Canadian Association of Palynologists
Association Canadienne des Palynologues

NEWSLETTER

Volume 22 Number 2 December 1999

Season's Greetings!

President's Message

This, of course, is the last CAP presidential message of the millennium. (Trumpet fanfare!) So, at the risk of widespread yawns at yet another Y2K-related retrospective, I would like to reflect briefly on the accomplishments of Canadian palynology over the past century. When the topic came to mind (and clearly it didn't require great leaps of mental gymnastics), I thought that I might do a long, somewhat erudite tome on the topic, with appropriate help from other members. While such a compilation remains, I think, a worthy CAP goal in the future, pressures of time and work have limited my current ambition to a more polemic statement. I trust you'll understand (perhaps sharing my relief) and forgive any glaring omissions.

Palynology is a multifaceted affair, wherein lies its great strength. On our microscope slides, we find everything from Precambrian problematics to practically perfect Pleistocene pine pollen. And in a land the size of Canada, there is an enormous potential for all branches of the subject - enough material to keep a pool of palynologists busy for many millennia. This is palynology's first century - in Canada as elsewhere - and even though we've barely scratched the surface of what is available, major strides have been made.

Two important contributions of palynology to Canadian geoscience have been in the fields of vegetational history and climate change on the one hand, and petroleum exploration on the other. From the last glacial maximum to the present state of ice retreat, palynology (in the guise of pollen analysis), more than any other discipline, has revealed the progress of changing environments. Tundra, boreal forest, mixed forest and prairie floras are all recorded in the pollen record. Sometimes innovative methodology has been needed to obtain an accurate understanding of how the pollen assemblages relate to the vast changes that have occurred in the Canadian landscape, but this exercise has usually added further insights. And the value of this work is by no means limited to an interpretation of the past. The pattern of changes to the flora over the past ten or so millennia is itself a powerful predictive tool of what may be in store for the Canadian environment in the future, knowledge that is clearly important to all of us. In addition to the pollen studies, more recently, Quaternary dinoflagellate studies on both coasts (indeed, perhaps I should write "all three coasts") are helping to sharpen the focus of the ocean's role in climate change.

For better or for worse, the continued supply of reasonably priced oil and natural gas is also important to practically all Canadians. Other disciplines such as geophysics, although

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crucial, can only go so far in determining the structure and age relationships in petroleum producing and prospective sedimentary basins. Biostratigraphy has been instrumental in providing vital age control information in offshore eastern Canada, the Western Canada Sedimentary Basin and the North. And among biostratigraphers, palynostratigraphers have played a prominent role, for both private companies and government institutions, with universities also doing their share.

With regard to industrial and petroleum-related palynology, it is true that recent years have been ones of crisis, about which much has been written in columns such as this. However, it seems to me that this crisis reflects a general change in the way oil companies operate, affecting many disciplines, rather than reflecting a failure of the palynological methodology. In my experience, regional geologists still clamour for the age control that palynology can provide, especially with the advent of sequence stratigraphy.

Palynological studies of offshore eastern Canada and the Western Canada Sedimentary Basin mostly involve analyses of Mesozoic and Cenozoic assemblages. However, most of the Canadian landmass is underlain by Paleozoic and Precambrian rocks, and palynologists have been busy here too. Some of the major pioneering studies of Devonian and Carboniferous pollen and spores were carried out by Canadians on Canadian material, especially on material from Atlantic Canada, in relation to mapping, mineral deposit and coal basin studies. Acritarch and chitinozoan studies have had a major impact on our understanding of Paleozoic marine strata, most notably perhaps in Quebec. And the vast Canadian Shield, though for the most part formed of non-sedimentary rock types, has yielded enough exciting Precambrian palynomorphs already to fuel the inquisitiveness of the handful of Canadians working this aspect of palynology.

Canadians are generally, by nature, retiring and modest. But when it comes to the contributions that Canadian palynologists and Canadian palynology have made to the discipline, both nationally and internationally, modesty is out of place. Far out of proportion to the size of the country, Canadian palynologists of the Twentieth Century have been sometimes world leaders and commonly innovators. Canadian palynologists of the Twenty-First Century have a strong foundation upon which to build and a worthy heritage. Happy New Millennium everyone!

Rob Fensome
CAP President
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Editor's Notes

As usual, many people contributed materials to this issue: Alwynne Beaudoin, Vaughn Bryant, Rob Fensome, Kevin Gostlin, Ian Harding, Martin Head, Markus Heinrichs, Jan Jansonius, David Jarzen, Susan Jarzen, Ramakant Kalgutkar, Dave Livermore, Francine McCarthy, Sandy McCracken, Dallas Mildenhall, Fred Rich, John Smol, Graham Williams, and Christina Wilson. Thank you all! Special thanks also go to the Edmonton Journal and PAGES for permission to reprint the articles on long-distance transport, and to Alwynne Beaudoin for suggesting these stories. And last, but by no means least, **thank you** to Rob Fensome and staff for printing and mailing

the newsletter.

I would like to add a new feature to the newsletter in the future: articles from you describing your labs and your research activities. Often we have only a fairly vague idea of the research projects that our members are involved in, and the capabilities and special expertise of their labs. Please let me know if you could volunteer such a write-up for the next CAP newsletter! Ideally, we would have one or two of these articles in each newsletter, thus rotating through the membership.

This is my second newsletter effort, and once again I have been impressed by the commitment and interest shown by so many of you in contributing materials. It seems to me that is an important indicator of the continuing viability of an organization such as CAP. May you each have a blessed and relaxing holiday break!

Mary Vetter
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Website Editor's Report

Since the establishment of the CAP Website in 1995, I had been carrying the duties of Website Editor and Newsletter Editor. In 1999, re-organization of the CAP Executive, following a vote by the membership, resulted in the establishment of a new Executive position, that of Website Editor. I handed over my duties as Newsletter Editor to the capable hands of Mary Vetter, and continued with duties as Website Editor. This report therefore marks the first year of this executive position.

Accesses to the CAP Website continue to grow steadily, if slowly. After a lull through the summer months, main-page accesses have increased to around 400 per month. Material has been added to the Website throughout the year. Most of this material has been derived from the CAP Newsletter, and has included a book review and an expanded listing of new publications by Canadian palynologists and about Canadian palynology. The Conference listing is updated often, and is a popular part of the presentation. This site is also being used to convey information about the upcoming CAP-sponsored symposium at the GeoCanada 2000 meeting (see p. 30).

I welcome contributions to the Website and suggestions for additional material that should be included.

Respectfully submitted
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Website Editor
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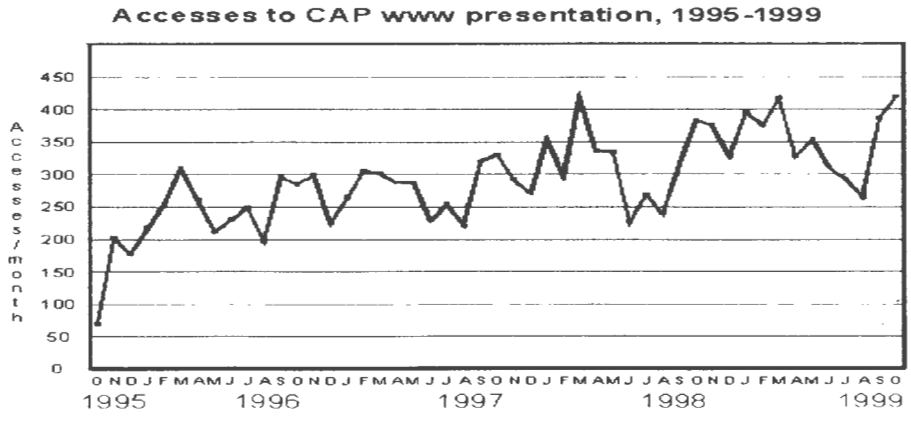

Message from Cambridge

It is a tribute to modern technology that I can sit at my computer in Cambridge and can be as "connected" to Canadian palynology - in many ways at least - as I had been during my time in Toronto. I certainly miss the comraderie of the Geology Department at Toronto, but contact with most of my CAP friends and colleagues was made over the internet, and CAP Newsletter. None of that has changed much. So, with the support of my fellow CAP Executive, I have decided not to resign as President-Elect but instead continue my term of office with CAP. Please be assured, however, that I will not utter Margaret Thatcher's immortal words: "I want to go on, and on, and on . . . ." I think by now everyone realizes one can have too much of a good thing!

I look forward to serving CAP into the next millennium, and hope to see many of you at the CAP-sponsored symposium in Calgary next year.

Yours sincerely,
Martin J. Head
CAP President-Elect

Please note my new contact details:

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From the bureaucrat's desk

New Member

On behalf of CAP, it is a pleasure to welcome Clayton Morgan (McMaster University) as a new member.

Dues Due

If your name appears below, here is a gentle reminder that **your membership subscription became due at the start of 1999**:

A. Ahmed, D. Batten, M. Boyd, G. Chmura, R. Hall, , P. Kuhry, K. Matsuoka, J. Ross, W. Sarjeant, L. Suneby, S. Sutherland, A. Traverse, J. White , V. Wiggins, and Z. Yu.

If your name appears below, your dues will become due at the **beginning of 2000:**

L. Apaalse, A. Beaudoin, E. Burden, K. Choi, B. Cumming, S. Douglas, J. Ford, L. Fortner, K. Gajewski, K. Gostlin, J. Haas, M. Heinrichs, R. Kalgutkar, E. Koppelhus, I. Larocque, A. Larouche, M. Mahmoud, J. McAndrews, F. McCarthy, C. Morgan, G. Parsons, V. Pospelova, A. Sarvis, L. Shane, J. Smol, S. Tiffin, G. Van Helden, G. Williams, C. Zutter, and Natural History Museum (London). **Thank you!**

Dues Payment

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. 38. Funds should be sent to:

Francine M. G. McCarthy
CAP Secretary/Treasurer
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CANADIAN ASSOCIATION OF PALYNOLOGISTS ANNUAL GENERAL MEETING

Thursday, 28 October 1999, 12:00 p.m. Coastal Georgia Center, Savannah, Georgia

Present: R. Mathewes, T. Demchuk, S. Tiffin, F. McCarthy

Given the very small attendance at this year's AGM, formal minutes were not kept, but the President's and Secretary-Treasurer's reports were circulated and accepted. Thomas Demchuk agreed to act as auditor for this year (see his signed report appended to the Financial Statement), and the following matters were briefly discussed:

1. Future of CAP
   T. Demchuk suggested that discussion of this important matter should be postponed until next year's AGM at the Geoscience Canada 2000 Meeting when a larger number of CAP members should be present. This suggestion was unanimously accepted.

2. Central repository for membership information / addresses at Bedford Institute of Oceanography:
   F. McCarthy reported that Rob Fensome arranged for a central repository for CAP information at BIO where he can rely on administrative assistance.

3. Location of the next CAP AGM:
   It was agreed that the obvious location for the next CAP AGM is in conjunction with the special CAP session at the Geoscience Canada 2000 meeting in Calgary in May-June 2000.

There being no other business, the meeting was adjourned.

The President, Rob Fensome, was not present at the meeting. His report was tabled and is reproduced below. The Secretary-Treasurer's Report and the Financial Report follow.

President's Report

I have the honour of presenting the final CAP President's Report of the millenium (notwithstanding arcane arguments to the contrary - the number is the thing, surely). This has been a more momentous year for CAP than usual. Our by-laws were emended for the first time since they were formulated, over 10 years ago. One of the results is that CAP now has an additional member of the executive, a Website Director, currently in the guise of Alwynne Beaudoin. Many thanks, Alwynne, for agreeing to take up that position officially after years of doing it unofficially, as well as putting in sterling service as CAP Newsletter Editor.

Another result of the by-law changes is that CAP is now a truly international organization, with non-Canadian residents/citizens being welcomed into full membership. Previously they were considered as "correspondents". I strongly believe that this is a forward step for the association, and that we can rest assured that sinister foreign interests will not compromise our Canadian essence. Obviously, the vast majority of the members that cast a ballot agreed with me.

This is perhaps the appropriate point in which to congratulate President-Elect Martin Head, who as of 1st January 2000 will move to Cambridge University to take up a research position there. In a recent e-mail to the executive, I'm delighted to report that Martin agreed "...that CAP's interests would be served better if I did not resign from the Executive, but continue as

President-Elect and then as President. Ironically, I will be more able to serve CAP from a funded position in Cambridge than an unfunded one here. Therefore, I look forward to continue working with you all on the CAP Executive. As a Canadian citizen, with...family in Toronto, and with many ongoing research projects [at the University of Toronto], and with your help, I should have no difficulty keeping in touch with the Canadian scene. We...hope to be able to return permanently to Canada in a few years."

Another very positive event was the recruitment of Mary Vetter of the University of Regina as CAP's new Newsletter editor. Mary did a great job with the May issue, and we can rest assured that the Newsletter has once again fallen in very capable hands. Many thanks for volunteering, Mary - and not least for saving me from having to produce this year's newsletters.

On yet another positive note, under the guidance of Alwynne Beaudoin and Martin Head, CAP will be convening a session at next years Geoscience Canada 2000 meeting. This will bring attention to Canadian palynology and related subjects to a much broader field than is usually the case, a factor which can only be good. Perhaps CAP should consider sponsoring symposia at larger conferences on a more regular basis. Let's see how this one goes first though.

CAP is clearly not among the most active of organizations. We are primarily a newsletter and website association and, despite the fact that these communications aspects are among the best in the business, the viability of CAP has from time to time been questioned. In my view, the existence of CAP provides a necessary focus for palynologists in Canada - not merely another society to belong to, but a network of like minds that can be potentially tapped into. It also makes possible the sponsoring of symposia at meetings such as Geoscience Canada 2000 and even the hosting of entire conferences, such as the 1984 International Palynological Congress. CAP may be low key, but its existence gives us Canadian Palynologists the corporate identity that is much needed in the modern world. I predict that CAP will be a survivor in the new millenium!

Rob Fensome

Secretary-Treasurer's Report

– Membership Report

As of October 27, 1999, CAP had a total of 58 members in good standing. As usual, this number is probably slightly low, since it is expected that several long-standing members who have lapsed will eventually send in their dues. CAP's membership has hovered around 70 since declining from ~ 90 during the late 1980's and early 1990's, but the relatively low current membership may be cause for concern.

