Canadian Association of Palynologists
Association Canadienne des Palynologues

NEWSLETTER

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President's Message

In spite of all the doom and gloom in the world, as natural scientists most of us are lucky to have jobs or vocations that help keep our lives interesting and enjoyable. We wouldn't have become natural scientists if we didn't have a certain enthusiasm about the nature of the world around us. Yet, we all go through stages in our careers when we tend to be sometimes more and sometimes less enthusiastic about our science. I came to geology and paleontology as a "high school" student, fascinated by the landscapes of southern England and the cliff exposures of the intriguing Dorset coast, where we spent our summer vacations. However, as a graduate student and young scientist, the necessary long hours glued to microscope and writing desk admittedly jaded my early joy. I viewed this as an inevitable side effect of growing up and having increased responsibilities in life.

So, you ask, why is Fensome baring his soul like this in a CAP Newsletter editorial? He confessed in a previous editorial (though I'm sure no one remembers) that he doesn't go to church. Is he now going to tell us that he has been born again? Well, in a way, yes: I've seen the light of ... (trumpet fanfare) ... Outreach Activities. Outreach activities have, I feel, revitalized my vocation. For example, I get to tell school children about fossils and see the joy in their faces. And I get to do an eclectic variety of fieldwork, so I can help write a popular book on the geology of the Maritimes. I'd like to take a few paragraphs to write about each of these activities.

Not everyone is suited to making presentations to school children, and a decade or so ago I would have put myself in the unsuitable category. However, sometime around 1994, GSC colleague and fellow CAP member Graham Williams told me that he had been invited to give a series of talks on dinosaurs to local school children - would I like to help out? My first reaction was terror! But I agreed to put some slides and materials together, if Graham would be the "front man" - I'm not a good public speaker, but I am a great projectionist. So we set off with our dinosaur package and Graham started to address the children. I dutifully sat by at first and made sure that the slides were the right-way-up and in focus. However, I soon realised, through the excitement of the kids, that I wanted to add some neat tidbits of information to Graham's narrative. So I chipped in. Then I chipped some more - and some more still. In the next talk we gave up the pretense of our different roles, and since then we have developed duo-style presentations on dinosaurs, fossils and rocks and minerals that both we and the kids enjoy.

The other outreach activity that I'm involved with, as mentioned above, is a popular book on the

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geology of the Maritimes, under the auspices of the Atlantic Geoscience Society. Our intended audience is the "educated" lay person, but we believe that if we do our job well enough, the book would also be useful at upper grade levels in high schools and even as a basic university text. It will fill a real gap in the literature of the region, since there is no readily accessible compendium of Maritimes geology available - just heavy technical works and some very basic overviews. Yet the Maritimes has a fascinating geological history, aspects of which draw tourists and industry alike - witness the red Bay of Fundy cliffs and offshore oil and gas, respectively.

I'm very excited about the book, which we are calling "The Last Billion Years". Personally, it has expanded my horizons enormously - I haven't thought about Paleozoic mountain building episodes since student field trips to the Scottish Highlands. And having to write an introductory chapter on the "Dynamic Earth" was a refresher course in itself. If I weren't involved with "the book", how else would I have met so many "hard-rock" geologists around the Maritimes. How else would I have persuaded local geologists to show me their favourite localities. How else would I have been involved in the commissioning and guiding of art work showing aspects of Maritimes geology. How else could I have had the opportunity to be turned down by the Millenium Fund. All but the last have been wonderful experiences. My excitement about natural science has peaked again to the level of those "salad days" on the Dorset coast.

I'm fortunate in having managers who support outreach activities - as long as one continues to be a productive scientist as well. I'm astounded when I hear about scientists who are not allowed to go out to schools or be involved in other outreach projects because of short-sighted time-accounting management systems. In so many organizations today, time in managers' eyes seems to equate with productivity. Maybe I'm incorrigibly naïve, but it seems obvious to me that morale, not time, equates with productivity. And even though such commodities are intangible, so much goodwill and community spirit is gained through outreach that I don't think the scientific community can neglect it.

What has all this got to do with CAP and palynology? Not a lot, except perhaps to serve as a reminder that we should also consider outreach activities for palynology. Palynomorphs may not have the same appeal as dinosaurs, but people are naturally fascinated by the very small as well as the very large. The role that palynology plays in such diverse fields as archaeology and plant evolution could surely be put to good effect. Perhaps we could develop some educational materials to put on the CAP website. The possibility is quite exciting and I don't think it has been done before. In any case, it is something to think about, and if anyone has suitable materials, please let our website director, Alwynne Beaudoin, know. Outreach does take time, motivation and even courage, but the rewards are many, not least perhaps the shedding of a little light on all the doom and gloom.

Rob Fensome
CAP President

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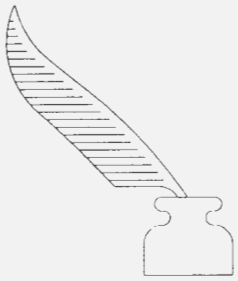


From the bureaucrat's desk

On behalf of CAP, it is a pleasure to welcome Aureal Cross (Michigan State University) and Clayton Morgan (McMaster University) as new members.

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, L. Apaalse, D. Batten, M. Boyd, G. Chmura, T. Demchuk, R. Hall, D. Hallett, P. Kuhry, T. Lacourse, R. Mathewes, K. Matsuoka, S. Porter, J. Ross, W. Sarjeant, R. Stancliffe, L. Suneby, S. Sutherland, A. Traverse, J. White , V. Wiggins, S. Yazvenko, and Z. Yu.

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. 28. Funds should be sent to:

Francine M. G. McCarthy
CAP Secretary/Treasurer
Department of Earth Sciences, Brock University
St. Catharines, Ontario, L2S 3A1, Canada
Tel: (905) 688-5550 ext. 4286, Fax: (905) 682-9020
E-mail: francine@craton.geol.brocku.ca

CAP MEMBERS VOTE TO AMEND BY-LAWS

In the recent special resolutions to change the CAP by-laws, all resolutions passed resoundingly, if not unanimously. To make a change to the by-laws, 75 percent of votes (or proxies) must be in favour and a quorum involves 25 percent of the membership taking part in the vote (By-laws 1c and 30). There were 15 votes in total out of a membership of 46. The following are the results:

Special resolution 1: for 13/15, against 2/15, no abstentions
Special resolution 2: for 14/15, against 1/15, no abstentions
Special resolution 3: for 14/15, against 1/15, no abstentions

Thus:

- Non-Canadians/Canadian residents can now be be full members of CAP; they just have to pay their dues.
- We now have an official Website Editor, with Alwynne Beaudoin taking over that position by acclamation.
- The other changes were administrative (I wonder if the votes against represent a misunderstanding) and anyone interested can see the changes at the CAP website.

