 6 Secretariat
NTNU Museum of Natural
History and Archaeology
Attn: Morten Smelror
N-7004 Trondheim, Norway
Tel: +47-73-592147
FAX: +47-73-592223
E-mail: morten.smelror@vm.ntnu.no

SYMPOSIUM ON "PALYNOSTRATIGRAPHY AT LOW LATITUDES"

Venezuela
November 16-19, 1997

Geoffrey Norris (University of Toronto) and Laurent de Verteuil (Petrotrin, Trinidad) are organizing a symposium on "Palynostratigraphy at Low Latitudes" to be held in Porlamar (Margarita Hilton; Isla Margarita), Venezuela, 16-19 November, 1997. This symposium commemorates the 50th anniversary of Industrial Palynology in Venezuela and is being convened under the auspices of the Venezuelan Geological Society (SVG) in association with the 8th Venezuelan Congress of Geology and the 1st Latin American Congress of Sedimentology. For additional information on the congress, including registration costs, field trips, short courses, hotels and travel, please visit the web site of the American Association of Stratigraphic Palynologists (http://opal.geology.utoronto.ca/AASP/). For more details contact:

Laurent de Verteuil
Geological Services Laboratory
PETROTRIN Ltd.
Pointe-a-Pierre
Trinidad, WI
Tel: (809) 658-4200/10/20/30 Ex. 2317
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E-mail: devert@petrotrin.com

POLLEN AND SPORES: MORPHOLOGY AND BIOLOGY

July 6-9, 1998

This is the fourth in an occasional series of palynological conferences organised by the Linnean Society Palynology Specialist Group (LSPSG) in collaboration with the Royal Botanic Gardens, Kew and the Natural History Museum, London. The programme will be a selection of both invited and contributed papers and posters on the following topics: Pollen development; Anther and tapetum; Pollen-pollinator interactions; Pollen-stigma interactions; Pollen morphology in systematics and evolution; Ultrastructure (fossil and living groups); Pre-Cretaceous palynology; Cretaceous palynology; Tertiary palynology; Quaternary palynology; Palynology and archaeology; Preparation and techniques. For more information contact:

Lisa von Schlippe
Conference Administrator
Royal Botanic Gardens, Kew
Richmond, Surrey, TW9 3AB, England, U.K.
FAX + 44 (0)181 332 5176/5278
E-mail: l.von.schlippe@rbgkew.org.uk

CIMP 1998

The next Symposium of the Commission Internationale de Microflore Paleozoique (CIMP) will be held in Pisa, Italy, September 11 to 15, 1998. The provisional program includes plenary lectures, two Subcommission symposia (running in parallel), short workshops of CIMP working groups, and a microscope session. Contributed oral and poster presentations will be accepted; no parallel scientific activities will take place during the poster session. Social events will include guided visits to the medieval towns of Pisa and Lucca and a gala dinner. The meeting will include a field excursion featuring the Paleozoic sequence of Southern and Central Sardinia. For more details contact:

Organizing Committee CIMP '98
Universita di Pisa
Dipartimento di Scienze della Terra
Via S. Maria 53 - I 56126
Pisa, Italy
FAX: +39-50-500932
E-mail: albani@dst.unipi.it

DEADLINES

Please submit items for the next *CAP Newsletter* (Volume 20, Number 2, December 1997) by November 15 1997. I prefer to receive material in MS-DOS WordPerfect 5.1 or 6.0 format; text files are also fine. I encourage submission of material by disk or, preferably, e-mail. Each item should also be sent as hardcopy. Articles may include diagrams and photos; for photos, please provide a glossy black-and-white or colour print (3" x 5" or 6" x 4") from a picture with good contrast. Illustrations may also be submitted in CorelDraw 4.0 format or as bitmap files (.tif or .pcx). Please send material to:

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CHANGES OF ADDRESS

Please note the following new addresses for Tom Demchuk and David Jarzen, respectively:

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Meeting calendar

1997

June 9-13: First International Conference - Applications of Micropaleontology in Environmental Sciences. Tel Aviv, Israel. Details: Prof. Valentina Yanko, Institute for Nature Conservation Research, Tel Aviv University, Ramat Aviv, Tel Aviv, Israel 69978. FAX: (972) 640-7304, E-mail: valyan@post.tau.ac.il

June 25-29: VIII International Conference on Harmful Algae. Vigo, Spain. Details: Beatriz Reguera, Conference Coordinator, VIII International Conference on Harmful Algae. Instituto Español de Oceanographía, Aptdo 1552 36280 Vigo, Spain.