– Financial Report

The balance in the CAP account was $2410.57, which is an increase of $736.22 over the balance at the last AGM. Our healthy balance is due in part to prepaid memberships (see Financial Statement). The main reason for CAP's good financial position this year, however, is the absence of production costs for the two issues of the newsletter since Rob Fensome and Mary Vetter have taken over production. Whether the production costs will continue to be absorbed by their institutions is unclear at present. Another substantial expenditure is the annual fee which we pay the IFPS, at $1.50 US/full member, a fee not helped by our weak dollar. The only other routine fee is to the Registry of Joint Stock Companies, which more than doubled in 1997 to $25.00. We incurred $25.60 in service charges, even though no changes were made to our bank account; I will speak to the bank manager to see whether we can negotiate this, and will "shop around" if I cannot get a break from the Bank of Nova Scotia.

Thomas Demchuk acted as auditor for this fiscal year, since Jan Jansonius did not attend the AASP Meeting this year; many thanks for his able assistance in this matter. The audited financial statement is included with this report (see page 7).

Francine McCarthy

SECRETARY/TREASURER'S REPORT
FINANCIAL STATEMENT
(for the period October 28, 1998- October 25, 1999)

Credits:	
Balance forward (October 28, 1998)	$1674.35
Other credits:	
Dues and subscriptions	$910.10
Total credits:	$910.10
Debits:	
IFPS dues	-$93.29
Registry of Joint Stock Companies	-$25.00
Prepaid subscriptions (2000-2003)(51@$10.00)	-$510.00
Refund (V. Bryant-overpayment, returned in $US)	-$29.99
Service charges	-$25.60
Total debits:	-$683.88

BALANCE:

On October 25, 1999 funds in the CAP account stood at $2410.57

Respectfully submitted by

Francine McCarthy

Francine M.G. McCarthy
CAP Secretary/Treasurer (October 25, 1999)

Statement by appointed auditor

It is my opinion that the above financial statement represents a full and fair account of the financial affairs of the Canadian Association of Palynologists for the above period.

Thomas P. Pemchuk

~~J. Jansonius~~ Thomas P. Pemchuk
Auditor for CAP

Book Reviews

Williams, G.L., J.K. Lentin, and R.A. Fensome. 1998. *The Lentin & Williams Index of Fossil Dinoflagellates, 1998 Edition*. American Association of Stratigraphic Palynologists Contributions Series, No. 34. 817p. ISSN 0160-8843. Price: $47.00 USD.

As a doctoral student in the 1980s, there were a handful of texts that I and most other budding dino-workers knew to be indispensable. Amongst these were such tomes as Bill Evitt's 1985 *Sporopollenin dinoflagellate cysts*, and Max Taylor's *The biology of dinoflagellates* of 1987; accompanying these two books on my shelf was the then current 1981 edition of the Lentin & Williams *'Index'*, which proved to be an essential guiding light through what then appeared to me to be an arcane maze of dinoflagellate taxonomic reassignments. Given that there was even then a huge volume of taxonomic literature and no widely utilised suprageneric classification system employed by the majority of dinoflagellate workers, a more valuable compendium of information which simply enabled a 'green' research student to assimilate and navigate the vast and complex world of dinoflagellate taxonomy could not be invented. Since those seemingly distant days, the *Index* has seen several more iterations, and continues to go from strength to strength, as evidenced from the latest contribution - one that will require many palynologists to install extra-strength shelving in their offices!

In these days of quality assessments and productivity demands (yes, we even have such things in Universities!), it is now scarcely possible to imagine the midnight oil-burning that must have gone into the compilation of the original *Index* prior to its genesis in 1973 (then known as *'Fossil dinoflagellates: index to genera and species'*). This first edition was a volume of 176 pages, being home to some 292 genera and 1329 species. It is perhaps not unreasonable to state that the publication of this text was one of the most notable publication milestones in the history of our subject area - enabling any novice researcher to locate any pertinent taxonomic reference with ease, and to track the sometimes chequered history of the species in which they were interested. As a vehicle for clarifying and stabilising dinoflagellate taxonomy and systematics, the importance of the *Index* cannot be overemphasised. Indeed, it could be said that the existence of both the *Index* in its various manifestations, and Evitt's *'Big Blue Book'* actually allowed a much more ordered and rapid progression of dinoflagellate taxonomics than has been possible in other fields of micropalaeontology, culminating in the now widely accepted suprageneric classification scheme of Fensome *et al.* (1993). As a measure of how much the field has developed, by the time my own much-cherished 3rd edition was published in 1981, the statistics had mushroomed considerably, so that 414 genera, 2210 species, 230 subspecies and 2 varieties, were included, encompassing some 117 new combinations, 12 new species and 9 rank changes! One could say that once the compilation of the first edition was complete, it was then only a matter of keeping the database up-to-date for the publication of each subsequent revised edition - but to do so would not only be uncharitable in the extreme (and lose me many friends!), but would also neglect the evolutionary progression of the series as a whole into something far more valuable than simply a list of genera and species.

A few facts and figures help to put the new 7th edition into perspective, including as it does taxa published up to April 1998. Coverage now extends to some 817 pages, and is home to a massive 583 genera, 3785 species, 374 subspecies, 19 varieties and 7 forms. This represents an increase of almost 30 genera and 300 species (many of them new to me!) over 1991's 6th edition of the *Index*. Combine this with 48 new combinations and 3 new names, and it becomes clear why such a huge undertaking has required the 50% increase in authorship, with the participation of Rob Fensome. Not only has the *Index* seen a variety of publishers over the years, but the new edition has also seen a change of name, now being officially recognised as *'The Lentin & Williams Index'*, a justified acknowledgement of the work of the original authors.

The main text of the *Index* itself remains largely comparable to previous editions, and is accompanied by two Appendices containing non-dinoflagellate genera and generic names not based on fossilisable forms. The massive reference list continues to be an indispensable information source to those papers not

taken by your own library or those published in other lands. However, it is at the front of the *Index* that some of the most important information can be found - a most welcome addition over recent years: the *'Rules of Nomenclature'* section. In a few short pages that should be compulsory reading for those wishing to erect new taxa, there are summarised all of the pertinent rules and regulations of the ICBN, clarifying the often opaque world of nomenclatural niceties, and hopefully ensuring that new descriptions do not fall into the taxonomic and systematic potholes of some of their predecessors. This section is then followed by a useful glossary to the terms used in the *Index*, and lists of new names, new combinations and (largely my own!) newly validated taxa.

Perhaps you may criticise this review for being positive in the extreme, but I for one believe that the publication of this series of indices, and the new edition in particular, has performed such a sterling service to dinoflagellate workers over the past quarter century (gulp!), that its importance cannot be over-estimated. The 7th Edition of the *Index* appears to be exhaustively comprehensive in scope, and I trust it will continue to serve our research community as successfully over the next 25 years as it has done since it first appeared in 1973 - buy it now!

Ian Harding
School of Ocean & Earth Science
University of Southampton, England

References

Evitt, W.R. (1985). *Sporopollenin dinoflagellates: their morphology & interpretation.* AASP Foundation, Austin, Texas. 333p.

Fensome, R.A. *et al.* (1993). *A classification of fossil and living dinoflagellates.* Micropaleontology Press Special Publication, No. 7, 351p.

Lentin, J.K. & Williams, G.L. (1973). Fossil dinoflagellates: index to genera and species. Geological Survey of Canada, Paper, No. 73-42, 176p.

Lentin, J.K. & Williams, G.L. (1981). Fossil dinoflagellates: index to genera and species. 1981 edition. Bedford Institute of Oceanography, Report Series, No. BI-R-81-12, 345p.

Taylor, F.J.R. (1987). *The biology of dinoflagellates.* Botanical Monographs, No. 21, Blackwell Scientific Publications, Oxford. 785p.

Macdougall, J.D. 1996. *A Short History of Planet Earth.* John Wiley and Sons, Inc., New York. 266 p. ISBN 0-471-199703-3 (paper), ISBN 0-471-14805-9 (cloth). Price: $16.95 USD (paper).

This is a great little book. It arrived in my mail a year ago, and I failed to read it as promptly as I now wish I had. The cover bears a statement from Publishers Weekly claiming that the book is "A splendid introduction for the lay reader." I would modify that to read "...for anyone". I consider myself to be a seasoned professional geologist by now, having taught physical and historical geology for nearly twenty years. Still, I found this book to be very engaging. I actually substituted it for the fiction that I oftentimes read in the evenings because *A Short History of Planet Earth* reads like something new and fresh. It will certainly appear on my adoption list, particularly for courses that we teach for earth science teachers.

The book's attractiveness comes from Macdougall's ability to write as though he were speaking to the reader. This conversational style leads one to the inevitable conclusion that "This is really pretty neat stuff!". The content covers the whole spectrum of Earth's history and is styled after such historical geology texts as Wicander and Monroe's *Historical Geology* or Dott and Prothero's *Evolution of the Earth.* Macdougall actually borrows an illustration or two from the latter, but he carefully avoids mimicking it. There is a review of the history of geological thought (Chapter 1, "Reading the Rocks"), and then a sequence of chapters that treat everything from Precambrian history (Chapter 2, "Early Days") to a philosophical discussion of what is likely to happen on Earth now that humans and the Great Ice Age have had their opportunities to shape its surface (Chapter 13, "What Comes Next? Geology and Man"). The

author even nods in the direction of palynology on a couple of occasions, and gives fossil pollen and spores recognition as significant tools in understanding the K-T extinctions and Pleistocene climate changes.

Three chapters seemed to me to be especially good. Chapter 2, "Early Days", provides an unusually clear discussion of radiometric dating, and, particularly, the significance of zircons in determining the age and location of the first fragments of continental crust. I wonder at these refractory little white grains whenever I see them in concentrations of Georgia's beaches. They have many stories to tell, and are too often overlooked by geologists. In Chapter 3, "Wonderful Life", Macdougall seriously questions the validity of the Miller-Urey experiment, stating that "In a carbon dioxide-rich atmosphere, the Miller-Urey electrical discharge method for creating amino acids doesn't work." I don't know how many times I have faithfully taught my students that the famous amino acid experiment successfully models the early planet, but apparently I need to learn more about this. Finally, Chapter 9, "From Pangea to (Almost) the Modern World: The Mesozoic Era", includes a very interesting and well-explained history of accretion in western North America during the Mesozoic, and a clear description of what geological signatures accompany rifting (salt beds, volcanic deposits, conglomerates, etc.)

I found only a few errors in this otherwise excellent book. In Chapter 9, for example, *Tyrannosaurus* is referred to as the Jurassic "king of the beasts"; doubtless even Macdougall has been adversely affected by the hyperbole associated with Jurassic Park.

Macdougall won me as a disciple as I read Chapter 12, "The Great Ice Age". There the author describes climate modeling and then observes that "Ultimately, information from the earth itself, the record in the rocks reflecting the actual climate changes that occurred, is the standard against which these theoretical treatments must be judged." Models are only models; they are not truth. The only true history lies within the Earth itself, and J.D. Macdougall does a mighty good job of describing it.

Fredrick J. Rich
Professor of Geology
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Photo of Fred Rich coring in Okefenokee Swamp, Georgia. Photo taken at the AASP meeting by Susan Jarzen (see meeting report below).

Far and wide....

32nd Annual Meeting of the American Association of Stratigraphic Palynologists (AASP) Savannah, Georgia October 26-30, 1999

Clear skies and warm temperatures greeted the 67 participants of the 32nd Annual Meeting of the American Association of Stratigraphic Palynologists to beautiful and historic Savannah, Georgia. Fred Rich

and Georgia Southern University hosted the meeting full of exciting talks, friendship and adventure.

For myself and some others, this was our first trip to Savannah, and I for one was pleasantly surprised at the architectural diversity, and historic presence of the older part of the city. Situated at the mouth of the Savannah River, just south of the border with South Carolina, Savannah has played an integral part in the settlement of the southern states, and especially in the South's role in the US Civil War. The historic section of the town is laid out in narrow, perpendicular streets, punctuated every 5 blocks with a named square, landscaped with mature majestic live oaks, often festooned with Spanish moss. The squares are usually adorned with a monument paying tribute to a Savannah founder, notable person, or a military hero. One square marks the grave of Tomochichi, a Yamacraw Chief who, with General James Edward Oglethorpe, is credited as the co-founder of the city.

The Days Inn® was our lodging headquarters. Centered on Bay Street, the Days Inn is within easy walking distance of the famed "Factors Walk," noted for its iron bridges and cobblestones, spanning several city blocks with 19th century buildings, including many cotton factors' offices. Below Factors Walk is River Street a nine-block concourse lined on one side with stores (old cotton warehouses), boutiques, restaurants, pubs, and candy shops! A walk along River Street can be an expensive but very enjoyable journey! The river side of River Street is a place for parks, benches, blues/jazz musicians, stately 'paddle wheelers', yachts, and the statue of the "Waving Girl," said to have 'waved' hello and farewell to all the ships that pass through the Savannah harbor.

The 32nd Annual Meeting began with an Ice Breaker, held at the Savannah History Museum located only a few blocks from the Days Inn. The evening reception was a chance to see 'old' and 'new' friends. The Museum is housed in the restored 1860s Central Georgia Railroad Station. Adjacent to the Museum is the treasured Savannah Roundhouse, the oldest and most complete railroad repair shop in the United States. The very well attended Ice Breaker, was complete with food and drinks to satiate the appetite and warm the spirits.

The talks began on Wednesday, October 27th and were held in the Coastal Georgia Center, a conference center operated by Georgia Southern University and the University System of Georgia. Fred Rich had arranged for the talks to finish early in the day (3:30 p.m. or so) so that the participants could spend more time in discussions after each day's sessions, or have additional time to explore the fascinating "nooks and crannies" of Savannah. I, for one, found this arrangement to be most satisfying, and calming. In addition to the regular sessions of talks covering diverse topics as "What do palynological records record?" (Francine McCarthy *et al.*), "Pollen analysis of western corn rootworm" (Gretchen Jones and W. Buhler), and Ordovician acritarchs (Uutila and Sarjeant), special sessions on "Short-term Palynological Records with Emphasis on Human Influences" (hosted by Arthur Cohen), and "Cretaceous and Tertiary Palynology of the Atlantic and Gulf Coastal Plains, Southeastern U.S." (hosted by Joyce Lucas-Clark) were also scheduled. Copies of the program and abstracts volume for this and past meetings are available from

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Talks and posters presented by CAP members included: "*Synopsis of Fossil Fungal Spores, Mycelia and Fructifications*" (poster), by R. Kalgutkar and J. Jansonius; "*High Resolution Palynology of a Marine Core from Saanich Inlet, British Columbia*" (oral presentation) by R.W. Mathewes and M.G. Pellatt; "*Testing the Importance of Glacioeustasy in Generating Sequence Boundaries - An Example from the New Jersey Margin*" (poster) by F.M.G. McCarthy, K.E. Gostlin & J. Hopkins; "*What Do Palynological Records Record*" (oral presentation) by F.M.G. McCarthy, P.J. Mudie & K.E. Gostlin; "*Controls on Palynomorph Distribution in the North Atlantic from the Miocene to the Recent*" (poster) by C.R. Morgan & F.M.G. McCarthy; "*Holocene Proxy-Records of the Red Tides*" (oral presentation) by P.J. Mudie, A.Rochon & E. Levac; "*Dinoflagellate Assemblages from the Paleocene of Southern Chile*" (oral

presentation) by M.E. Quattrocchio & W.A.S. Sarjeant; "*Late Pleistocene-Holocene History of Georgian Bay, Ontario: Sedimentation Patterns in Response to Fluctuating Lake Levels*" (poster) by S.H. Tiffin, F.M.G. McCarthy and S.Blasco; and "*The Ordovician Acritarch genera Tranvikum and Ampullula: Their Relationship and Taxonomy*" (oral presentation) by A. Uutela and W.A.S. Sarjeant.