See the CAP website for the complete by-laws, new and old.

Rob Fensome
1998/99 President of CAP

CANADIAN ASSOCIATION OF PALYNOLOGISTS ANNUAL GENERAL MEETING

The CAP Annual General Meeting for 1999 will be held during the AASP Meeting at Georgia Southern, Savannah, Georgia, 26-30 October, 1999. The exact time and location are not known at the time this Newsletter went to press, but please watch for notices or announcements at the AASP Meeting, or contact CAP Secretary Francine McCarthy.

See you there!

Editor's Notes

A few years ago now I took a diatoms short course at the University of Manitoba's Delta Marsh field station. The instructor, Dr. Charles Reimer (The Diatoms of the United States, R. Patrick and C.W. Reimer, 1966), began the course by writing the following phrase on the board:

Aller Anfang ist schwer
Das Beste kommt später!

It translates as 'Every beginning is difficult, the best comes later'. I have the quote pinned on the shelf above my desk, and I thought of it often while putting this edition of the newsletter together, reminding myself that it will get easier!

By way of a brief introduction, I teach in the Biology Department at the University of Regina (introductory and human biology, plant taxonomy and diversity, Quaternary ecology). My research interests are the Holocene history of northern Great Plains and boreal forest grasslands.

Although Alwynne Beaudoin has officially stepped down from editing the newsletter (you will note she is now the official CAP website editor, something she has actually done for a number of years), this newsletter would not have been possible (not to say much thinner) without her help and contributions. She kindly provided the template and much advice. Special thanks also go to Rob Fensome who collected several of the items for the newsletter and who, with staff at the Geological Survey of Canada, printed and mailed this edition of the *CAP Newsletter*.

Many thanks to the following contributors to this issue: Alwynne Beaudoin, Vaughn Bryant, Audrey Dallimore, Catherine Dalton, Rob Fensome, Roland Hall, Martin Head, Sandy McCracken, Bill Sarjeant, Dan Smith, John Smol, and Al Traverse.

Mary Vetter

SPECIAL ANNOUNCEMENT:

THE JULIAN SZEICZ MEMORIAL SCHOLARSHIP

As many of you will recall, Dr. Julian Szeicz, 33, an assistant professor in the Geography Dept. at Queen's University and a member of CAP, was killed in a snow avalanche last April, while doing fieldwork near Watson Lake, in the Yukon. Julian was well known for his work on tree rings and lake sediments.

Since Julian was killed, members of the Department of Geography, in consultation with Barb Zeeb, Julian's wife, and some members of the Department of Biology, have been working on an appropriate scholarship to remember Julian's lasting contributions to his students, colleagues and friends. Several of you have already donated to this scholarship fund, but since it is now more formally described, I am sending you this notice:

The Julian Szeicz Memorial Scholarship
Established by friends, colleagues and students of Julian Szeicz, internationally respected biogeographer and award winning teacher who was tragically killed doing fieldwork in 1998. To be awarded annually to a fourth year honours student pursuing graduate studies in an environmental field; value to be determined.

If you have not already done so or would like to make an additional contribution to this scholarship, we invite you to send a donation to:

"The Julian Szeicz Memorial Scholarship"
c/o The Student Awards Office
Victoria School Building
Queen's University
Kingston, Ontario, Canada
K7L 3N6

Thank you for your support.

John Smol
smolj@biology.queensu.ca

Book Review

Vaughn M. Bryant Jr and John H. Wrenn (editors) *New Developments in Palynomorph Sampling, Extraction, and Analysis*. 1998. AASP Contribution Series Number 33. 155 pp. $12 USD.

New Developments in Palynomorph Sampling, Extraction and Analysis consists of 16 papers and an introduction by the editors. Most papers were presented in a symposium at the 27th AASP Annual Meeting held in College Station, Texas, in 1994. As Bryant and Wrenn observe in their overview, the papers span the range from "new ideas [to] refinements of older techniques and procedures". Techniques and data interpretation are the focus of most papers, which deal primarily with Quaternary palynology, including melissopalynology, entomopalynology, and forensic palynology, with only two papers (Wrenn, and Rich and Pirkle) focussing on pre-Quaternary palynology. However, the issues raised – among them, quality control, cost reduction, and statistical validity – are not the monopoly of the Quaternary community and indeed have implications for other areas of micropalaeontology beyond palynology.

An evocative, if light-hearted, subtitle for the volume might be "The Palynology of Weird Stuff". Certainly, several of the papers deal with the extraction of palynomorphs from difficult samples, many in archaeological context. Often, these samples are isolated and do not form part of a stratigraphic sequence. Indeed, the recovery of palynomorphs from objects, whether human-made artifacts such as amphorae or naturally-formed items such as mollusc shells and insect bodies, is a subsidiary theme. These objects and their pollen loads can often be transported far from their place of origin or initial assembly. Thus, as well as requiring creative solutions for extracting palynomorphs, the acquired data also require different interpretive strategies.

Four papers deal explicitly with archaeological or historical samples. Three of these concern the recovery of palynomorphs from artifacts, namely, amphorae and their contents and textiles. Jones, Bryant and Weinstein attempt the "Pollen Analysis of Ceramic Containers from a Late Iron Age II or Persian Period Shipwreck near Haifa, Israel". They concentrate on five sediment samples that they believe "represent decomposed materials originally stored in amphora" rather than later inwashed sediment (p. 62) and four samples of pitch and resin from ceramic containers. They were able to identify pollen from several plants of economic significance, such as grape, olive, and pistachio, and pollen from other plants, such as oak and hazel, that perhaps represent later contamination or the contemporary pollen rain. Pollen evidence for grape was supplemented by the recovery of seeds from two samples. Jones *et al.* note the coincidence of well-preserved pine pollen in some samples with olive or grape pollen or both. They suggest that this might result from amphorae sealed with pine pitch and used to transport olives, olive oil, grapes, or wine. In a related paper, Jacobsen, Bryant and Jones present "Preliminary Pollen Analysis of Terebinth Resin from a Bronze Age Mediterranean Shipwreck" found off the shore of southwest Turkey. The resin, traded and valued for its use as incense and presumed medicinal properties, was obtained from the sap of a species of pistachio tree. Based on the analysis of eight samples, the assemblage includes conifer (predominantly *Pinus*) and *Pistacia* pollen but is dominated by NAP, especially cereal pollen grains. Their data suggest an origin for the resin in the eastern Mediterranean, perhaps the area now encompassed by north Israel-south Syria-northwest Jordan.