August 24-31: GCTE/PAGES/IGAC/BAHC Workshop. Theme: "Spatial-temporal dimension of High-Latitude Ecosystem Change (Siberian IGBP Transect)". V. N. Sukachev Institute of Forest, Krasnoyarsk, Russia. Details: Dr Elena Muratova, V.N. Sukachev Institute of Forest, Russian Academy of Sciences, Siberian Branch, Academgorodok, Krasnoyarsk, Russia, 660036. FAX: +7-39-12-43-36-86, E-mail: dndr@ifor.krasnoyarsk.su

August 28-September 2: 7th International Symposium on Palaeolimnology. Heiligkreuztal/Riedlingen, Germany. Details: Dr Andy Lotter, Geobotanisches Institut, Universitaet Bern, Altenbergrain 21, CH-3013 Bern, Switzerland. Tel: +41 31-631 4932, FAX: +41 31-332 2059, E-mail: lotter@sgi.unibe.ch

September 9-10: Scientific Birthday Party for Herbert E. Wright Jr. Wengen, Switzerland. Details: Dr Brigitta Ammann, Geobotany, Altenbergrain 21, 3013 Bern, Switzerland. FAX: +41 31-332 20 59, E-mail: ammann@sgi.unibe.ch

September 7-13: Third Symposium of African Palynology. University of the Witwatersrand, Johannesburg, South Africa. Includes a ten-day pre-meeting field trip to the Cape and a one-day post-meeting trip to the Makapansgat Australopithecine site. Details: Dr Ann Cadman, BPI (Palaeontology), University of the Witwatersrand, PO WITS, 2050, South Africa. FAX: 27 11 403 1423, E-mail: 106caa@cosmos.wits.ac.za

September 7-12: Peribaltic Group of the INQUA Commission on Glaciation - A Field Symposium on Glacial Geology at the Baltic Sea Coast in Northern Germany. University of Kiel, Germany. Details: Dr habil. Jan A. Piotrowski, Institute of Geology and Palaeontology, University of Kiel, Olshausenstr. 40-60, D-24118 Kiel, Germany, Tel: +49 (0)431 880 2878, FAX: +49 (0)431 880 4376, E-mail: noe57@rz.uni-kiel.d400.de

September 14-19: AASP 1997 Annual Meeting. Woods Hole, Massachusetts, U.S.A. Includes an extended seminar series on the evolution of the marine phytoplankton in addition to the regular technical sessions. See announcement, *CAP Newsletter* 19(2):40, 1996. CAP's AGM will be held at this meeting, see announcement p. 24. Details: Paul K. Strother, Weston Observatory of Boston College, Department of Geology & Geophysics, Weston, Massachusetts 10293, U.S.A. Tel: (617) 552-8395, FAX: (617) 552-8388. E-mail: strother@bc.edu or Reed Wicander, Department of Geology, Central Michigan University, Mount Pleasant, Michigan 48859, U.S.A. Tel: (517) 774-3179, FAX: (517) 774-2142. See: http://www2.bc.edu/~strother/1997/1997.html

September 26-30: Seventh Canadian Paleontology Conference. Saskatoon, Saskatchewan. See announcement, p. 24. Details: Brian Pratt, Convenor, Department of Geosciences, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 5E2, Canada. Tel: (306) 966-5725, E-mail: brian.pratt@usask.ca

September 29-October 6: RCANS Second Congress - Main Changes in the Marine and Terrestrial Atlantic During the Neogene. RCANS is the Regional Committee on Atlantic Neogene Stratigraphy, Subcommission on Neogene Stratigraphy. Salamanca, Spain. Details (scientific program): Secretary of the Organizing Committee, Departamento de Geologia (Paleontologia), Facultad de Ciencias, Universidad de Salamanca, 37008 Salamanca, Spain. Tel: 34-23-294497, FAX: 34-23-294154, E-mail: civis@gugu.usal.es or angel@gugu.usal.es Details (registration): Secretaria Tecnica RCANS Second Congress, Viajes y Congresos, S.A., c/Sierpes, 9, 37002 Salamanca, Spain. Tel: 34-23-267292, FAX: 34-23-269208

October 20-23: GSA Annual Meeting. Salt Lake City, Utah. Theme: "Global Connections". Details: GSA HQ, Box 9140, 3300 Penrose Place, Boulder, Colorado 80301. Tel: (303) 447-2020, X133, E-mail: meetings@ geosociety.org

November 16-19: Symposium on "Palynostratigraphy At Low Latitudes". Porlamar, Venezuela. See announcement, p. 26. Details: Laurent de Verteuil, Geological Services Laboratory, PETROTRIN Ltd., Pointe-a-Pierre, Trinidad, WI, Tel: (809) 658-4200/10/20/30 Ex. 2317, FAX: (809) 658-3074, E-mail: devert@petrotrin.com. Website: http://opal.geology.utoronto.ca/AASP/

December 9-12: The Ninth Brazilian Meeting of Paleobotanists and Palynologists. In memoriam: Prof. Dr. Murilo Rodolfo de Lima. Guarulhos, São Paulo, Brazil. Details: Profa. Dra. Maria Judite Garcia (President, Organizing Committee), Universidade de Guarulhos, Departamento de Geociências, Praça Tereza Cristina, 01 Guarulhos, Sao Pãulo, Brazil - 07023-070 Telephone: 55 (11) 6464-1708, FAX: 55 (11) 6464-1702 , 6464-1708 or 6440-2030, E-mail: geo@server.ung.br