The final talk on Friday afternoon was an excellent presentation by Dr. Steven Emslie (Ornithologist, University of North Carolina) on "*A Fossil Death Assemblage of Seabirds and Fish: Evidence for Toxic Red Tides in the Late Pliocene of Florida*". Through a well-organized and stepwise presentation, Dr. Emslie demonstrated that a very large death assemblage of cormorants (*Phalacrocorax sp.*) and other seabirds from the extensive Pliocene fossil beds near Tampa Bay, Florida died in a single catastrophic event, probably a red tide. The lecture was well received. (See also: Emslie, S.D. & Morgan, G.S. *Science* 264:684-685, 29 April 1994.)

Friday (October 29th) was also the time for the Group Photo and Annual Business Luncheon. The photography of the group took place outside the Coastal Georgia Center with Vaughn Bryant, Jr. and Bob Clarke behind the camera, set on a timer, so that they, too, could join in the picture. (Note: Vaughn has informed me that the photo has turned out well. Pers. comm. November 5, 1999.)

The business luncheon is always a time to learn something more of the activities of the society, and to catch up on the status of the varied publications currently on the work table of the AASP Foundation. Outgoing President, Chris Denison, carried out the duties of reporting on the current status of the organization, and with the traditional handing over of the AASP Gavel and copy of "Robert's Rules..." passed the meeting to our new President, Fred Rich, with David Pocknall assuming the elected position of President-Elect.

Several awards were bestowed to a variety of persons at this meeting. First and perhaps the most moving of the awards was the first **AASP Excellence in Teaching Award**, presented to Dr. Aureal Cross. The presentation was made with a testimonial by Leonard Eames (former graduate student of Dr. Cross), followed by a very emotional acceptance speech from Dr. Cross. The room was quiet, waiting to hear from Dr. Cross about those "early days" when palynology was just an infant. Dr. Cross, and many in the audience, held back tears, as he spoke of how he wished he could live to be 1000 years old so that he might have a chance to do all the things remaining to be done in palynology. He closed, with tears now visible, by commenting that no one can have this sort of career by doing things alone. "...We all owe it to each other...we stand on each others shoulders...we need our students and our colleagues...we do not earn these awards alone". A standing ovation followed.

Ken Piel read a detailed tribute, and presented the **AASP Distinguished Service Award** to Professor Vaughn Bryant Jr. Another well earned award, another standing ovation. Dr. Bryant accepted the award graciously and spoke to the group about his entry into palynology and how he was "urged" to join AASP as a Quaternary Palynologist amid a group of "stratigraphic specialists". Vaughn's long service record and his "genetic deficiency" which does not allow him to say "no" has provided AASP with many years of unfailing service and cooperation.

Daniel Michoux accepted the best poster award on behalf of Samuel Piriou, Daniel Michoux, and Rene Braun for the co-authored poster entitled "*Organic Sedimentation in the Early Cretaceous of the Austral Basin (Tierra del Fuego, Argentina)*". Two students from Brock University shared the best student poster Award. Sarah Tiffin, in co-authorship with Francine M.G. McCarthy and Steve Blasco presented the poster, "*Late Pleistocene-Holocene History of Georgian Bay, Ontario: Sedimentation Patterns in Response to Fluctuating Lake Levels*" , and Jennifer Hopkins with Francine M.G. McCarthy & Kevin E. Gostlin co-authored the poster entitled " *Testing the Importance of Glacioeustacy in Generating Sequence Boundaries - An Example From the New Jersey Margin*". The best student paper award went to Robert K. Booth for his co-authored presentation with Stephen T. Jackson on "*Impacts of Historical Logging and Fire on a Lake*

Superior Coastal Wetland, Keweenaw Peninsula, Michigan", a talk that clearly and convincingly demonstrated that the modern wetland vegetation at Grand Tracerse Bay is the result of late 19th and early 20th century fires following extensive lumbering in the region.

Photo of W.A.S. Sarjeant, taken by Susan Jarzen.

Friday continued to be a busy day. Following the business luncheon and group photo session, the AASP Board held its annual meeting. Some participants joined Eddie Robertson as group leader for an afternoon field trip to the Savannah-Ogeechee Canal, sponsored by Georgia Southern University and Reinhardt College. The trip showcased local history and floodplain forest communities along the Ogeechee River.

Saturday was different. Some of the participants left Savannah for their home base, others stayed in Savannah to see more of the city, and its cultural and entertainment offerings. Thirty-eight of us, myself and Susan included, joined Fred Rich, for a very exciting trip into the legendary Okefenokee Swamp (a National Wildlife Refuge), one of the largest swamps in America. The day began with a soft light rain that cleared before we arrived at the swamp. The Okefenokee (Indian term for 'Land of the trembling earth') is a fresh water swamp with its water fed from rain, and is characterized by constantly flowing waters in channels that eventually give birth to the south and east flowing Saint Mary's River emptying into the Atlantic Ocean, and the southwest flowing Suwannee River (of Stephen Foster Fame) which drains into the Gulf of Mexico. The all-to-short trip, was replete with botanical, zoological, geological and historical tidbits of information supplied by Fred Rich. I was left quite amazed at the breath and depth of the information supplied by Fred. Susan and I learned a great deal in the few hours we were actually in the swamp. Fred showed us some of the more common water and terrestrial plants of the swamp including Spanish Moss (*Tillandsia*, Bromeliaceae), *Nyssa bicolor* (Tupelo), *Gordonia lasianthus* (black laurel, a member of the tea family native to the southeastern USA), the carnivorous Sundew (*Drosera*, Droseraceae, pollen in tetrads), and the white flowering water lilies (*Nymphaea odorata*). Just as we entered the refuge, Fred commented that he could guarantee not a single mosquito would be seen or felt. The all day adventure into the depths of the swamp proved Fred correct. Fred directed the four, ten-seat aluminum, 6hp boats, down the Suwannee Canal and into the Chesser Prairie. The prairie is an open "savannah" wetland of patches of sedge and grass (batteries) and more mature mounds with bald cypress and other trees (houses). The diversity of the biota within the numerous prairies is truly remarkable. At several spots we stopped to listen to another short 'lecture' from Fred, who also took several peat cores, demonstrating the nature of the peat. Cores were taken to levels (about 3.5 feet) where charcoal bands, indicating major swamp fires, were recorded in the core. These fires are a natural way in which the swamp reverses the successional stages, which tend to fill in the area, thus reopening the prairies and maintaining the water regime. (See also: Rich, F.J. & Bishop, G.A. 1998, *Geology and Natural History of the Okefenokee Swamp and Trail Ridge, Southeastern Georgia-Northern Florida.* 33rd. Annual Field Trip, Georgia Geological Society, October 9-11, 1998, Georgia Geol. Soc. Guidebooks volume 18, number 1, pp.1-109).

In summary, I feel the 32nd Annual Meeting of the AASP was very much a success. It is appropriate here to thank the Coastal Georgia Center, specifically Tim Moore, Nancy Hester, and their staff for their wonderful job of coordinating the catering and providing us with solutions to all the little problems. "The devil is always in the details, and it's good to know that there is someone competent on hand to help ferret him out!" (pers. comm. Fred Rich, November, 1999).

CAP members should be aware of the fact that next year AASP will hold the 33rd Annual Meeting jointly with the Geological Society of America (GSA) in Reno, Nevada. The meeting will be held from

November 13-16, 2000. AASP is working out the details for special sessions(s) that will focus on palynology. All CAP members who are also members of AASP will receive mailings including *GSA Today* so that they will know just what is planned. Thomas Demchuk and Fred Rich are organizing the Reno meeting together, with help from the AASP Board.

During our stay in Savannah, Hollywood was also there, filming on the streets near the Days Inn. Robert Redford was there, as producer and director of a new film "The Legend of Bagger Vance" a $70 million effort about one golfer's search for his authentic swing. With the film set in the 20s, the streets, buildings and autos of Savannah were converted, through Hollywood magic, into the days when dinners were served for 25 cents and the pace of life was a fair bit slower.

A visit to Savannah, Georgia at anytime is a visit to the past. The charm, elegance, the southern meals and hospitality, all join to make the visitor feel welcomed and a very real part of the southern heritage.

I want to thank Fred Rich for providing some much needed facts and figures for this article and to Susan Jarzen for her secretarial skills and the photography.

David Jarzen
Florida Museum of Natural History
Gainesville, Florida

From left to right: Betty Traverse, Al Traverse, and Susan Jarzen. Photo taken by David Jarzen.

Fossil Dinoflagellate Course
Urbino, Italy
May 17-22, 1999

Why have to worry about fossil dinoflagellates in paradise, I thought, as I viewed the beautiful city of Urbino from the balcony of my hotel room. We (Henk Brinkhuis, Jan Willem Weegink, Erica Crouch, Tim Eype, Anja Oosting and I) had driven down the previous day from Utrecht, via Almelo, where Henk and Annemie, as always during my visits, provided me with fine food and accommodation. The trip, in a Volkswagen van, had taken 15 hours but had been fascinating because of the company and scenery.

We arrived in Urbino on Thursday, 13th May, since our plans were to look at some of the Lower Cretaceous sections that Anja would be studying for her Ph.D. Also, we needed time to review the facilities for the Course, which was being presented at the University. The hosts were Professor Rodolfo Coccioni and Dr. Simone Galeotti, who had made all the local arrangements at the University. Urbino is a beautiful medieval city built almost entirely from the local stone. The University sits atop a hill a few miles outside but with a wonderful view of the city. And as with everything concerning the course, the facilities at the university were superb: we had an air-conditioned lecture hall capable of holding about 200.

How did this course happen and who should I thank? The driving force was Henk Brinkhuis, who dreamed up the idea of holding a dinoflagellate course at Urbino University where his two close friends, Rodolfo and Simone, work. Fortunately for me, Henk asked if I would help out and also invited our good friend Jonathan Bujak. It was decided that the course would cover Mesozoic-Cenozoic fossil dinoflagellates, a not inconsequential task. The difficulty of preparing for any course, especially one of six days (an endurance test of no small magnitude), is knowing what to present and what is needed for illustration purposes. We agreed that there should be a short opening session on morphology (one day), two days biostratigraphy, and two days paleoecology. To relieve the monotony, Henk wisely organized a field trip to the Contessa

Valley and the Massiagno Eocene/Oligocene boundary section for the Wednesday.

An important decision concerning any course is how many species should be highlighted. This is the controlling factor regards the number of 35 mm slides needed and the size of range charts. Disregarding our better instinct, we selected 600 species and got to work with a vengeance. We decided to use a proven technique from previous courses, which necessitates using two screens, with a line drawing on the left and slides of specimens on the right. But then we went one better, or worse, depending upon one's philosophy. We used a third projector to show overall ranges of taxa in groups of ten.

Despite all our concerns regarding the popularity of such a course and being ready in time, Henk and I were standing before 26 participants on the Monday morning. The session on morphology stayed on schedule but we slowed down on the biostratigraphy, in which we were supposed to cover about 300 species (using three projectors) each day. By Tuesday evening, everyone was looking forward to a day in the field.

Wednesday dawned beautiful and sunny, a good omen for a fantastic day. The field trip leaders, Rodolfo, Simone and Henk had put together an excellent guide so that when we arrived at the spectacular Contessa section (my second visit since Simone had taken some of us there the previous Saturday), I had some idea of the geology but not how to pronounce the names. The Contessa and Bottaccione Valleys, where deep water Jurassic to Miocene rocks are exposed in superb quarry sections, have to be seen to appreciate the scale and grandeur.

Then we headed for Gubbio where we had an excellent lunch (including pasta with truffles) and examined (with great respect) the Cretaceous/Tertiary boundary site. This is one of the sections on which Alvarez *et al.* (1979) based their hypothesis of the iridium layer denoting a meteorite impact, responsible for the mass extinction at the K/T boundary. This location is not for weak hearts, being located on a winding road where motorcyclists can fly past, within inches of a studious geologist paying homage at this shrine.

But this exciting day was not over yet. Our last stop was at the Global stratotype section for the Eocene/Oligocene boundary at Massignano, where we saw the "golden spike". The informative signs at this 23 m section in an abandoned quarry set an example for what could be done at some other famous localities.

Thursday was back to work, when those with the stamina endured a supersonic trip through the Cretaceous and Jurassic dinoflagellates. Unfortunately, there was no time to do justice to the Triassic.

On Friday and part of Saturday morning, Henk and Jonathan gave topnotch presentations on the paleoecology of primarily Cenozoic dinocyst assemblages. Jonathan focused on the climatic changes determinable from dinocyst fluctuations in the Paleogene of the North Sea and North Atlantic. And Henk highlighted the Milankovitch cycles, global circulation, and his and his students' research on the Cretaceous/Tertiary boundary, the Miocene-Pliocene and the Quaternary.

The course also featured presentations from some of the participants on Friday afternoon and Saturday morning. All were well prepared and enjoyable.

One highlight of the week was the Friday evening banquet, which featured some memorable jokes and some interesting presentations. Henk, Jonathan and I received gifts, cunningly selected and paid for by the students. I am still using my telescope but drank all the Crodino at the banquet.

Saturday we headed back to Utrecht, taking a different route through the Swiss Alps. What we could see was magnificent but most of the mountains were shrouded in fog. After an overnight stay we arrived back in Utrecht, where Jan Willem and Tanja kindly took care of me before my return to Canada.