In these studies, the extraction of palynomorphs from the pitch and terebinth resin required considerable experimentation. Jones *et al.* dissolved the pitch and resin by "soaking the samples for several days in acetone, then soaking them again in 95% ethanol", prior to acetolysis (p. 63). Jacobsen *et al.* were able to dissolve the terebinth resin in xylene. However, they next describe adding *Lycopodium* tracers and HCl acid. I assume a precursor step would have involved removal of the xylene and transfer of the palynomorphs to water for further processing. The description of how this was accomplished is missing. Thus it would be difficult for anyone to follow their procedure with similar samples.

Moving forward in time, Jarzen summarizes his

"Pollen Analysis of the Gondar (Ethiopia) Hanging". Determining the item's origin, history, and authenticity were the objectives of the investigation. Jarzen analyzed debris from the packing and wash and rinse water from the conservation treatment of this historically-important two-hundred-year-old silk hanging. Most data were retrieved from the packing debris, and did yield two pollen types (*Olea* and *Justicia*) that suggested residence in Ethiopia for the artifact, although most pollen types were more cosmopolitan and probably related to its residence in Ontario since the late 19th century. The small sample size available, and the necessity to eliminate sources of contamination, involved processing techniques similar to those used in forensic palynology.

Cummings considers sample spatial variation in "Sampling Prehistoric Structures for Pollen and Starch Granules". Her samples were obtained in 1979 from an Anasazi Pueblo I pithouse in Colorado, a site over a thousand years old. By gridding the floor into 50 cm x 50 cm squares, and sampling within this grid, she was able to identify probable activity areas, based on characteristic pollen components. Not surprisingly, pollen from food plants was often found in squares near the hearth in areas where artifacts indicated food preparation had probably occurred. As a sidelight on contamination, she had to consider the problem associated with the interpretation of *Nicotiana* pollen as a consequence of tobacco use by the field crew. Cummings was able to identify certain areas of the pithouse that provided most information on probable plant use, then used this as a guide for sampling in a subsequent pithouse excavation. Cummings' analysis shows the importance of considering spatial variability in the assessment of archaeological pollen samples, and the importance of a research design that allows this variability to be revealed. Stratigraphic (and thus temporal) variability is often a consideration in pollen studies; it is less common to take areal variability into consideration. I was, however, mystified by the reference to starch granules in the title of this paper, since these are only mentioned briefly in one sentence and are not a focus of the research presented here.

Moving away from archaeology and stepping back in time, Rich and Pirkle look at "Steinkerns as Pollen Traps". Steinkerns, I found out, are not beer-glasses but are the sediment infillings of mollusc shells. Because these are likely to have formed soon after the mollusc shell became part of the deposit and because the shell has protected the contents from contamination or reworking, these may give a contemporary palynological signature. This is a concern for the authors working in the southeast US where the floras of the late Tertiary and Quaternary are very similar and so contamination from modern sources may be difficult to detect.

Two papers focus on entomopalynology and deal with the pollen loads of insect pests on economically-important crops. Jones and Coppedge explore "Pollen Analysis of the Boll Weevil Skeleton" by using SEM imagery to examine pollen adhering to the heads of these insects. Their results show that the insects forage on plants other than cotton, including oak, plum, and black willow. In the following paper, "Pollen Analysis of the Crop of Adult Corn Earworms", Jones and Lopez use light microscopy (LM) to look at pollen in the crop, an internal organ of the moth. Again, the results showed that the insects were visiting a variety of plants. Both papers are investigating where the insects are foraging and feeding, presumably so that better pest control strategies can be designed. These papers form an interesting contrast, since in the first the authors argue that SEM analysis of externally-adhering pollen gives a better impression of foraging strategy than the LM analysis of gut contents, whereas in the second paper, precisely the opposite argument is advanced! Whether this is related to the different morphologies or feeding and foraging strategies of the two insect taxa is not clear.

Another theme that is strongly evident in several papers in this compilation is the evaluation of costs of doing pollen analysis. Perhaps this is a reflection of the increasing importance of consulting and contract work in the palynological world. The opening paper in the volume by Wrenn on "The Importance of Palynological Sampling to the Oil Industry" introduces this theme. His central argument is that using external contractors to process samples, while initially perhaps attractive from a cost perspective, is not effective if there is no quality control over the product being produced. He

illustrates this proposition by presenting the results produced by three consulting firms in southeast Asia who were asked to process mainly Eocene samples from the Chindwin Basin of Myanmar. Their preparations were generally poor and often debris-laden in comparison to the relatively clean slides produced by Amoco Production Company staff. These preparations would have involved significantly greater counting times. Chances are that debris may have also obscured some palynomorphs. The age assignments provided by the consultants were also broad and inaccurate. His results show quite cogently that there is no substitute for expertise, especially from in-house experts who are able to assess the validity of results being presented and maintain continuity in quality. This may be a powerful argument to present to managers who are simply looking at a "bottom line" assessment, rather than considering value and reliability. Certainly, when decisions are being made about spending millions of dollars in development, it would seem prudent to be confident of the validity of the data underlying those decisions. His paper takes tilt at the myth that somehow outside consultants can do things better, quicker, and cheaper than in-house staff.

Dean in "Finding a Needle in a Palynological Haystack: A Comparison of Methods" attempts to devise a strategy for assessing the abundance of rare types in primarily archaeological samples. These rare types, which Dean defines as being those present as < 0.5% of the pollen spectrum, might include taxa of low abundance but high interpretive significance, such as corn (*Zea mays*). In these instances, even the occurrence of a single grain of the cultigen is significant. Thus the palynologist may be faced with the prospect of scanning a large amount of the preparation to be sure of counting (or not counting) a rare type. As Dean points out, if a rare type is not encountered within some target count, the palynologist may be in danger of concluding that the type is "not present" when in fact it is there but just has not been found. The objectives of her recommended procedures are three-fold: to maximize the probability of encountering rare types, to minimize counting time, and to provide an estimate of time needed to reach the target count for budgetary purposes. The methods that she describes, which she calls "Intensive Systematic Microscopy" or ISM, uses the spike palynomorph as an index to estimate the amount of counting needed to encounter a type present as a certain specified concentration, say an abundance of 1 grain g^{-1}. This approach does not eliminate the prospect of drawing a wrong conclusion of absence of a particular type, since, even if not encountered within the target count, it may still be present in the rest of the preparation. It does, however, provide the palynologist a way of quantifying what has been done in search of the rare type.