1998

February 10-13: 7th International Nannoplankton Association (INA) Conference. La Parguera, Puerto Rico. Will include results from all fields of nannoplankton research, including both palaeontological and biological aspects, with a special session on the role of coccolithophores in global change. Details from website: http://wwei.ucsd.edu/INA7.htm

April 6-10: 3rd International Symposium: C14 and Archaeology. Lyons, France. Details: Secretariat of the C14 and Archaeology Symposium, Centre de Datation par le Radiocarbone - Batiment 217, 43, Bld du 11 Novembre 1918, 69622 Villeurbanne Cedex, France. FAX: (33) 72 43 13 17.

May 18-20: GAC/MAC Meeting. Québec City, Québec. Will include a Special Session on "Distribution Patterns of Fossils in Paleozoic Sequences of Northeastern North America". Field trip on "Paleontology, Stratigraphy and Sedimentology of Lower to Middle Paleozoic Rocks of the Anticosti Basin, National Park of Mingan Islands and Anticosti Island". The Association québecoise pour l'étude du Quaternaire (AQQUA) will hold its annual meeting during the conference, and will co-sponsor, with the Canadian Geomorphology Research Group (CGRG), a symposium on "Quaternary sea levels in Canada, particularly during the Holocene". Details: Mme Agathe Morin, Département de géologie et de génie géologique, Université Laval, Pavillon Adrien-Pouliot, Sainte-Foy, Québec, G1K 7P4, Canada. Tel: (418) 656-2193, FAX: (418) 656-7339, E-mail: quebec98@ggl.ulaval.ca Website: http://www.ggl.ulaval.ca/quebec98.html

June 7-12: Dino 6. Trondheim, Norway. See announcement, p. 25. Details: Dino 6 Secretariat, NTNU Museum of Natural History and Archaeology, Attn: Morten Smelror, N-7004 Trondheim, Norway. Tel: +47-73-592147, FAX: +47-73-592223, E-mail: morten.smelror@vm.ntnu.no. Website: http://www.ntnu.no/vmuseet/dino6

June 24-26: 7th International Conodont Symposium (ECOS VII). Bologna and Modena, Italy. Details: M. C. Perri, Dipartimento di Scienze della Terra e Geologico Ambientali, via Zamboni 67, 40126 Bologna, Italy, Tel: 39-51-354560, FAX: 39-51-354522, E-mail: perri@geomin.unibo.it

June 28-July 5: Gondwana 10: Event Stratigraphy of Gondwana. An International "Out of Africa" Symposium: University of Cape Town, South Africa. Details: Deborah McTeer, Gondwana 10 Congress Co-ordinator, Postgraduate Conference Division, UCT Medical School, Anzio Road Observatory, 7925, Cape Town, South Africa. Tel: +27-21-406-6348, FAX: +27-21-406-6263, E-mail: deborah@medicine.uct.ac.za Website: http://www.uct.ac.za/depts/cigc

July 6-9: Pollen and Spores: Morphology and Biology. Palynological conference organized by the Linnean Society Palynology Specialist Group (LSPSG) in collaboration with the Royal Botanic Gardens, Kew and the Natural History Museum, London. See announcement, p. 26. Details: Lisa von Schlippe, Conference Administrator, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, England, U.K., FAX + 44 (0)181 332 5176/5278, E-mail: l.von.schlippe@rbgkew.org.uk

July 7-11: FORAMS '98. Monterrey, Mexico. Details: gamper@servms.fiu.edu

September 11-15: Symposium of the Commission Internationale de Microflore Paleozoique (CIMP). Pisa, Italy. See announcement, p. 26. Details: Organizing Committee CIMP '98, Universita di Pisa, Dipartimento di Scienze della Terra,Via S. Maria 53 , I 56126, Pisa, Italy. FAX: +39-50-500932, E-mail: albani@dst.unipi.it

CAP MEMBERSHIP FORM

Canadian Association of Palynologists (CAP) membership is open to all members of the palynological community in Canada. The Association is devoted to promoting the exchange of information among palynologists in Canada. Palynologists from outside Canada may become corresponding members for the same dues, with no voting rights. Membership dues include two issues a year of the *CAP Newsletter*, to which all members are invited to contribute. CAP is also affiliated with the International Federation of Palynological Societies (IFPS) and CAP members receive two issues of the IFPS newsletter (*PALYNOS*) each year.

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CAP membership dues are $10 per year in Canadian funds payable at the beginning of the year. Lapsed members are removed from the mailing list after one year, following a reminder notice. Members may, if they wish, pay for up to three years in advance. Please send a cheque or money order payable to CAP to:

Francine M.G. McCarthy, Department of Earth Sciences, Brock University, St. Catherines, Ontario, L2S 3A1, Canada

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