The course has left some in indelible memories. The first was the number of slides: we used about 2000 and only had two upside down. I was impressed with the quality of the manual and the CD-ROM, both compiled largely through the efforts of Jan Willem. During the course, Jan Willem ensured that everything ran

smoothly, providing round the clock transportation for all. Rodolfo and Simone were the perfect hosts tending to all our needs. This included watching the Monaco Grand Prix at Simone's on the Sunday afternoon. The participants were a great bunch and tolerated our quirky humour. Jonathan was, as always, fun to be around. And then there were my fellow travellers in the van. The journey down and back was saved by Anja, Erica, Tim, Jan Willem and Henk, plus all the Monty Python characters who accompanied us.

Lastly, there's Henk. Thanks to his imagination and drive, I had an unforgettable ten days in a country where the food and scenery are exquisite. And I learnt a lot about dinoflagellates. Perhaps, one day, I shall be lucky enough to repeat the experience with the same gang.

Graham Williams
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Canadian Quaternary Association - Canadian Geomorphology Research Group Joint Meeting August 23-27, 1999

The 1999 CANQUA-CGRG joint meeting in Calgary was a notable success. Excellent weather allowed some superb pre-, mid- and post-conference field trips, and the meeting was exceptionally well attended. Our thanks to Derald Smith and his organizing committee for a magnificent job.

The first day featured a symposium in honour of Nat Rutter, who retired from the University of Alberta last year (although is as busy as ever in research). The following days included excellent sessions on:

- Paleolimnology of the Great Plains and the Mountains
- Glacial and periglacial
- Geomorphic response to climate variability and extreme climatic events
- Sub-glacial processes: review of past and recent findings
- Geoarcheology: coastal and inland routes for the peopling of North America
- Holocene climate and glacier fluctuations
- Rivers: a stream of new ideas
- Geochronology methods, applications and limitations
- Applied and economic Quaternary studies

Of note were CANQUA awards during the meeting. The WA Johnston Award, given for notable achievement in Canadian Quaternary science was awarded to Jim Ritchie. The Dave Proudfoot Award for best student presentation was awarded to Zeve Gedalof for his paper "*Blips and bellyflops: dendroclimatic evidence for regime-scale climate shifts during the Little Ice Age*", co-authored with Dan Smith. The Guy Lortie Award for best poster went to Dave Clements for his poster on "*In-grade braiding and wandering on the gravel-bed middle-reach of the Yukon River, Alaska*", co-authored with Derald Smith. Cheryl McDenna Neumann, recipient of the CGRG J Ross Mackay Award of the CGRG presented an overview of her recent work entitled "*Particle supply restrictions in aeolian systems - how damp, lumpy, cristy surfaces mess up sediment transport models*".

The new president is Dave Liverman, the vice-president Dave Sauchyn, secretary-treasurer Martin Batterson, and Gail Chmura moves to past-presdient. We welcome two new councillors, Martin Batterson for Atlantic, and Andree Bolduc for Eastern. These join the existing council. Toon Pronk and Peter Bobrowsky, both with years of outstanding service to CANQUA, step down from council, and we are very appreciative of their efforts and guidance over the last few years.

CANQUA welcomes new members, who receive 4 issues/year of *Geographie Physique et Quaternaire* and the biannual CANQUA newsletter. The dues have been raised to $50, but there are student membership options at $10 (excluding journal subscription). A membership form and more information on CANQUA can be found on the CANQUA web site at http://www.mun.ca/geog/CANQUA/

Dave Liverman
Newfoundland Geological Survey
St. John's Newfoundland

Essays

CORN FLOWER OR CORN FLOUR?

For the small country of New Zealand, honey is truly a "golden" liquid—it the basis of a billion-dollar industry. Because of its isolation in a far corner of the Pacific, New Zealand is free of European foul brood, a disease that can devastate beehives. The accidental introduction of foul brood disease into the country would be a blow to New Zealand's "clean, green" image and could destroy the local honey industry.

Bees can not only carry foul brood disease, it can be transmitted on the pollen they harvest. To protect the honey industry, under the Biosecurity Act of 1993, bulk pollen could be imported into New Zealand only under an Import Health Permit, which required testing of the pollen, once it was landed in New Zealand, to ensure it was disease-free. The importation of unprocessed bee pollen into New Zealand has since been banned; bee pollen is allowed in only in tablet or capsule form.

In June 1997 officials from the New Zealand Ministry of Agricultural and Forestry (MAF) learnt that low-grade bee pollen was being sold on the local market. The pollen did not appear to be of local origin, and as no New Zealand company had been given a permit to import bulk pollen, they decided to investigate.

Documents showed that a local company, Megavitamin Laboratories Limited, based in Christchurch, the major city in the South Island of New Zealand, had imported from the United States 200 kilograms of "corn flower, cleaned and sifted" and 50 kilograms of "corn flower powder" on 10 June 1997.

In July 1997 a further shipment of "corn-flower cleaned and sifted", shipped from San Francisco, was found by MAF officials at a freight forwarding company in Christchurch. No Import Health Permit had been issued to allow this product to be imported. As a result of this discovery MAF obtained a warrant to search the premises of Megavitamin Laboratories Limited.

On the premises, MAF officials found empty drums, labeled as "corn flower" and with what appeared to be residues of bee pollen. These drums were identical to the drums found at the freight forwarding company's offices. They also found documents on the premises, including a facsimile from San Francisco thanking Megavitamin Laboratories for their order of bee pollen, and a reply from the managing director of Megavitamin asking them to invoice the consignment as "corn flour".

On the other side of the Pacific, officials of the United States Department of Agriculture (USDA) in San Francisco were investigating the source of the shipments. They found documents indicating that the misleading manifest was at the request of the New Zealand importer, and that another consignment of pollen was to be labeled as "camomile powder".

The defendants in the case were Evan Stewart, the Company Director and Operations Manager, and his father Warren Stewart, the Managing Director of Megavitamin Laboratories. When they were questioned, they said that the pollen had been collected from cornflowers and chemically treated to harden the pollen into granules. They also claimed that it was the suppliers who had suggested that the consignment should be labeled as cornflower, as that was the source of the pollen.

I was asked to check whether all the pollen was cornflower and to try and determine the original source of the pollen.

In July 1997 I was given 16 samples of bee pollen, collected from 16 drums from both the freight forwarder's and Megavitamin's premises. The samples consisted of yellow-brown granules—analysis showed that the granules were almost pure pollen composed of a wide variety of types. There were only minor variations in the samples from the barrels—the pollen from the drums at both premises were identical in composition and had all come from the same source. I did not try to identify all of the pollen, just enough to confirm its source.

The pollen granules had been imported into New Zealand from San Francisco, but the pollen assemblage did not appear to be what I would expect from a northern American source. Therefore I sent some of the pollen slides to Prof. Vaughn Bryant of Texas A & M University and Dr. Gretchen Jones of the USDA for their advice.

The pollen that we identified consisted of the following taxa (because of the similarity of pollen from each barrel the list is a composite from all samples):

Acanthaceae
Justicia
Alangium type
Alternanthera
Amaranthaceae
Apiaceae
Asteraceae
Artemisia
Centaurea
cf. *Saussurea*
Bignoniaceae
?Dolichandrone
Brassicaceae
Campanulaceae
Adenophora
Caryophyllaceae
Chenopodiaceae
Convolvulaceae
Argyreia nervosa
Cucurbitaceae
Cucurbita
Echium
Euphorbiaceae
Fabaceae
?Gentianaceae
Geraniaceae
Labiatae
Lamiaceae
Leguminosae
Liliaceae
Linum
Malvaceae
cf. *Abutilon*
Moraceae
Cannabis sativa
Myriophyllum
Onagraceae
Epilobium
?Pachysandra
Plantago formosana
Poaceae
Zea mays
Polygalaceae
Polygonaceae
Fagopyrum esculentum
Rosaceae
Rumex
Sesamum orientale (?S. indicum)
Solanaceae
Taraxacum
Thymus
Trifolium
Verbenaceae
cf. *Clerodendron*

There was cornflower in the samples, but it formed a very small and insignificant component. Overall the barrels contained pollen predominantly from Asteraceae (*Artemisia*), Poaceae and *Fagopyrum*. Chenopodiaceae, *Sesamum*, *Zea mays*, Labiatae, and *Cannabis sativa* pollen were more common in some samples than in others. To the surprise of both officials and the importer, cannabis pollen was common in most of the samples, although the pollen does not contain the active hallucinogenic drug.

If the pollen had come from Canada or the United States the samples would have contained Ericaceae (if from Alaska), *Elaeagnus*, *Acacia*, *Mimosa*, Fagaceae (oak), Rhamnaceae (*Berchemia*), Onagraceae (*Gaura*, *Oenothera*), Pinaceae, Tiliaceae and Ulmaceae. However, none of these taxa were located. The most important omission was that of oak—the tree is widespread and it is a favourite source of pollen for bees in the United States. A number of the pollen types were clues to the source of the pollen. *Fagopyrum esculentum*, a species of buckwheat with polymorphic pollen, was abundant in many of the samples. This species of buckwheat is grown in eastern Canada and the United States in cool, moist areas on the Canadian/US border, but only where the growing season is long enough, as it is frost-tender. However, there were a number of pollen taxa missing from this sample that would be typical of the Canadian/US border regions. For example, Canadian honey nearly always contains pollen from clover, yet only one of the drum samples contained any clover pollen. Honey from the United States and Canada rarely contains buckwheat pollen. This buckwheat is much more common in China and is native to Asia. Honey from China commonly contains abundant buckwheat pollen. In addition, the genus *Adenophora* is common in China and Japan. The species *Sesamum orientale* (or *S. indicum*) is also common in China and Japan, although it is known from some localities in the United States.

The samples lacked distinctive marker pollen that would define a precise locality—most of the pollen comes from plants that can be found in many temperate regions of the Northern Hemisphere. Overall, however, there was a lack of a large number of taxa that are a major component of Canadian and United States bee pollen. All the taxa identified do occur in China and this points to a very strong likelihood that the samples examined originally come from China and not the United States, even though the bee pollen was exported to New Zealand from San Francisco.

Also, a composite source for the bee pollen cannot be discounted. The pollen may represents a number of sources, possibly including both China and the United States, but again the lack of pollen commonly found in honey and bee pollen within the United States and Canada tends to rule this out. On the evidence obtained, a sole Chinese source is more likely.

For the Stewarts to be convicted, the ultimate source of the bee pollen was not an issue, so I did not carry out a detailed pollen analysis and identification. I only needed to show that the bee pollen could not have come from a local New Zealand source, and the evidence for this was conclusive.

In a desperate bid to save their company from insolvency, the Stewarts had tried to bypass stringent biosecurity checks and had claimed that 500 kilograms of Chinese bee pollen was cornflour or cornflower?. In April 1999 they pleaded guilty and were jailed for jeopardising New Zealand's $3 billion bee industry.

I wish to thank Prof. Vaughn Bryant (Texas A & M University), Dr. Gretchen Jones (US Department of Agriculture) and Mr. Gary Redshaw (Ministry of Agriculture and Forestry Investigation Unit) for information used in this short note.

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Radiocarbon Dating Labs

As part of my thesis research in the Department of Biology, University of Regina, I need to submit some samples for radiocarbon dating. In the interests of economy and turn-around time, I conducted an internet search for laboratories that do radiocarbon dating. The matrix on the following page is the result of my search. When incomplete information was given on the website, someone from the lab was contacted. I'm sure I haven't found all of the labs, but these were the main ones that I came up with for Canada and the United States (and one from New Zealand). Prices were based on the dating of seeds, as they are often used and are easily compared in terms of dating costs. A complete list of laboratories that do radiocarbon dating as well as links to most of these websites can be found at www.radiocarbon.com.

Christina Wilson
M.Sc. Student
Department of Biology
University of Regina
Regina, Saskatchewan

Company	Address	Website	Contact	Email/phone/fax	Cost	Time Frame	Min. Wt. (seeds)
Beta Analytic, Inc.	Miami, Fl	www.win.net/~analytic/	Ron Hatfield	dhood@radiocarbon.com ph. 305-667-5167	$595 USD	20-30 working days	7 mg
CU-INSTAAR AMS Radiocarbon Preparation and Research Lab. (NSRL)	University of Colorado Boulder, Colorado Ph. 303-492-0362 Fax: 303-492-6388	www.colorado.edu/ INSTAAR/ RadiocarbonDatingLab/ brochure.html	Jocelyn Turnbull	Jocelyn.Turnbull@colorado.edu	$100 USD - ESH & IAI approved samples $400 USD - other Fed. funded samples $480 USD - rest	6-8 weeks	3 mg
NSF - University Of Arizona AMS Facility	University of Arizona Tucson, Arizona ph. 520-621-6810 fax 520-621-9619	www.physics.arizona. edu/ams	Mitzi de Martino	AMS@physics.arizona.edu	$400 USD $200 if NSF funded	~2 months	1 mg; sugg. size 5 mg
Waikato	Hamilton, NZ	http://c14.sci.waikato. ac.nz	Dr. Alan Hogg	A.Hogg@waikato.ac.nz	$800 NZD	8-10 weeks	5 mg
Illinois State Geological Survey	University of Illinois Urbana-Champaign, Il	www.isgs.uiuc.edu	Jack Liu	jliu@isgs.uiuc.edu	$450 USD	8-10 weeks	no less than 10 mg
Geochron Laboratories	Cambridge, MA ph. 617-876-3691 fax 617-661-0148	www.geochronlabs.com	Dr. Alexander Cherkinsky	acherkinsky@geochronlabs.com	$550 USD	60 day guarantee usu. 4-6 weeks	3 mg
NOSAMS - National Ocean Sciences AMS Facility	Cape Cod, Massachussets ph. 508-289-2469 fax 508-457-2183	http://nosams.whoi.edu	John Hayes	jhayes@whoi.edu	~$600 USD ~$300 if NSF funded (formula for exact)	10 weeks	1 mg
Purdue Rare Isotope Measurement Lab (PRIME lab)	Purdue University West Lafayette, IN ph. 765-494-5381 fax: 765-494-0706	http://primelab.physics. perdue.edu/web/primelab	David Elmore	elmore@perdue.edu ph. 765-494-6516	~$470 USD NSF funded is half price (formula for exact)	2-3 months	5-20 mg
Isotrace Laboratory	University of Toronto	http://helios.physics. utoronto.ca/~isotrace	Roelf Beukens	roelf.beukens@utoronto.ca alice.leung@utoronto.ca ph. 416-978-4711	$315 if NSERC funded $575 Academic $775 Government	5-6 months	10 mg preferred
LLNL CAMS lab	Livermore, Ca	www-ep.es.llnl.gv/ www-ep/cams	John Southon	southon1@llnl.gov lab will only do tiny samples	≤ 10 samples $625 USD >10 samples $550 USD	2-3 weeks	200-300 micrograms

Long-Distance Transport

The following two articles are reproduced with permission from the original sources. Special thanks to Alwynne Beaudoin for suggesting these articles!