An embarrassment of samples was Gish's problem in "The Transwestern Pipeline Expansion Project Pollen Analysis". She describes her solution to the formidable challenge of dealing with more than a thousand samples from 90 archaeological sites and geomorphological study locales. Analysis had to follow a strict priority based on sample context. Sample counting was split between three analysts but with Gish, as the lead investigator, doing part of each count to minimize operator bias. Here both costs and project time constraints were limiting factors.

On the processing side, Jones and Ellin present "Improved Palynological Sample Preparation Using an Automated Focused Microwave Digestion System". They suggest that this system produces cleaner samples and reduces the needed amounts of processing chemicals, which are often both expensive and hazardous. They point out that there are now more stringent occupational health and safety regulations in the workplace and tighter controls over the use and disposal of hazardous chemicals. Hence processing methods that can be shown to be both safer and more environment-friendly are attractive. Their method is devised to deal primarily with rock samples. The advantages and results for the system certainly sound impressive, indicating success with samples that were not treatable by conventional means. But I was curious why the vital information about the cost of the system was left out of the article. Parenthetically, I note that it may be easier for labs to get money for chemicals ("supplies") than it is for new pieces of equipment ("capital"), so a new method that involves considerable outlay may not find wide acceptance.

Cost reduction is also a concern for Milne in the development of "Surface-embedding of Fossil Pollen for Time- and Cost-Effective Ultramicrotomy (TEM) and Multiple Microscopy (LM, SEM, TEM) of Single Grains". She describes a method that allows the same grain to be examined by different microscopy techniques, thus saving time and therefore reducing costs. Her especial concern was to reduce the costs involved in preparing a specimen for sectioning for TEM.

Several papers, besides that of Dean, focus on both processing techniques and aspects of the statistical validity of samples. Jones and Bryant explicitly examine whether a single-drop sample is representative in one of two papers dealing with melissopalynology ("Are All Counts Created Equal?"). Honey is characterized or classified according to the analysis of one drop of pollen residue. From this the honey will be judged as to its floral source, a judgement that may have financial implications for the producer. Hence, it is critically important to know whether the sample strategy used gives representative and reliable results. Not surprisingly, Jones and Bryant found that assemblage diversity increases with increasing pollen count. They counted 500 grains in each of five single drop samples, finding 130 taxa in total. They note that none of the samples contained more than 60% of the total number of taxa. The implication is that large counts, as a minimum 500 grains, are needed to adequately characterize a honey's floral sources. However, I was left questioning how these data relate to honey classification. Presumably, "clover honey", for example, would be expected to have an assemblage dominated by clover pollen. So how does the total number of taxa identified in a sample help in this assessment?

In their companion paper, "Pollen Recovery from Honey", Jones and Bryant explore two processing techniques (alcohol dilution and filtration), assessing their ability to maximize the chances of recovering a full spectrum of pollen types from a honey sample. They conclude that using ethyl alcohol to dilute honey and reduce its specific gravity as an initial processing step is likely to allow good recovery of pollen. The authors are not enthusiastic about the filtration technique, citing a number of disadvantages, especially in terms of the equipment required.

Smith's paper focusses on the comparison of samples prepared by different processing methods. The results that she obtained in her investigation of "Processing Pollen Samples from Archaeological Sites in the Southwest United States: An Example of Differential Recovery from Two Heavy Liquid Gravity Separation Procedures" are quite startling, especially for the concentration values. Her main conclusion is that "different procedures may not yield comparable data" (p. 29), a worrying issue. Besides statistical concerns, this paper raised questions about processing techniques. Analysts might perform HF acid treatment after heavy liquid separation to minimize the amount of HF acid needed to treat the sample by pre-removing silicates. This both reduces cost (HF acid is expensive) and reduces the amount of hazardous waste needing disposal. The implications of Smith's analysis are that this may not be the best procedure for pollen recovery. But the results raise other questions. For instance, I noted that some of the samples were described as containing clay. Yet no procedure for removal of clays and fine-grained material was apparently performed, as described for instance by Bates *et al.* (1978) and Cwynar *et al.* (1979). So are the differential results due to the influence of clay in the sample and, if so, would the effects be minimized with a precursor step for clay disaggregation and removal? A careful consideration of this paper will point the way to additional research questions.

In the last paper, Bryant and Mildenhall bring us a glimpse of the regrettable but necessary application of "Forensic Palynology: A New Way to Catch Crooks". They survey many cases in which pollen evidence was useful, especially to tie suspects or objects to a particular locale. All themes are well exemplified in this review: the necessity for meticulous and well-documented laboratory technique, concerns about statistical validity, and the need for cost-effective procedures. Besides having credentials as a scientist, the forensic palynologist must be prepared to deal with varied samples, from clothing to hair to drugs, maintain an impeccable chain of custody protocols, including locked storage, that will withstand legal

scrutiny, and be ready to face, perhaps hostile, cross-examination in a courtroom. Given these strictures, I'm not surprised that most palynologists would opt for the calmer atmosphere of a research lab!

The editors have drawn together an interesting and thought-provoking set of papers. Many raise issues that deserve more consideration. Here, I am just going to discuss a couple of points that struck me as important as I read the book.

First, I was quite surprised that several of the papers (*e.g.*, Dean, Smith, Gish) refer to a 200 grain count as though it were a standard. Several other papers (*e.g.*, Jones *et al.*, Rich and Pirkle) also mention this target. I was perplexed to find this thinking embedded in a volume devoted to new methods and approaches. Dean, for instance, states that a count of 200 grains has been "standard in palynology since the early years of this century" (p. 53). Although this may have been true at one time, I believe that palynological thinking has moved far from this view.

Several basic palynological textbooks provide guidance in this matter. As far back as 1980, Birks and Birks (pp. 165-166) were presenting data showing that a count of at least 300 – 500 grains is necessary to obtain stable pollen percentages for the main components of the assemblage. Moore *et al.* (1991: 168-169) suggest that a count of around 600 grains (in the pollen sum) may be adequate if the objective is "gross forest history". Much greater counts (over 1000 grains) will be necessary if minor components of the pollen assemblage are the focus of study. In another recent AASP volume, MacDonald (1996: 890) also summarizes these recommendations and indicates that "Quaternary palynologists generally count between 300 and 1000 grains of terrestrial plant pollen per sample". Berglund and Ralska-Jasiewiczowa (1986) suggest a minimum pollen sum 500 grains, and recommend that at least 1000 grains in the pollen sum be recorded where anthropogenic influence is suspected. Their experience suggests that "a pollen sum of 2000 will facilitate the identification of human impact" (p. 462). Because not all palynomorphs are included in the sum, the actual count may be much greater.