Arctic's 'golden rings' just well-travelled pollen

ED STRUZIK
JOURNAL STAFF WRITER

Edmonton

Last June, the tiny Inuit community of Repulse Bay on the Arctic Circle was thrown into a panic by the mysterious appearance of yellow rings and gold stains that extended 25 km out onto the sea ice.

Wildlife officer Joanni Kringayark had never seen anything like it before and immediately contacted health and environment officials in Yellowknife, fearing that it might be a contaminant that could harm humans.

In the end, it was a meteorologist and two forestry scientists in Edmonton who finally solved the mystery. Their findings, to be published today in the British scientific journal *Nature*, report that it was a rare meteorological event that transported a huge cloud of pollen from the forests of central Quebec to the Arctic Circle.

> *"Everyone here was very concerned. They thought that it might have been the cause of a 'red eye' outbreak that had broken out in the community around the same time."*
>
> — Joanni Kringayark, wildlife officer in Repulse Bay

"Everyone here was very concerned," said Kringayark. "They thought that it might have been the cause of a 'red eye' outbreak that had broken out in the community around the same time. It was very strange. No one in the history of the community had experienced anything like this."

Kringayark worked day and night collecting samples, which he sent to labs in Winnipeg and Yellowknife for analysis. By then, the only thing that the 559 Inuit residents had been told was not to come into contact with the substance.

The pollen was easy to identify, said Ian Campbell of the Forest Service.

"It was from Jack pine and white spruce, remarkably pure and in excellent condition, and unlike the so-called 'yellow rain' in southeast Asia in the late 1970s and early 1980s which proved to be bee feces," he said.

How the cloud of pollen got to a place where the nearest tree is 1,000 km away was a mystery.

Campbell turned to colleague Mike Flannigan and Environment Canada meteorologist Karen McDonald for help.

Their analysis of past weather patterns in the area suggests that on June 1, 1998, a severe thunderstorm accompanied by high winds may have picked up the pollen from a forest in central Quebec.

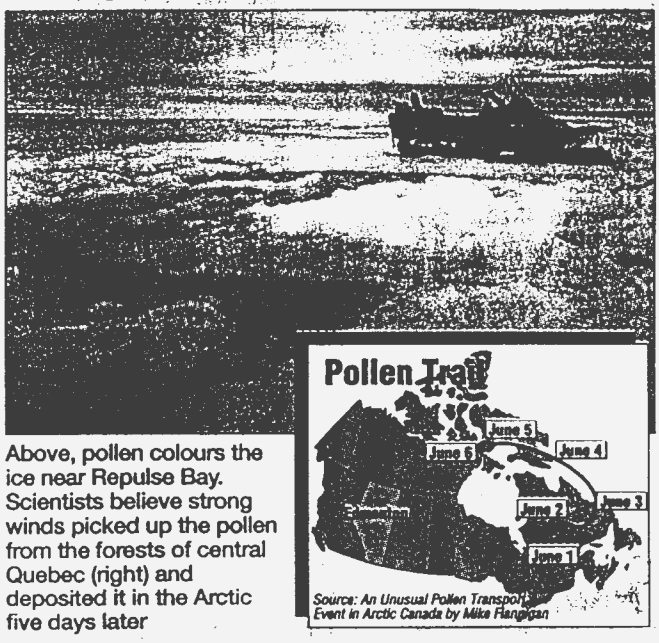
The pollen-laden air mass travelled northeast over Labrador, north over the Labrador Sea, and west over southern Baffin Island before the pollen dropped to the sea ice at Repulse Bay in relatively calm air that had developed with a strong low-pressure system on the night of June 5.

"No doubt, this was a rare event," said Campbell. "Most pollen remains airborne for less than a day and it's rare that you get an amount like this travelling such a long distance."

Campbell said the event shows for the first time that long-distance, low-level atmospheric transport of particulates, whether it be pollen or pollution, is possible. Until now, it was generally believed that particulates of this size can travel over great distances and in large quantity only if they are driven into the upper atmosphere by volcanic eruption, a very hot forest fire or desert windstorm.

Kringayark was relieved to get the news and particularly pleased that he is listed as a co-author of the scientific paper.

"Perhaps we'll see some trees growing up here in the future," he joked. "But I won't be holding my breath."

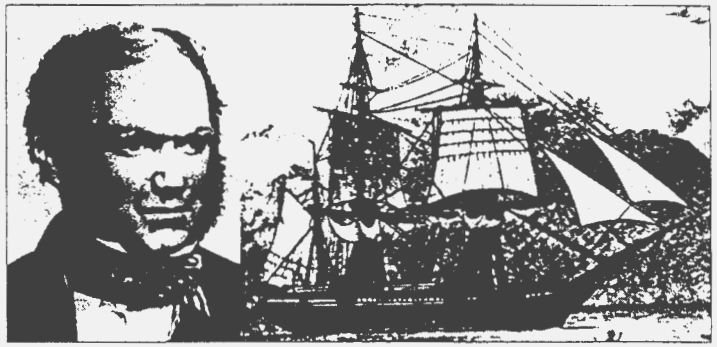


Above, pollen colours the ice near Repulse Bay. Scientists believe strong winds picked up the pollen from the forests of central Quebec (right) and deposited it in the Arctic five days later

Edmonton Journal,

Thursday, May 6, 1999. p. A1.

Darwin on Dust at Sea



In their interesting contribution "The Chinese loess plateau - far and wide" (PAGES Newsletter 98–1) Biscaye and Grousset state that the record of modern eolian dust transport beyond the borders of continental deserts has been known for decades, at least since Radczewski 1939. They could have cited also Darwin who in 1833, a hundred years before Radczewski's report, mentioned "atmospheric dust" off the Cape Verde Islands on board of the *HMS Beagle* "dirtying everything on board and even hurting people's eyes" (see his Journal of Researches, 1845, chapter 1).

Darwin was well aware that this dust originated from Africa. However, Ehrenberg (1844, 1845 *Monatsber. Berlin Ak. Wiss.*), studying Darwin's and other dust samples collected at sea, found remains of siliceous skeletons of diatoms and phytoliths of plants, some of which he knew only from S. America. Darwin in his later "account of the fine dust which often falls on vessels in the Atlantic Ocean" (*Quart. J. Geol. Soc.* London, 1846) refers again to his observation on the *Beagle* as well as to many scattered accounts concerning dust which had fallen on ships on the African side of the Atlantic Ocean. Darwin concludes an African origin, because of the increase of dust towards the African coast and the wind direction, dismissing Ehrenberg's finding of some S. American diatoms. Maury (1855) in his well known "Physical Geography of the Sea" devotes part of his chapter 4 (6 in later editions) to dust at sea, the so called "red fogs" probably well known to sailors even long before Darwin. He tries to explain the presence of S. American diatoms in the dust observed by Ehrenberg as due to a transport from the Amazon and Orinoco basins in higher layers of the atmosphere. Maury also refers to a description of a wind-spout in the dry season in Orinoco basin observed by Alexander von Humboldt and described in his "Ansichten der Natur" (1807) to explain how dust particles can be transferred to high in the atmosphere.

In 1849 Darwin again mentioned aerial dust in his contribution on Geology in Herschel's "Manual of scientific Enquiry". He urged travelers to collect the dust falling on ships in the middle of the Atlantic, and make notes on day and location, indicating also the direction and force of the wind on the day itself and the previous days. Darwin was very interested in the provenance of this dust, a topic which remains an active research topic in our times.

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Picture credits
Down House Archive (*HMS Beagle*), Drawing by T. Magire (Darwin)

PAGES. Vol. 6, No. 2. December, 1998.
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On the shelf

RECENT PUBLICATIONS BY CANADIAN AND OTHER PALYNOLOGISTS - 12

Akaret, O., *Haas, J.N., Leuzinger, U., and Jacomet, S. 1999. Plant macrofossils and pollen in goat/sheep faeces from the Neolithic lake-shore settlement Arbon Bleiche 3, Switzerland. *The Holocene* 9 (2): 175-182.

*Beaudoin, A.B. 1999. What they saw: the climatic and environmental context for EuroCanadian settlement in Alberta. *Prairie Forum* 40 (1): 1-40.

Bos, D.G., *Cumming, B.F., and *Smol, J.P. 1999. Cladocera and Anostraca from the Interior Plateau of British Columbia, Canada, as paleolimnological indicators of salinity and lake level. *Hydrobiologia* 392 (2): 129-141.

*Haas, J.N. 1999. Charophyte population dynamics during the Late Quaternary at Lake Bibersee, Switzerland. *Australian Journal of Botany* 47: 315-324.

*Haas, J.N., Richoz, I., Tinner, W. and Wick, L. 1998. Synchronous Holocene climatic oscillations recorded on the Swiss Plateau and at timberline in the Alps. *The Holocene* 8 (3): 301-309.

*Haas, J.N., Karg, S., and Rasmussen, P. 1998. Beech leaves and twigs used as winter fodder: examples from historic and prehistoric times. *Environmental Archaeology* 1: 81-86.

Haeberli, W., Kaab, A., Wagner, S., Vonder Mühll, D., Geissler, P., *Haas, J.N., Glatzel-Mattheier, H., and Wagenbach, D. 1999. Pollen analysis and ^{14}C age of moss remains in a permafrost core recovered from the active rock glacier Murt 1-Corvatsch, Swiss Alps: geomorphological and glaciological implications. *Journal of Glaciology* 45 (149): 1-8.

*Hall, R.I., Leavitt, P.R., Dixit, A.S., Quinlan, R., and *Smol, J.P. 1999. Limnological succession in reservoirs: a paleolimnological comparison of two methods of reservoir formation. *Canadian Journal of Fisheries and Aquatic Sciences* 59 (6): 1109-1121.

*Hall, R.I., Leavitt, P.R., Quinlan, R., Dixit, A.S., and *Smol, J.P. 1999. Effects of agriculture, urbanization, and climate on water quality in the northern Great Plains. *Limnology and Oceanography* 44 (3): 739-756.

*Head, M.J. and Nöhr-Hansen, H. 1999. The extant thermophilic dinoflagellate *Tectatadinium pellitum* (al. *Tectatodinium rugulatum*) from the Danian of Denmark. *Journal of Paleontology* 73 (4): 577-579.

*Head, M.J. and Westphal, H. 1999. Palynology and paleoenvironments of a Pliocene carbonate platform: the Clino Core, Bahamas. *Journal of Paleontology* 73 (1): 1-25.

*Head, M.J. 1999. The Late Pliocene St. Erth Beds of Cornwall: a review of the palynology and reappraisal of the dinoflagellates. In: Scource, J. and Furze, M.F.A. (Eds.). *The Quaternary of West Cornwall.* Field Guide, Quaternary Research Association, Durham, U.K. pp. 88-92.

Hicock, S.R., Lian, O.B., and *Mathewes, R.W. 1999. Bond cycles recorded in terrestrial Pleistocene sediments of southwestern British Columbia, Canada. *Journal of Quaternary Science* 14 (5): 443-449.

Laing, T.E., Ruhland, K.M., and *Smol, J.P. Past environmental and climatic changes related to tree-line shifts inferred from fossil diatoms from a lake near the Lena River Delta, Siberia. *Holocene* 9 (5): 547-557.

Majewski, S.P. and *Cumming, B.F. 1999. Paleolimnological investigation of the effects of post-1970 reductions of acidic deposition on an acidified Adirondack lake. *Journal of Paleolimnology* 21: 207-213.

Sawada, M., *Gajewski, K., de Vernal, A., and *Richard, P. 1999. Comparison of marine and terrestrial Holocene climatic reconstructions from northeastern North America. *Holocene* 9 (3): 267-277.

Wilkinson, A.N., *Hall, R.I., and *Smol, J.P. 1999. Chrysophyte cysts as paleolimnological indicators of environmental change due to cottage development and acidic deposition in the Muskoka-Haliburton region, Ontario, Canada. *Journal of Paleolimnology* 22 (1): 17-39.

* denotes a CAP member

New Books

Synopsis of Fossil Fungal Spores, Mycelia and Fructifications. **anticipated early 2000. R. Kalgutkar and J. Jansonius. AASP Contributions Series. Approx. 800 p.**

In this Synopsis we bring together some 940 validly published names of species, attributed to some 230 genera (not including some 70 names of extant genera, nomina nuda, and junior synonyms and homonyms). We propose twelve new genera. We propose one new species. Transfers of species to more appropriate genera resulted in 31 junior homonyms, for which we provided new names. The names of one genus and several species, not validly published in their protologue, are here validly published "*ex* Kalgutkar & Jansonius". Our transfers also resulted in some 350 new combinations.

While we tried to include all papers of interest particularly to palynologists, this Synopsis will also benefit mycologists who find the literature on fossil remains not easily accessible. The latter also may appreciate a brief survey of the megascopic remains reported in the literature. Still, we did not access many of the earlier (nineteenth century) publications.

We give an introduction into paleomycology, as well as some mycological fundamentals, for palynologists; a brief section on palynological practices may benefit mycologists. Technical terms are explained in a glossary.

The main part of this Synopsis is the systematics section, where descriptions of genera and species are given in alphabetic order; junior synonyms and homonyms are included, with cross-references to new combinations or names. The types of most species are illustrated; the line drawings are mounted on the 35 plates approximately in the order of the Saccardo system. Finally, there is a list of all specific epithets, with the general names with which they form binomials.

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A Handbook of Geophysical Techniques for Geomorphic and Environmental Research. **1999. Robert Gilbert (Compiler). Geological Survey of Canada Open File Report 3731. 125 p. $21.00 Cdn tax included(CGRG members), $26.40 + $5.40 shipping/tax non-members of CGRG.**

This handbook is an expanded version of a document provided to participants at a workshop at Queen's University in the fall of 1997. It comprises an introduction by the compiler, Bob Gilbert, and five chapters summarizing different geophysical techniques:

1 electromagnetic methods (Christoph Hyde and Larry Dyke)
2 land-based shallow seismic methods (Susan Pullan and James Hunter)
3 borehole geophysical logging methods (James Hunter, Martin Douma, and Ron Good)
4 ground penetrating radar (Stephen Robinson and Yves Michaud)
5 subaquatic acoustical techniques (Robert Gilbert)

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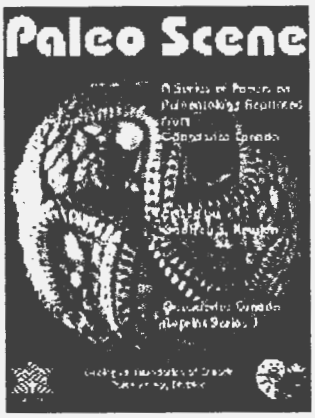
Paleo Scene. **1999. Godfrey S. Nowlan (editor). Geoscience Canada Reprint Series No. 7. 308 p. (See prices below.)**

This book deals with the diverse applications of paleontology in earth sciences and presents an overview of the paleontological scene. It is a valuable compendium of papers that will be useful for those needing to know more about paleontological principles and applications. The soft-covered, spiral bound, 308 page book contains a series of articles on paleontology that originally appeared in the scientific journal *Geoscience Canada*. The articles were written for the non-specialist with an emphasis on useful illustrations and practical examples. It is eminently suitable as a supporting text for paleontology courses and has been produced in an inexpensive format to make it readily accessible to students of earth sciences.