Larger counts may also be required if the pollen assemblage is dominated by one abundant type. For example, I recently undertook a study of pollen assemblages and variability from Lake O'Hara where the statistical validity of minor types was a particular concern. We set two counting targets for taxa included in the pollen sum: a minimum of 500 identifiable grains and a minimum of 100 grains over and above the abundant *Pinus* pollen. As a result, the mean number of grains counted was 1141, with a range from 534 to 5638 (Beaudoin and Reasoner 1992: 111).

A greater number of taxa (assemblage diversity) is also usually obtained with larger counts. This is illustrated quite neatly by Jones and Bryant's "Pollen Recovery from Honey" paper. Their data show that between about 7% and 17% new taxa were still being found when the count was increased from 400 to 500 grains (p. 110). In "Are All Counts Created Equal?", Jones and Bryant found 19 additional taxa in scanning one of their samples beyond the 500 grain count (p. 117). To assess adequately assemblage diversity, whether of a honey or a sediment sample, large counts are probably necessary.

There may be many situations in which the pollen count is limited by the sample itself. Here, the archaeological samples examined by Jones *et al.* and Jacobsen *et al.* are good examples, as are the forensic cases described by Mildenhall and Bryant. In other situations, where the sample or recovery does not impose limits, I would argue that, rather than adhering to a "standard", pollen counting strategies need to be flexible and devised according to the research questions. Indeed, this approach is illustrated by the analysis that Dean presents in the rest of her paper.

Second, given that several papers take a statistical approach and eight mention using tablets containing *Lycopodium* spores as a spike or tracer, I was surprised that more attention was not paid to the statistics of these. None of the papers give the batch number for the tracers, only four indicate whether one or more tablets were added, and only three acknowledge that the tablets have a range of contents, rather than an absolute number of spores. Jones *et al.* indicate that they added tablets containing 11,300±400 *Lycopodium* spores;

Jones and Bryant (both papers) used tablets containing 11,300±300 spores. I was left wondering if these were actually from the same batch. The statistics associated with the use of a spike have been well explored by Maher (1981, 1997, see also Stockmarr 1971). Ideally, when assessing variability of spiked samples, the variability in the quantity of spike added needs to be taken into account. For instance, Dean's discussion of counting limits based on spike values would have been enhanced by a consideration of the confidence intervals on the amount of tracer added (see Maher 1997). I felt that a number of the papers, especially Smith's and Dean's, would have been much stronger with a more rigorous examination of the underlying statistical issues.

On the production side, while the book is nicely laid-out and designed, the volume would have benefitted from the attentions of a good copy-editor. There are inconsistencies in word use and there are noticeable typographical errors. The articles are generally well illustrated. With a few exceptions (the images in Wrenn's and Jones and Ellin's papers, and the laboratory view in Jarzen's paper), image reproduction is generally adequate, especially for the palynomorph photo-micrographs. The very modest price for the volume means that it should be in reach of a wide readership.

I greatly enjoyed reading this compilation. It would be a worthwhile addition to any palynologist's bookshelf. For me, the most abiding impression left by the volume is the sheer range of sample materials being investigated. As it extends from its traditional focus on peat, mud, or rock, palynology finds broader applications in other spheres, and makes a contribution to diverse fields in bio- and geosciences.

The publication can be ordered from Vaughn M. Bryant Jr, Secretary AASP Foundation, c/o Palynology Laboratory, Texas A&M University, College Station, Texas 77843-4352, USA. E-mail: vbryant@tamu.edu

Alwynne B. Beaudoin
Archaeological Survey, Provincial Museum of Alberta
abeaudoi@gpu.srv.ualberta.ca

References

Bates, C. D., P. Coxon, and P. L. Gibbard (1978) A New Method for the Preparation of Clay-Rich Sediment Samples for Palynological Investigation. *The New Phytologist* 81:459-463.

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

Berglund, B. E., and M. Ralska-Jasiewiczowa (1986) "Pollen Analysis and Pollen Diagrams". In *Handbook of Holocene Palaeoecology and Palaeohydology*, edited by B. E. Berglund, pp. 455-484. John Wiley and Sons, Chichester.

Birks, H. J. B., and H. H. Birks (1980) *Quaternary Palaeoecology*. Academic Press, New York.

Cwynar, L. C., E. Burden, and J. H. McAndrews (1979) An Inexpensive Method for Concentrating Pollen and Spores from Fine-Grained Sediments. *Canadian Journal of Earth Sciences* 16: 1115-1120.

MacDonald, G. M. (1996) "Non-Aquatic Quaternary". Chapter 22 in *Palynology: Principles and Applications*, Volume 2, edited by J. Jansonius and D. C. McGregor, pp. 879-910. AASP Foundation.

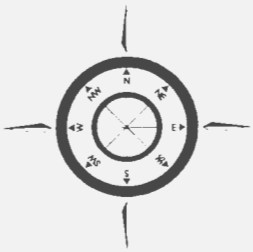
Maher Jr, L. J. (1997) Statistics for *Lycopodium* tablets. *CAP Newsletter* 20(2):26. See http://www.ualberta.ca/~abeaudoi/cap/articles/paper8.htm

Maher Jr, L. J. (1981) Statistics for Microfossil Concentration Measurements Employing Samples Spiked with Marker Grains. *Review of Palaeobotany and Palynology* 32:153-191.

Moore, P. D., J. A. Webb and M. E. Collinson (1991) *Pollen Analysis*, 2nd edition. Blackwell Scientific Publications, Oxford, U.K.

Stockmarr, J. (1971) Tablets with Spores Used in

Absolute Pollen Analysis. *Pollen et Spores* 13:615-621.



Far and wide....

MONTREAL WORKSHOP ON ARCTIC DINOFLAGELLATE CYSTS REPORT

An informal Workshop on Arctic Dinoflagellate Cysts was held at GEOTOP, Université de Québec at Montréal from March 15 to 19, 1999. This workshop focussed on the systematics of recent dinoflagellate cysts from the arctic and subarctic regions and their applicability for paleoenvironmental reconstructions. Participants from Canada and several European countries (Norway, Denmark, Germany, France, United Kingdom and Netherlands) who are currently working in the polar regions attended this meeting.