Contents:
Preface
Introduction. Paleontology: Ancient and Modern. Godfrey S. Nowlan
Species in Paleontology. Richard C. Fox
Physical and Biological Constraints on the Pattern of Vertebrate Evolution. Robert L. Carroll
Dual Biostratigraphy: Zones and Biofacies. Rolf Ludvigsen, Stephen R. Westrop, Brian R. Pratt, Pamela A. Tuffnell and Graham A. Young
Darwinian Evolution and Developmental Biology: A Brief Review of Current Ideas. Lars E. Ethraeus
Geochemistry of Recent Marine Invertebrates. Joan O. Morrison and Uwe Brand
Biogeochemistry of Fossil Marine Invertebrates. Uwe Brand and Joan O. Morrison.
Precambrian Biostratigraphy. Hans Hofmann
Biostatistics in Paleontology. Brian Jones
Taphonomic Processes: Information Loss and Information Gain. Mark V.H. Wilson
Paleoecology: Paleoecosystems, Paleocommunities. Paul Copper
Paleobiogeography and Plate Tectonics. Paul L. Smith
Benthic Macrofossils as Paleoenvironmental Indicators in Marine Siliciclastic Facies. Ron K. Pickerill and Pat J. Brenchley
Paleopathology of Vertebrates: Insights to Lifestyle and Health in the Geological Record. Bruce M. Rothschild and Darren Tanke
Organisms and Carbonate substrates in Marine Environments. Paul Copper
Paleozoic Biostratigraphy. Alfred C. Lenz, Jisuo Jin, Alexander D. McCracken, John Utting and Stephen R. Westrop
Sequence stratigraphy and Chronostratigraphy: Problems of Definition and Precision in Correlation, and their Implications for Global Eustacy. Andrew D. Miall
Footprints in the Sands of Time. Vertebrate Footprints and the Interpretation of Past Environments. William A.S. Sarjeant
Future Trends in Research on the Ancient Biosphere. Godfrey S. Nowlan.

The cost for the publication is $29 for members of the Geological Association of Canada (GAC) and $58 for non-members. **As a special one-time offer the GAC Publications Committee has offered non-member students the special price of $39 if they purchase in "bulk" orders.** Students wishing to purchase this volume can obtain an order form from their GAC Campus Representative or by writing directly to the GAC.



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Three new books available from the Geological Society Publishing House:

1. *Volcanoes in the Quaternary.* 1999. C.R. Firth and W.J. McGuire. Geological Society Special Publication 161. 220 p. hardcover. ISBN 1-86239-049-5. $108.00 USD

It has long been suggested that there is a causal link between volcanic activity and Quaternary environmental change. Earlier work pointed to the volcanic activity driving large-scale Quaternary glacial fluctuations. However, a growing body of evidence lends weight to the converse view that Quaternary environmental changes resulted in increased volcanic activity. Using tephra layers as chronological horizons, researchers have begun to suggest that these volcanic events may have produced not only short-term climate changes but also variations in regional vegetation patterns and in the distribution of society. A full understanding of the complex interaction between volcanic activity and Quaternary environmental change requires the

collaboration of both volcanologists and Quaternary scientist. *Volcanoes in the Quaternary* brings together papers from workers in both fields and reflects the diversity of current research. The papers are grouped geographically and focus on New Zealand's North Island, the East African Rift Valley, the Mediterranean and Iceland. They cover the determination of eruptive chronologies, discuss the impacts on local vegetation and society, outline the importance of tephrostratigraphic records and provide detailed studies of hazard assessment.

2. *Late Cenozoic Environments and Hominid Evolution: A Tribute to Bill Bishop.* Peter Andrews and Peter Banham (eds). 276 p. ISBN 1-86239-034-7. $115 USD.

The influence of Bill Bishop is reflected throughout this volume, even though his sudden death stopped a brilliant research career in full flow. Most of the authors are connected with Bill as research collaborators and students, or as the next generation of students of these supervisors, and much of the research reported here has been aided by grants from the fund that bears Bill's name. The volume begins with an appreciation of Bill's life and work; the research contributions that then follow are arranged in three thematic sections, each with a scene-setting editorial overview:
Part 1. Early Miocene of Uganda, including the first full account and discussion of the recently discovered oldest know hominoid, *Morotopithecus bishopi*.
Part 2. Middle Miocene to Pleistocene of the Tugen Hills, Kenya, a comprehensive account of the hominids and their environmental context from members of the Baringo Basin Project.
Part 3. Quaternary Environments, with particular emphases on the English Midlands, western Scotland and southern Africa. Throughout this commemorative volume, the determination of editors and authors to place the results of specialist research into their environmental context is perhaps the clearest indication of the visionary influence of Bill Bishop. Every paper presents new, unpublished research *e.g.* the first full account of the oldest known hominoid (Uganda), *Morotopithecus bishopi*; the first integrated account of the Baringo Basin (Kenya) hominids and their environmental contexts; the climatic implications of the ages and directions of the dune winds of southern Africa; new ideas on physical and biological aspects of the British Quaternary.

3. A Revised Correlation of Quaternary Deposits in the British Isles. D.Q. Bowen (ed.). Geological Society Special Report No. 23.

Realization that continental records of Quaternary rocks were more complex than hitherto believed came with the re-interpretation of oxygen isotope stratigraphy in the late 1960s and early 1970s. This necessitated a comprehensive re-evaluation that has been assisted by the emergence of new geochronological methods for terrestrial as well as land-sea correlations. The current state of such correlations is presented in this revised set of proposals for correlations in England, Ireland, Scotland and Wales, which also includes the Quaternary geology of the continental shelf. Correlation with the global standard of oxygen isotope stratigraphy enables the significance of British lithostratigraphical units to be appreciated in a wider context that includes the evolution of the climate system of a margin of the northeast Atlantic Ocean. It thus provides timely British data for the international palaeoceanographical and palaeoclimatological community and the correlations proposed are primarily on Milankovitch timescales. But their appearance coincides with the early stages of a paradigm shift to the search for both terrestrial and land-sea correlation on millennial timescales and then on centennial and decadal ones. This is the first of many similar terrestrial and land-sea correlations.

Geological Society Publishing House
http://bookshop.geolsoc.org.uk

Climate and Environment Changes During the Last 65 Million Years (Cenozoic: Paleocene - Holocene). Eastern Europe - Siberia - Central Asia - North Atlantic, North Pacific and Arctic Oceans. 1999. A.A. Velichko (ed.). GEOS Publishers, Moscow. 300 p. In Russian, with English summary.

This book provides the first comprehensive summary of the Cenozoic environmental history of a vast area including Eastern Europe, Siberia, and part of Central Asia, as well as adjoining oceans. It presents results of multidisciplinary investigations of climate changes and environmental response within large regions of

Northern Eurasia through the Cenozoic. New data on climate fluctuations are also presented obtained on adjoining areas of the Arctic and Atlantic Oceans as well as North Pacific. The attention is focussed on most important climatic events of global occurrence. The book is meant for geographers, geologists, climatologists, biologists, ecologists, as well as other specialists interested in environmental evolution.

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AMQUA Website

The report "A Vision for Geomorphology and Quaternary Science Beyond 2000" is now available for review on the AMQUA website.

Please be sure that your name is entered into the Directory of North American Quaternary Scientists and that all information is correct.

The Quaternary Times is available online.

Darrell Kaufman, Editor
http://vishnu.glg.nau.edu/amqua

palyno bytes

International Society for Diatom Research

A new home page has been established, as a source of information about the society. The address is

http://www.isdr.org

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Canadian Archaeological Radiocarbon Database

Two new WWW-accessible databases based on data from the Canadian Archaeological Radiocarbon Database are now available.

1 The main CARD database, over 6000 dates of archaeological and vertebrate palaeontological sites in Canada:
http://www.canadianarchaeology.com/radiocarbon/card/card.htm

2 "Mapping Ancient History", an interactive map based on the CARD dates, that visually represents the location and spread of dated sites:
http://wwwims1.gsc.nrcan.gc.ca/projects/mabasyquad/radiocarbon/indexC14.htm

The British Antarctic Survey (BAS) Metadata Management System (MDMS)

The BAS MDMS is maintained by the Antarctic Environmental Data Centre (AEDC), the designated repository of the Natural Environment Research Council (NERC) for UK Antarctic data. All aspects of Antarctic science are represented in the system, including:

- Ice bed topography
- Long-term ozone monitoring records
- Sedimentary records from Antarctic and Sub-Antarctic lakes
- Long-term meteorological records
- Climate models
- Ice-core records
- Physical and biological oceanography
- Mapping, GIS and GPS data
- Atmospheric chemistry

The MDMS boasts:

- Simple free-text searches
- Advanced free-text, geographical and date-range searches
- Gazeteer of Antarctic place names
- Comprehensive on-line help

The MDMS now contains several hundred publicly-available metadata records which can be accessed from

For further information, consult the sources below or e-mail Adam Gardner (arga@bas.ac.uk)

AECD: http://www.nerc-bas.ac.uk/public/aedc/
MDMS: http://www.nerc-bas.ac.uk:8000/query/
NERC: http://www.nerc.ac.uk
Minimum system requirements: Java enabled web browser (*e.g.* Netscape 3.0, IE 4.0)

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Heinrichs, Markus. 1999. *A Late-Quaternary Paleoecological Analysis in the Engelmann Spruce - Subalpine Fir Biogeoclimatic Zone of the Okanagan/Ashnola Region, British Columbia, Canada.* Ph.D. Thesis, University of Victoria, Victoria, British Columbia, Canada. Supervisor: Richard J. Hebda.

A multi-proxy paleoecological analysis from three sites in the high-elevation Engelmann Spruce-Subalpine Fir forests of the Okanagan and Ashnola regions was undertaken. Using pollen plant macrofossils, and microscopic charcoal, the vegetation and natural disturbance history was reconstructed.

At Mt. Kobau, Crater Mountain, and Cathedral Provincial Park, the Late-glacial vegetation consisted of an *Artemisia* steppe. Inferred climate from this period is cold and dry. Rapid warming occurred in the early Holocene, approximately 10,000 to 9500 yr BP, and vegetation during the xerothermic interval varied from grasslands at Mt. Kobau, open *Pinus* parklands at Crater Mountain, and closed *Pinus* forests at Cathedral Provincial Park. An increase in available moisture during the mid-Holocene, from approximately 7000 to 4000 yr BP, resulted in increased fire severity at all three sites. Vegetation responded to the moisture and fire regimes, resulting in open *Pinus* parkland at Mt. Kobau, fire-successional stands of *Pinus contorta* at Crater Mountain, and increasing amounts of *Abies lasiocarpa* and *Picea engelmannii* at Cathedral Provincial Park. Late Holocene cooling resulted in Engelmann Spruce-Subalpine Fir forests at all three sites.

These forests differ in composition, history, and response to disturbance. Furthermore, impacts of future climate change and disturbance will be expressed differently at these sites. These differences are of significant importance in resource management strategies.

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Current project: Examination of past terrestrial-aquatic interactions in sub-arctic environments using fossil chironomids, CIRC, Abisko, Sweden.

Gostlin, Kevin. 1999. *Continental Margin Architecture: The Palynological Signature of Glacioeustasy.* M.Sc. Thesis, Brock University, St. Catherine's, Ontario, Canada. Supervisor: Francine McCarthy.

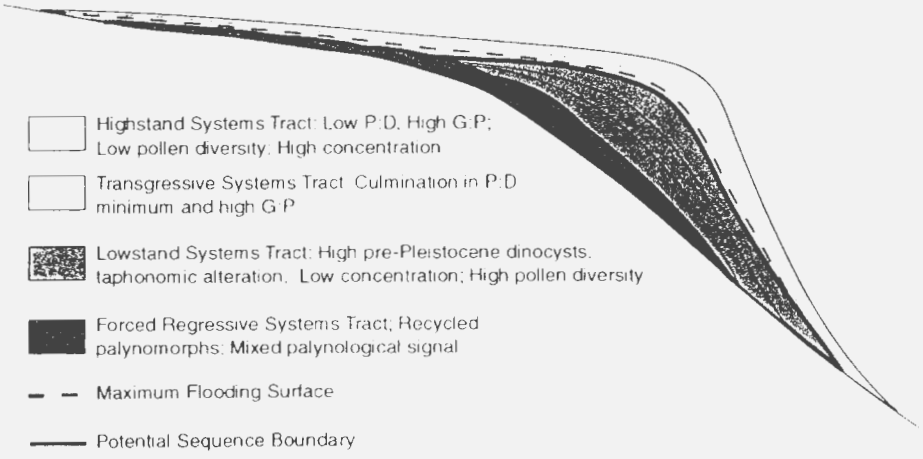
Palynomorphs from two siliciclastic margins were examined to gain insights into continental margin architecture. Sea level change is thought to be one of the primary controls on continental margin architecture. Because Late Neogene glacioeustasy has been well studied marine sediments deposited during the Late Neogene were examined to test this concept. Cores from the outer shelf and upper slope were taken from the New Jersey margin in the western North Atlantic Ocean and from the Sunda Shelf margin in the South China Sea.

Continental margin architecture is often described in a sequence stratigraphic context. One of the main goals of both coring projects was to test the theoretical sequence stratigraphic models developed by a research group at Exxon (e.g. Wilgus *et al.*, 1988). Palynomorphs provide one of the few methods of inferring continental margin architecture in monotonous, siliciclastic marine sediments where calcareous sediments are rare (e.g. New Jersey margin). In this study theoretical models of the palynological signature expected in sediment packages deposited during the various increments of a glacioeustatic cycle were designed. These models were based on the modern palynomorph trends and taphonomic factors thought to control palynomorph distribution. Both terrestrial (pollen and spores) and marine (dinocysts) palynomorphs were examined. The palynological model was then compared with New Jersey margin and Sunda Shelf margin sediments.

The predicted palynological trends provided a means of identifying a complete cycle of glacioeustatic change (Oxygen Isotope Stage 5e to present) in the uppermost 80 meters of sediment on the slope at the New Jersey margin. Sediment availability, not sea level change, is thought to be the major factor controlling margin architecture during the late Pleistocene here at the upper slope. This is likely a function of the glacial scouring of the continents which significantly increases sediment availability during glacial stages. The subaerially exposed continental shelf during the lowstand periods would have been subject to significant amounts of erosion from the proglacial rivers flowing from the southern regions of the ice-sheet. The slope site is non-depositional today and was also non-depositional during the last full interglacial period.

The palynomorph data obtained from the South China Sea indicate that the major difference between the New Jersey Margin sites and the Sunda Shelf margin sites is the variation in sediment supply and the rate of sediment accumulation. There was significantly less variation in sediment supply between glacial and interglacial periods and less overall sediment accumulation at the Sunda Shelf margin.

The data presented here indicate that under certain conditions the theoretical palynological models allow the identification of individual sequence stratigraphic units and therefore, allow inferences regarding continental margin architecture. The major condition required in this approach is that a complete and reliable database of the contemporaneous palynomorphs be available.



Theoretical palynological trends within an idealized sequence that forms during a typical Pleistocene glacio-eustatic cycle.
Note: P:D = pollen & spore to dinocysts ratio. G:P = gonyaulacoid to protoperidinioid ratio.

Announcements

Calls for Papers

Palynology and Micropaleontology in Canadian Geoscience: New Frontiers and Applications

One-day Symposium sponsored by the Canadian Association of Palynologists to be held during GeoCanada 2000
Calgary, Alberta, Canada
May 29- June 2, 2000

The GeoCanada 2000 event is Canada's millennium conference of the major geoscience societies, including the Geological Association of Canada, and will be held in Calgary, May 29 - June 2, 2000. As part of this meeting, CAP will be sponsoring a one-day symposium, featuring both oral and poster presentations, on "Palynology and Micropaleontology in Canadian Geoscience: New Frontiers and Applications".

Palynology and micropaleontology contribute to many branches and aspects of geoscience: biostratigraphy, paleoecology, vegetational history, maturation studies, evolution, past biodiversity, isotope studies, limnology, oceanography, and many others. To capture fully the Canadian scene, we welcome contributions on any locality from those working within Canada, and on Canadian sites from those working outside the country.

At this time, we are requesting an expression of interest, and a paper title, from potential contributors. The one-day session can accomodate 14 oral presentations. The convenors reserve the right to assign presentations as posters. We would appreciate receiving your responses by November 26 1999.

Abstracts must be submitted directly to the Conference Committee. Abstracts can be submitted electronically between October 22 1999 - January 7 2000. Please note that the final abstract deadline is January 7 2000. The abstract form, submission instructions, and details of the meeting are available on the conference website at http://www.geocanada2000.com

If you are interested in contributing to this symposium, please contact either of the convenors:

Alwynne B. Beaudoin
abeaudoi@gpu.srv.ualberta.ca

Martin J. Head
mh300@cam.ac.uk

Alwynne B. Beaudoin
Archaeological Survey
Provincial Museum of Alberta
12845 - 102nd Avenue
Edmonton, Alberta T5N 0M6 Canada

Second International Conference
Application of Microorganisms to Environmental Problems
Winnipeg, Manitoba, Canada
August 27-31, 2000

The conference is organised by the Avalan Institute of Applied Science, Canada, The Centre for Marine Geology - Dalhousie University, Canada, and the Geological Laboratory - University of Angers, France. The main aim is to present results of innovative research in microorganisms (*e.g.* bacteria, foraminifera, ostracoda, radiolaria, calcareous nannoplankton, dinoflagellates, pollen and spores) to show their significance in solving environmental / paleoenvironmental problems. Abstracts will be accepted until April 30, 2000. For further information contact:

Prof. Valentina Yanko-Homback
Conference President
Avalon Institute of Applied Science, Inc.
P.O. Box 60013-RPO Tuxedo Park
Winnipeg MB R3) 2G9 Canada

or

Prof. Francine McCarthy
Conference Chairperson
Earth Sciences
Brock University
St. Catharines ON L2S 3A1 Canada

8th International Symposium on Paleolimnology
Queen's University
Kingston, Ontario, Canada
August 20-24, 2000

All paleolimnologists are invited to come to Kingston, Ontario, Canada in August, 2000, to participate in our next international symposium. The symposium will be open to presentations on any aspect of paleolimnology, using poster sessions, as well as contributed (20 minutes) and keynote oral lectures. There will also be opportunities to have workshops and other meetings during the symposium. Please contact the co-organizers if you have any suggestions for sessions, workshops, or comments on any aspect of the conference.

We are primarily using the PEARL and Journal of Paleolimnology web sites and the Paleolimnology Listserver to communicate information regarding travel, accommodations, registration, etc.

For details and updates, please consult the PEARL web site and link at:
http://biology.queensu.ca/~pearl/

Or the J. Paleolimnology web site at:
http://www.umanitoba.ca/geoscience/paleolim/jopl.html

The conference will open on Sunday evening, August 20 (with an opening mixer), and will end on Thursday evening, August 24, 2000. We currently anticipate offering 3 day (optional) excursions following the conference, depending on interest.

We have secured very reasonable housing rates at the university residences. The lecture and poster sessions will be held in the Biosciences Complex, at Queen's University. Further details are on our web sites.

Details concerning abstracts and registration procedures are also on the web. The deadline for early registration and abstracts will be March 1, 2000.

If you are not on the Paleolimnology Listserver, or do not have access to the web, please contact the organizers to be sure that we keep you informed of progress.

JOHN P. SMOL & BRIAN F. CUMMING
(Co-Chairs)
Paleoecological Environmental Assessment and Research Lab (PEARL)
Dept. of Biology, Queen's University
Kingston, Ontario K7L 3N6, Canada

SmolJ@Biology.QueensU.Ca
CummingB@Biology.QueensU.Ca

Fax: (613) 533-6617

Festscrift in Honour of
Professor Dr. Horst Lange-Bertalot

To celebrate the 65th birthday of Professor Dr. Horst Lange-Bertalot in February of 2001, we are planning a Festschrift in his honour. Contributions to this volume are open to all who are interested, but they should reflect the field of research for which Dr. Lange-Bertalot is best known: diatom taxonomy, systematics and ecology, including biogeography and palaeoecology. The Festschrift will be published by Koeltz Scientific Books.

Potential contributors should indicate their interest in submitting manuscripts for inclusion in the Festschrift as soon as possible by sending a letter or e-mail to any one of the five co-editors. We hope to have original submissions completed by March 2000, and revisions completed by September of 2000. We plan to have all manuscripts peer-reviewed. Instructions to authors will be forwarded to those who express an intention to submit a manuscript. It is our hope to present the completed published Festschrift to Dr. Lange-Bertalot on his birthday.

We look forward to hearing many positive responses from Horst's colleagues and friends, to celebrate this important milestone in his life with a contribution to the Festschrift.

Patrick Kociolek
kociolek@calacdemy.org
Regine Jahn
r.jahn@bgbm2.bgbm.fu-berlin.de
Andrzej Witkowski
witkowsk@univ.szczecin.pl
Pierre Compere
P.Compere@BR.fgov.be
Ditmar Metzeltin
DMETZELTIN@aol.com

Co-Editors of the Lange-Bertalot Festschrift

Journal of Paleolimnology Special Personal Subscription Rate Offer

We are happy to announce that Kluwer Academic Publishers has agreed once again to offer a "special" personal subscription rate for the Journal of Paleolimnology (JOPL) and that this special rate is the same as latst year's!

For the year 2000, fees for a special personal subscription rate to JOPL will be $120 USD. Payment of these fees will provide you with Volumes 23 and 24 (4 issues each; *i.e.* 8 issues total for year 2000) of JOPL, including all postage and handling. There are NO ADDITIONAL SOCIETY FEES, etc. (Please note that this price is exclusive of Value Added Tax (VAT); this VAT will be applied automatically if applicable to the country you are ordering from.)

In order to subscribe to JOPL at this much reduced rate, simply go to the JOPL web page at
http://home.cc.umanitoba.ca/~mlast/paleolim/subsc.html

The JOPL page provides all the details, and a link to the Kluwer order forms.

As we have done in the past, the table of contents and other announcements relative to Journal of Paleolimnology will be posted on the JOPL Web page and on the Paleolimnology Listserver.

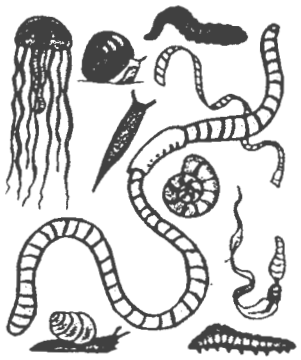
William M. Last
mlast@ms.umanitoba.ca
John P. Smol
smolj@biology.queensu.ca
Co-Editors

Editorship of EON Newlsetter of the Paleontology Division of the Geological Association of Canada

Please be advised that the Editorship of EON has been assumed by Dr. Mike Melchin of Antigonish, Nova Scotia. Dr. Melchin's full address and contact information are as follows:

Dr. Michael Melchin
Department of Geology
St. Francis Xavier University
Antigonish, Nova Scotia B2G 2W5
Phone: (902) 867-5177
Fax: (902) 867-5177
E-mail: mmelchin@juliet.stfx.ca

In future, all correspondence regarding EON should be directed to Dr. Melchin.



COURSE AVAILABLE IN UK

SHORT COURSE IN ENVIRONMENTAL PALAEOECOLOGY FOR MSc AND PhD STUDENTS 2000

The ENVIRONMENTAL CHANGE RESEARCH CENTRE, University College London is offering the following short course for palaeoecologists, environmental archaeologists and other interested environmental scientists:

INTRODUCTION TO DIATOM ANALYSIS
Dr. V.J. Jones, Dr. L. Carvalho & Prof. R.W. Battarbee
24th January - 4th February 2000

This intensive two-week course is designed for ecologists, palaeoecologists, micropalaeontologists and archaeologists. It provides a thorough grounding in diatom analysis and its applications, and assumes no prior knowledge of diatoms.

The course consists of lectures and practical classes covering diatom morphology and systematics, evolution, habitats and ecology, taphonomy and preservation, training-sets and transfer functions, and marine biostratigraphy, archaeology, estuarine sediments, climate change, saline lake sediments, eutrophication, lowland lake sediments, acidification, upland lake sediments.

Practical classes focus on slide preparation techniques, counting, taxonomy, computing, and the analysis of material from estuarine, saline lake, eutrophic and acid lake sediments. Participants are welcome to bring along their own material too, *e.g.* seidment samples, slides etc., for personal tuition sessions.

Proposed staff:
Prof. Rick Battarbee
Dr. Laurence Carvalho
Dr. Viv. Jones
Dr. Tim Allott
Dr. Roger Flower
Dr. Nigel Cameron
Dr. Helen Bennion
Dr. Carl Sayer
Dr. Catherine Stickley

Please note our courses are heavily subscribed and early booking is advisable.

For more information, please contact:
Catherine Dalton
Environmental Change Research Centre
University College London
26 Bedford Way
London WC1H 0AP
UK
Email: c.dalton@ucl.ac.uk
http://www.geog.ucl.ac.uk/ecrc/teaching.htm
Tel: + 44 (0) 171 380 7575
Fax: + 44 (0) 171 380 7565

POLLEN POSTER

The American Association of Stratigraphic Palynologists is selling a pollen poster that was developed by the pollen laboratory at USDA-ARS, Areawide Pest Management Research Unit (APMRU), College Station, Texas. This pollen poster is a compilation of 222 black-and-white micrographs from 117 plant taxa. The light micrographs were made using brightfield microscopy. Pollen for the micrographs was collected from vouchered plant specimens, acetolyzed, and stained. The micrographs are grouped by aperturation and family. More tricolporate types are shown than any other type. Both anemophilous and entomophilous taxa are represented. Aperturation, family, and scientific name are printed above the micrographs. Most of the micrographs are from plants that occur in the southeastern USA; however, some are common to Mexico. Micrographs from common and uncommon occurring taxa can be found in the poster including (common) *Pinus palustris* and *Magnolia virginiana* and (uncommon) *Pithecellobium calostachys* and *Berchemia scandens*. The idea of the poster is to give technicians and students a starting place for pollen identification, not to be the ultimate identification tool. The poster is 3' X 5' and costs $25 USD. Purchase price includes postage and a mailing tube. MasterCard and Visa are accepted.

To order a poster, contact:

Vaughn M. Bryant, Jr.
Professor and Director
Palynology Laboratory
Department of Anthropology
Texas A & M University
College Station, Texas 77840-4352 USA
Tel: (409) 845-5242; Fax:: (409) 845-4070

DEADLINES

Please submit items for the next issue of the *CAP Newsletter* (Volume 23, Number 1, May 2000) by **April 15, 2000**. Laboratory articles, conference reports, field trip reports, announcements, notices of new books, book reviews, news, and essays on topics relevant to Canadian palynology are all welcome. Submissions by disk or e-mail are preferred. Articles may include diagrams and photos; for photographs, please provide a glossy black-and-white or colour print (3" x 5") from a picture with good contrast, a 35 mm slide (colour or black-and-white), or illustrations may be submitted in digital format. Please send material for the next issue to

Dr. Mary Vetter
CAP Newsletter Editor
Luther College, University of Regina
Regina, SK S4S 0A2 Canada
Tel: (306) 585-4571 Fax: (306) 585-5267
E-mail: mary.vetter@uregina.ca

Meeting calendar

2000

Date TBA. **Canadian Paleontology Conference**. Antigonish, Nova Scotia, Canada.