The major goals of this workshop were to initiate a joint approach to standardizing the taxonomy and nomenclature of cold-water dinoflagellate cysts and to establish a common modern ecological database for the arctic regions. The stimulus comes from recent paleooceanographic and paleoclimatic investigations in the Arctic Ocean and adjacent subarctic seas, where several undescribed dinoflagellate cyst taxa have been recorded which apparently have quite specific ecological affinities. Since the early studies of Rex Harland and co-workers in the Beaufort Sea, some 20 years ago, little progress has been made on the taxonomy of polar species. The workshop therefore began with the study of major arctic taxa in order to improve taxonomic concepts of both described forms and those that are evidently related but presently undescribed.

Knowledge of the ecology of arctic species is still based on a relatively small data set from widely distributed areas of the Arctic region. Our revised taxonomic concepts will be used in the study of a new set of surface sediment samples from the Arctic shelf seas which will describe the distribution of taxa with respect to sea-surface conditions. The new data set will enlarge and extend the modern reference data base developed for the northern North Atlantic and adjacent basins using standardised laboratory procedures and taxonomy into the Arctic Ocean and circum-Arctic seas. A next rendezvous of the group has been set for spring (late April) 2000.

During the workshop the participants discussed the taxonomy of *Algidasphaeridium minutum* and related taxa; the cysts of *Pentapharsodinium dalei*; a new taxon with possible affinities to *Polykrikos*; *Spiniferites frigidus*; together with *Operculodinium centrocarpum* sensu Wall & Dale and related morphotypes. The busy but stimulating schedule included a talk by Rex Harland on 'Dinoflagellate cysts from the bottom of the world' and by Martin Head on 'Pliocene dinoflagellates of the North Atlantic region: their biostratigraphy, ecology, and versatility'.

More information about the workshop can be obtained from:

Anne de Vernal [r21024@er.uqam.ca]
Marianne Ellegaard [marianc@bot.ku.dk]
Kari Grøsfjeld [Kari.Grosfjeld@ngu.no]
Rex Harland [rexharland@msn.com]
Martin Head [head@quartz.geology.utoronto.ca]
Arun Kumar [adumar@ccs.carleton.ca]
Martina Kunz-Pirrung
[mpirrung@awi-bremerhaven.de]
Jens Matthiessen
[jmatthiessen@awi-bremerhaven.de]
Peta Mudie [mudie@agc.bio.ns.ca]
Niels Poulsen [nep@geus.dk]
André Rochon [rochon@agc.bio.ns.ca]
Jean-Louis Turon [turon@geocean.u-bordeaux.fr]

Submitted by Martin Head

NEWS FROM CANADIAN-BORN PALEONTOLOGIST, AL TRAVERSE

Al Traverse (native of PEI!) officially became emeritus in 1995 at Penn State University but continued to teach palynology at PSU for one more year. Since that time he has continued to be active in palynological research, though the courses he taught in palynology and paleobotany have been discontinued. During the last year he has relocated his principle office, library and microscopy laboratory to a new facility he and the other Dr. Traverse (Elizabeth I. = Betty) have had constructed at their country home ("Alphabet Arboretum"). Al still maintains a small office at Penn State (Deike 307) and uses this office for correspondence, especially via e-mail, and as a *pied de terre* at PSU. The famous palynological prep lab, originally designed by Bill Chaloner and continually improved over the years by the Traverses, has been lost to (this is not a joke) an "Institute of Astrobiology", which claims to need it to process Moon and Mars rocks and such (maybe they'll find some pollen???). However, a replacement facility in the Deike Building has been made available, and it is proving quite satisfactory. Current research projects include a broadscale study of Catskill Magnafacies Devonian rocks in Pennsylvania and New York, a Cretaceous project in Oregon in collaboration with S.R. Ash, a Pennsylvanian/Permian project in New Mexico, also with Dr. Ash and potentially also with D.A. Willard of the USGS, and various Triassic Newark Supergroup projects, for example in New Brunswick, in collaboration with S.J. Fowell.

Address and numbers:

Palynological Labs
Department of Geosciences
307 Deike Bldg.
Pennsylvania State University
University Park, PA 16802 USA
Tel: (814) 863-3419
E-mail: traverse@ems.psu.edu

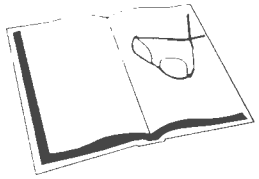
Alphabet Arboretum
R.D. 2, Box 390
Huntingdon, PA 16652 USA
Tel: (814) 643-1958

NEWS FROM SASKATOON

Bill Sarjeant (University of Saskatchewan) keeps on, like Stephen Leacock's knights, "riding away in all directions". Work on the dinoflagellate TREATISE continues steadily, with aid from Max Taylor and Rob Fensome; co-operative studies of Jurassic dinoflagellate/acritarch assemblages from Argentina (with M. Quattrocchio and W. Volkheimer) and from Lithuania (with Petras Musteikis and Hans von Konijnenburg) are in progress; a study of two Ordovician acritarch genera from the Baltic region (with Anneli Uutela) has been completed; and a responsive fusillade to Magda Moczydlowska's onslaught on the Sarjeant/Stancliffe revisions to acritarch generic diagnoses is almost ready for firing. A biography of the late Maria Lejeune-Carpentier (jointly with Michel Vanguestaine), a study of the lives and work of the two Wetzels, Walter and Otto (jointly with Linda Dietz) are on their way to publication, while a critical biography of Boris Timofeyev is being prepared, jointly with Tadas Jankauskas.

If this were not enough, he has also been busy tracking further extinct animals! Bird and mammal footprints from the mid-Cretaceous of Alberta (with Richard McCrea) and the Tertiary of California (with Robert Reynolds) are on their way to press, as is a joint account of invertebrate trace-fossils from Ghost Ranch, New Mexico (with Lynett Gillette and George Pemberton). He is also writing a history of dinosaurs in literature and continuing to write further episodes in his Rockall saga, four books of which have so far

appeared under the pen-name "Antony Swithin". Two selections from his numerous journal articles on crime fiction are being readied for book publication. In addition, he edits the annual *Saskatoon History Review* and writes review of folk-music recordings. He is Vice-President of Nature Saskatchewan and Archivist for the Canadian Society for Traditional Music, to whose *Bulletin* he contributes reviews of folk-music records. He manages also to play badminton twice a week and even to spend time with his wife, daughters, and grandson.



On the shelf

RECENT PUBLICATIONS BY CANADIAN AND OTHER PALYNOLOGISTS - 11

Campbell, I.D. 1999. Quaternary pollen taphonomy: examples of differential redeposition and differential preservation. *Palaeogeography, Palaeoclimatology, Palaeoecology* 149 (1-4): 245-256.

Clague, J.J., I. Hutchinson, *R.W. Mathewes, and R.T. Patterson. 1999. Evidence for late Holocene tsunamis at Catala Lake, British Columbia. *Journal of Coastal Research* 15(1): 45-60.

Clague, J.J., E. Naesgaard, and *R.W. Mathewes. 1998. Geological evidence for prehistoric earthquakes. In Clague, J.J., D.C. Luternauer and D.C. Moshers (eds.). Geology and Natural Hazards of the Fraser River Delta, British Columbia. *Geological Survey of Canada, Bulletin* 525: 177-194.

*Gajewski, K. 1998. Climate changes of the past millenium reconstructed from high-resolution pollen records. In MacIver, D.C. and R.E. Meyer (eds.). *Proceedings of the workshop on decoding Canada's environmental past: Climate variations and biodiversity change during the last millenium.* Atmospheric Environment Service. Downsview, Ontario.

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

*Hall, R.I. and *J.P. Smol. 1999. Diatoms as Indicators of Lake Eutrophication. pp. 128-168 In Smol, J.P. and E.F. Stoermer (eds.) The Diatoms: Applications for the Environmental and Earth Sciences. Cambridge University Press.

Hutchinson, I., R.T. Patterson and *R.W. Mathewes. 1998. Plant macrofossil, pollen, diatom, and foraminiferal biofacies of the Fraser Delta. In Clague, J.J., D.C. Luternauer and D.C. Moshers (eds.). Geology and Natural Hazards of the Fraser River Delta, British Columbia. *Geological Survey of Canada, Bulletin* 525: 177-194.

Larsen, C.P.S., R. Pienitz, *J.P. Smol, K.A. Moser, *B.F. Cumming, J.M. Blais, *R.I. Hall, and G.M. MacDonald. 1998. Relations between lake morphometry and the presence of laminated lake sediments: a re-examination of Larsen and MacDonald (1993) *Quaternary Science Reviews* 17: 711-717.

Leavitt, P.R., D.L. Findlay, *R.I. Hall, D.W. Schindler and *J.P. Smol. 1999. Algal response to dissolved organic carbon loss and pH decline during whole-lake acidification: Evidence from paleolimnology. *Limnology & Oceanography* 44: 757-773. (Special Issue on Effects of Multiple Stressors on Freshwater and Marine Ecosystems)

Paterson, A.M., *B.F. Cumming, *J.P. Smol, J.M. Blais, and R.L. France. 1998. Assessment of the effects of logging, forest fires and drought on lakes in northwestern Ontario: a 30-year paleolimnological perspective. *Canadian Journal of Forest Research* 28(10): 1546-1556.

Pellatt, M.G., M.J. Smith, *R.W. Mathewes, and I.R. Walker. 1998. Paleoecology of postglacial treeline shifts in the northern Cascade Mountains, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology* 141: 123-138.

Pienitz, R., *J.P. Smol, and G.M. MacDonald. 1999. Paleolimnological reconstruction of Holocene climatic

trends from two boreal treeline lakes, Northwest Territories, Canada. *Arctic, Antarctic and Alpine Research* 31(1): 82-93.

*Porter, S.C., D.J. Sauchyn, and L.D. Delorme. 1999. The ostracode record from Harris Lake, southwestern Saskatchewan: 9200 years of local environmental change. *Journal of Paleolimnology* 21(1): 35-44.

Quinlan, R., *J.P. Smol and *R.I. Hall. 1998. Quantitative inferences of past hypolimnetic anoxia in south-central Ontario lakes using fossil chironomids (Diptera: Chironomidae). *Canadian Journal of Fisheries and Aquatic Sciences* 54: 587-596.

Ruhland, K. and *J.P. Smol. 1998. Limnological characteristics of 70 lakes spanning arctic treeline from Coronation Gulf to Great Slave Lake in the Central Northwest Territories, Canada. *International Review of Hydrobiology* 83(3): 183-203.

Sauchyn, D.J. and *A.B. Beaudoin. 1998. Recent environmental change in the southwestern Canadian Plains. *The Canadian Geographer* 42(4): 337-353.

Vinebrooke, R.D., *R.I. Hall, P.R. Leavitt and *B.F. Cumming. 1998. Fossil pigments as indicators of phototrophic response to salinity and climatic change in lakes of western Canada. *Canadian Journal of Fisheries and Aquatic Sciences* 54: 668-681.

*Yu, Z. and E. Ito. 1999. Possible solar forcing of century-scale drought frequency in the northern Great Plains. *Geology* 27: 263-266.

*Yu, Z. and U. Eicher. 1998. Abrupt climate oscillations during the last deglaciation in central North America. *Science* 282: 2235-2238.

*Yu, Z. and I.D. Campbell. 1998. Peatland dynamics simulation model: A literature review and modelling design. *Working Paper 1998-17, Sustainable Forest Management Network of Centres of Excellence.* University of Alberta, Edmonton, Alberta. 54 p.

* denotes a CAP member

New Books

The Diatoms: Applications for the Environmental and Earth Sciences. Edited by Eugene F. Stoermer and John P. Smol. 1999. Cambridge University Press. 484 p. 34 line diagrams, 3 half-tones, 12 tables. Hardcover. About $120 (USD) (ISBN 0 521 58281 4)

http:www.cup.cam.ac.uk/Scripts/webbook.asp?isbn_0521582814

Description: Diatoms are microscopic algae which are found in virtually every habitat where water is present. This volume is an up-to-date summary of the expanding field of their uses in environmental and earth sciences. Their abundance and wide distribution, and their well-preserved glass-like walls make them ideal tools for a wide range of applications as both fossils and living organisms. Examples of their wide range of applications include as environmental indicators, for oil explorations, and for forensic examination. The major emphasis is on their use in analysing ecological problems such as climate change, acidification and eutrophication. The contributors to the volume are leading researchers in their fields and are brought together for the first time to give a timely synopsis of a dynamic and important area. This book should be read by environmental scientists, phycologists, limnologists, ecologists and paleoecologists, oceanographers, archaeologists and forensic scientists.