January 6-7 2000. **Quaternary Research Association: Annual Discussion Meeting.** Southampton, England, UK. Theme: Millennial Scale Changes

Details: Jane Hart (jhart@soton.ac.uk), Tel: 01703-594615, Keith Barber (Keith.Barber@soton.ac.uk), Tel: 01703-593215, Antony Payne (A.J.Payne@soton.ac.uk), Tel: 01703-593823, Paul Hughes (Paul.Hughes@soton.ac.uk), Tel: 01703-592489, Department of Geography, University of Southampton, Southampton, SO17 1BJ, England, UK.
Website: http://www.qra.org.uk/

February 10-12 2000. **Geological Association of Canada Environmental Conference and Atlantic Geoscience Society Annual Meeting.** Fredericton, New Brunswick, Canada. The theme of the conference will be "Current Environmental Research and Foci for the Next Century". Contact: Bruce Broster or Andrew Stumpf, Department of Geology, University of New Brunswick, Box 4400, Fredericton, NB, E3B 5A3. E-mail broster@unb.ca or stumpf@unb.ca

March 6-8 2000. **Fourth Geological Meeting on Northwestern Mexico and Adjacent Areas.** Universidad de Sonora, Hermosillo, Sonora, Mexico. For more information on the Quaternary Symposium contact: Cristina Penalba, UNAM, Instituto de Ecologica; E-mail: penalba@servidor.unam.mx

March 16-18, 2000. **30th International Arctic Workshop**
Institute of Arctic and Alpine Research (INSTAAR), University of Colorado, Boulder, Colorado, USA. The meeting will consist of oral and poster presentations covering all aspects of high-latitude environments, past and present.
Website: http://instaar.colorado.edu/AW2000/

March 27 - 31 2000. **INQUA - Commission for the Holocene Meeting: Environmental Changes During the Holocene: Correlations Between Temperate and Semiarid Regions.** Seville, Spain. Details: Secretary of the Meeting: Ana I. Porras, Departamento de Geografia Fisica, Facultad de Geografia e Historia c/Maria de Padilla, sn., Universidad de Sevilla, Spain, Tel: +34 954.551.377 Fax: +34 954.556.988, E-mail: aipor@cica.es
Environmental conditions during the last 10,000 years have been increasingly governed by the human factor and in some regions the climate controlled geodynamics have been altered. Geomorphic responses to climatic fluctuations and episodes vary spatially and temporally.

We would like to shelter a forum for discussing the significance of climatic and anthropic impulses: High spatial variability of the paleoenvironmental processes in small areas is a major topic. This meeting of the Commission is intended to bring together new research conceptions from worldwide researchers.
Website: http://www.ku-eichstaett.de/MGF/geo/inqua1.htm

April 4-8 2000. **Association of American Geographers Annual Meeting.** Pittsburgh, Pennsylvania. Website: http://www.aag.org

May 15-19 2000. **International Symposium on Archaeometry.** Mexico City, Mexico. Contact: Archaeometry 2000, Instituto de Investigaciones Antropologicas, UNAM, Circuito Exterior s/n, Ciudad Universitaria, Del. Coyoac n, Mexico City, D.F. 04510 Mexico. E-mail: archaeom@servidor.unam.mx

May 20-27 2000. **AMQUA 16th Biennial Meeting.** University of Arkansas, Fayetteville, Arkansas, USA. Theme: Landscape and Biotic Responses to Climate Variability: Future Impacts and Past Lessons. Technical Sessions May 22-24; Field Trips and Short Courses May 20, 21, and 25-27. Contacts:
Registration: Continuing Education, Attn. Tracy Selvin, CTED-504, University of Arkansas, Fayetteville AR 72701; tselvin@postbox.uark.edu
Technical Program: Robert S. Webb, NOAA-NGCD Paleoclimatology Program, 325 Broadway, Boulder, CO 80303; Robert.S.Webb@noaa.gov
Abstracts: Joanne or Ken Kvamme, Anthropology Department, MAIN-330, University of Arkansas, Fayetteville, AR 72701; kkvamme@comp.uark.edu
All other correspondence: Margaret J. Guccione, Geosciences Department, OZAR-113, University of Arkansas, Fayetteville, AR 72701; guccione@comp.uark.edu
Tel: (501) 5755-3354; Fax: (501) 575-3177

June 2000. **17th International Radiocarbon Conference**. Near Jerusalem, Israel.
Website: http://www.radiocarbon.co.il/

May 29-June 2 2000: **GEOCANADA 2000**. Joint meeting of Canada's major geoscience societies, including the Geological Association of Canada (GAC), the Mineralogical Association of Canada (MAC), the Canadian Society of Petroleum Geologists (CSPG), the Canadian Society of Exploration Geophysicists (CSEG), the Canadian Well Logging Society (COOLS) and others. University of Calgary, Alberta. Details: Dr Grant Mossop, Geological Survey of Canada, 3303-33rd Street N.W., Calgary, Alberta, T2L 2A7, Canada. Tel: (403) 292-7049, Fax: (403) 292-5377, E-mail: mossop@gsc.nrcan.gc.ca

n.b. CAP-sponsored symposium on "Palynology and Micropaleontology in Canadian Geoscience: New Frontiers and Applications. **(See p. 30 of this newsletter)**

May 29-June 3 2000. **Canadian Association of Geographers (CAG) Annual Meeting**. Brock University, St. Catharines, Ontario. Details: Hugh Gayler E-mail: hjgayler@spartan.ac.brocku.ca

June 1-3 2000. **Paleo-Grassland Research 2000. Sponsored by the National Science Foundation Geosciences: Earth System History and PAGES Past Global Changes - IGBP.** Water's Edge Resort, Long Island Sound, Westbrook, Connecticut, USA.
Co-ordinators and contacts:K.R.M. Beuning, Department of Earth and Environmental Sciences, 265 Church Street, Middletown, Connecticut, 06459-6067; kbeuning@wesleyan.edu and
M.J. Wooller, Tropical Paleoenvironments Research Group, Department of Geography, University of Wales Swansea, Singleton Park, Swansea, SA2 8PP; m.wooller@swansea.ac.uk

June 4-8 2000. **GSA Penrose Conference: Great Cascadia Earthquake Tricentennial.** Seaside, Oregon, USA. Contact: John J. Clague, Earth Sciences, Simon Fraser University, Burnaby, British Columbia, V5A 1S6 Canada. Tel: (604) 291-4924; Fax: (604) 291-4198; jclague@sfu.ca

June 24-30 2000. **10th International Palynological Congress (IPC).** Nanjing, China. Details: Secretary of the Organizing Committee for 10th International Palynological Conference, Nanjing Institute of Geology and Palaeontology, Academia Sinica, 39 East Beijing Road, Nanjing, 210008, People's Republic of China. Electronic version of first circular, with registration form, available at: http://members.spree.com/sip/spore/index.htm

Information on International Palynological Congresses is available at
http://geo.arizona.edu/palynology/ifps.html

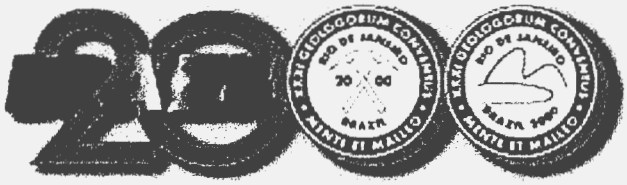
June 26-30 2000. **2000 World Conference on Natural Resource Modelling.** Wageningen, The Netherlands. Theme: The Ecology of Scale, and the emphasis will be on spatially explicit models. Contact: Max Rietkerk, Wageningen University, Department of Environmental Sciences, Bornsesteeg 69, 6708 PD Wageningen, The Netherlands. Tel: 31 317 485437; Fax: 31 317 484845; Max.Rietkerk@staf.ton.wau.nl
Website: http://www.slm.wau.nl/natcons/RMAconf/

July 10-14 2000. **8th International Symposium on Pollination.** Mosonmagyaróvár, Hungary. Theme: "Pollination: integrator of crops and native plant systems" Details: Prof. P. Benedek, Zoology Department, Faculty of Agricultural Sciences, Pannon University of Agricultural Sciences, H-9201 Mosonmagyaróvár, Vár 4. Hungary Fax: 36(96)215-931, E-mail: benedek@movar.pate.hu

July 12-14 2000. **5th International Ancient DNA Conference.** Manchester, England, U.K. Details: Terry Brown adna5@bi.umist.ac.uk

July 30 - August 3 2000. **Sixth Quadrennial Conference of the International Organization of Paleobotany (IOPC IV - 2000)**. Qinhuangdao, Hebei, China. Details: Prof. Lujun Liu, Secretary-General of IOPC-VI Organizing Committee, Nanjing Institute of Geology and Palaeontology, Academia Sinica, 39 East Beijing Road, Nanjing 210008, PR China, Tel.: +86-25-6637 208, Fax: +86-25-3357 026, E-mail: paleobot@public1.ptt.js.cn

August 6-17 2000: **31st International Geological Congress**. Rio de Janeiro, Brazil. Theme: "Geology and Sustainable Development: Challenges for the Third Millennium".



Details: Secretariat Bureau, Av. Pasteur, 404 - Casa Brazil 2000 - Urca, Rio de Janeiro - RJ - Brazil, CEP 22.290-240. Tel: 55 21 295 5847, Fax: 55 21 295 8094, E-mail: 31igc@31igc.org, Website: http://www.31igc.org

August 20-24 2000. **8th International Symposium on Paleolimnology.** Queen's University, Kingston, Ontario, Canada Details: J.P. Smol, E-mail: smolj@biology.queensu.ca
and B. Cumming E-mail: cummingb@biology.queensu.ca
Paleoecological Environmental Assessment and Research Lab (PEARL), Dept. of Biology, Queen's University, Kingston, Ontario K7L 3N6, Canada
Details also appear at the PEARL website at http://darwin.biology.queensu.ca/~pearl/

August 22-27 2000. **Association québecoise pour l'étude du Quaternaire (AQQUA) 2000 and Canadian Geomorphology Research Group (CGRG) Annual Meeting.** Université du Québec Montréal, Montréal, Québec, Canada. Participants to this joint meeting are invited to take a critical look at the Québec and Canadian contribution over the last thirty years to the knowledge of the Quaternary, as well as to evaluate the impact of new technologies on solving the problems we face today. A special session on the Holocene and general presentations will complete the programme. The first circular will be sent in May 2000. Until then, contact Michel Lamothe, Département des sciences de la Terre, UQAM; lamothe.michel@uqam.ca

August 25-27 2000. **16th International Diatom Symposium.** Hellas, Greece; Athens 25-27 August, Aegean Islands, 28 August - 1 September. Copies of the first circular are now available at
http://www.uoa.gr/IDS2000
Contact: Dr. Richard M. Crawford, Curator: Friedrich Hustedt Diatom Collection, Alfred Wegener Institute for Polar and Marine Research, AM Handelshafen 12, 27570 Bremerhaven, Germany. Tel: 49 471 4831 530; Fax: 49 471 4831 425; rcrawford@awi-bremerhaven.de

August 27-31 2000. **Application of Microorganisms to Environmental Problems, 2nd International Conference.** Winnipeg, Manitoba, Canada. Aim: to present results of innovative multidisciplinary research in microorganisms (*e.g.* bacteria, foraminifera, ostracoda, Radiolaria, diatoms, calcareous nannoplankton, dinoflagellates, pollen and spores) and to show their significance in solving environmental/paleoenvironmental problems in the

fields of biosciences, geosciences and agriculture. Conference secretariat: Dr. Irena Motnenko, Avalon Institute of Applied Science, Box 60013 - RPO, Tuxedo Park - 110-2025 Corydon - Winnipeg, MB, R3P 2G9, Canada; Tel: (204) 489-4569, Fax: (204) 489-5782; valyan@ilos.net (see also p. 30 of this newsletter)

September 4-8 2000. **International Symposium on High Mountain Lakes and Streams: Indicators of a Changing World.** Innsbruck, Tyrol, Austria. Details: E-mail: hmls2000@uibk.ac.at
Website: http://zoology.uibk.ac.at/congress

November 13-16 2000. **Geological Society of America, Annual Meeting and AASP 33rd Annual Meeting.** Reno, Nevada, U.S.A. Details: GSA HQ, Box 9140, 3300 Penrose Place, Boulder, Colorado 80301, U.S.A. Tel: (303) 447-2020, X133, E-mail: meetings@geosociety.org
AASP: contact Thomas Demchuk (thomas.d.demchuk@conoco.dupont.com) or Fred Rich (frich@gsaix2.cc.GaSoU.edu)

2001

Date: TBA. **CANQUA Meeting**. Whitehorse, Yukon Territory, Canada (proposed).

Date: TBA. **Canadian Paleontology Conference.** London, Ontario, Canada

May 27-30 2001. **GAC/MAC Joint Annual Meeting** St John's, Newfoundland

May 29 - June 2 2001. **Canadian Association of Geographers (CAG) Annual Meeting.** McGill University, Concordia University and Université de Montréal, Montréal, Canada. A joint event arranged by the three Montréal universities in celebration of the 50th anniversary of the founding of the CAG.
Details: Tim Moore (moore@felix.geog.mcgill.ca), Patricia Thornton (thorpat@vax2.concordia.ca), André Roy (royandre@ere.umontreal.ca)

September 18-22 2001. **PAGES - PEP III Conference.** Le Centre de Congres, Aix-en-Provence, France. PAGES - PEPIII is concerned with studies of past climate variability in Europe and Africa. Key aims are to assess variability on different time-scales, to assess the impacts of past climate change on natural ecosystems and human society, and to provide a firm basis for the verification and testing of climate models. There will be a number of plenary lectures from invited speakers plus a series of poster sessions open for all participants, plus a post-conference excursion to the Massif Central, France (subject to interest).
Contact: Dr. Catherine E. Stickley, Environmental Change Research Centre, University College London, 26 Bedford Way, London. WC1H 0AP.
C.stickley@ucl.ac.uk
Website: www.geog.ucl.ac.uk/ecrc/pep3

November 5-8 2001. **Geological Society of America, Annual Meeting.** Boston, Massachusetts, U.S.A. Details: GSA HQ, Box 9140, 3300 Penrose Place, Boulder, Colorado 80301, U.S.A. Tel: (303) 447-2020, X133, E-mail: meetings@geosociety.org

2002

Date: TBA. **GAC Meeting**. Saskatoon, Saskatchewan

October 28-31 2002. **Geological Society of America, Annual Meeting.** Denver, Colorado, U.S.A. Details: GSA HQ, Box 9140, 3300 Penrose Place, Boulder, Colorado 80301, U.S.A. Tel: (303) 447-2020, X133, E-mail: meetings@geosociety.org

2003

Date: TBA. **CANQUA Meeting.** Halifax, Nova Scotia, Canada (proposed).

Date: TBA. **INQUA XVI Congress.** Reno, Nevada, USA

November 2-5 2003. **Geological Society of America, Annual Meeting.** Seattle, Washington, U.S.A. Details: GSA HQ, Box 9140, 3300 Penrose Place, Boulder, Colorado 80301, U.S.A. Tel: (303) 447-2020, X133, E-mail: meetings@geosociety.org

More conference information, together with other material relevant to Canadian palynology, can be found on CAP's website at http://www.ualberta.ca/ ~abeaudoi/ cap/cap.htm