Chapter Contents: Preface; Dedication; Part I. Introduction: 1. Applications and uses of diatoms: Prologue, E.F. Stoermer and J.P. Smol; Part II. Diatoms as Indicators of Environmental Change in Flowing Waters and Lakes: 2. Assessing environmental conditions in rivers and streams with diatoms, R.J. Stevenson and Y. Pan; 3. Diatoms as indicators of hydrologic and climatic change in saline lakes, S.C. Fritz, B.F. Cumming, F. Gasse, and K.R. Laird; 4. Diatoms as mediators of biogeochemical silica depletion in the Laurentian Great Lakes, C.L. Schelske; 5. Diatoms as indicators of surface water acidity, R.W. Battarbee, D.F. Charles, S.S. Dixit, and I. Renberg; 6.

Diatoms as indicators of lake eutrophication, R.I. Hall and J.P. Smol; 7. Continental diatoms as indicators of long-term environmental change, J.P. Bradbury; 8. Diatoms as indicators of water-level change in freshwater lakes, J.A. Wolin and H.C. Duthie;
Part III. Diatoms as Indicators in Extreme Environments: 9. Diatoms as indicators of environmental change near Arctic and alpine treeline, A. Lotter, R. Pienitz, and R. Schmidt; 10. Freshwater diatoms as indicators of environmental change in the High Arctic, M. Douglas and J.P. Smol; 11. Diatoms as indicators of environmental change in Antarctic freshwaters, S. Spaulding and D. McKnight; 12. Diatoms of aerial habitats, J.R. Johansen;
Part IV. Diatoms as Indicators in Marine and Estuarine Environments: 13. Diatoms as indicators of coastal paleoenvironmentts and relative sea-level change, L. Denys and H. de Wolf; 14. Diatoms and environmental change in brackish waters, P. Snoijs; 15. Applied diatom studies in estuaries and shallow coastal environments, M. Sullivan; 16. Estuarine paleoenvironmental reconstructions using diatoms, S. Cooper; 17. Diatoms and marine paleoceanography, C. Sancetta;
Part V. Other Applications: 18. Diatoms and archeology, S. Juggins and N. Cameron; 19. Diatoms in oil and gas exploration, W. Krebs; 20. Forensic science and diatoms, A. Peabody; 21. Toxic and harmful marine diatoms, G. Fryxell and M. Villac; 22. Diatoms as markers of atmospheric transport, M.A. Harper; 23 Diatomite D.M. Harwood;
Part VI. Conclusions: 24. Epilogue: A view to the future. E.F. Stoermer and J.P. Smol; Glossary; Index.

J.P. Smol
Co-Editor

Fossil Plants and Spores - Modern Techniques. Edited by T.P. Jones (Cardiff University, UK) and N.P. Rowe (Universitė de Montpellier, France). April 1999. Geological Society Publishing House, Bath, UK.
Paperback $48 (USD) (ISBN 1-86239-041-x)
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In recent years the study of fossil plants, spores and pollen has produced an abundance of new methods and modifications of old ones. This volume provides the first comprehensive collection of these practical methods - balancing the techniques that have been perfected over decades of research with the very latest methods and ideas.

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Fran Clarke, Marketing Executive
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Cambrian Acritarchs from Upper Silesia, Poland - Biochronology and Tectonic Implications. M. Moczydowska. 1998. Fossils and Strata, No. 46. 121 p.

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Special Issue of *The Canadian Geographer*: Regional Perspectives on 20th Century Environmental Change. Winter 1998, 42 (4).

'Regional Perspectives on 20th Century Change' is a review of current research on regional environmental change, impacts, and responses in Canada. In includes substantive papers on change in the Canadian Rockies (Luckman), the southwestern plains (Sauchyn and Beaudoin), Newfoundland and Labrador (Banfield and Jacobs), on impacts of sea level rise on Canada's coasts (Shaw, Taylor, Solomon, Christian and Forbes) and regional impacts and opportunities from climate change (Chiotti), as well as an introduction by the editors, Jacobs and Bell.

The issue was designed to be a reference suitable for use in teaching as well as research. Accordingly, additional copies have been printed byond the normal subscription run. These may be ordered while they last at a cost of $16 + $1.20 GST + $1.21 PST (Quebec only) + $2.80 S&H per copy. All orders should be directed to the CAG office at the following address:

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Copies of the abstracts of the papers can be viewed by accessing "Recent Publications in Canadian Geomorphology No. 114, February 8, 1999" and following the related hotlinks at
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***Stratigraphy and Paleontology of China (2 Vol. set) Edited by Yang Zunyi and others, 260X184mm / Hardback / English Edition**
Vol.1 210 pages, 15 plates, 1991
Vol.2 240 pages, 31 plates, 1994
Price: US$90 Postage: US$8 Total: US$98

This book is a new one of the national Publications sponsored by the Commission on Stratigraphy & Paleontology under the Geological Society of China. It aims at recording new advances in the study of stratigraphy and paleontology and their related subjects. Meanwhile, with emphases on those topics relating to global geology it will also embody some comprehensive themes in order to help the foreign readers who are not familiar with China to know the geology of China. Volume 1 covers nine papers concerning the records to foraminifers , brachiopods, bivalves and conodonts; a synthesis of Famennian stratigraphy of South China; discussion on the boundaries of Cambrian and Ordovician and others . Volume 2 published in August 1994 Trilobita, Brachiopods, Coral, Stromatoporoids, Calcareous nannofossils, Conodonts and Graptolite, thermal maturity and others.

***Stratigraphical Lexicon of China -The Ordovician System:**
Edited by the Editorial Committee
1996 /260X184mm /230pages/
Price: US$38 Postag:US$7 Total US$45

The stratigraphical Lexicon of China is a dictionary of Chinese stratigraphical name including mainly the lithostratigraphical units. Being under the guidance of the principle of multiple stratigraphic subdivision and the theories of modern science, it was compiled by drawing the results of modern science and technology and the strong points of stratigraphical lexicons of various countries. In the course of its compilation, various published stratigraphical units in China were systematically researched and put in order, with their definitions clarified; and detailed descriptions are given for the names, namers, times of naming, type localities, lithologies, sedimentation characteristics, paleontological assemblages, sratigraphical sequences, thickness, distribution, geological events, overlying and underlying relationships, paleogeomagnetism and isotopic ages of these stratigraphical units. Detailed correlations are also made for stratigraphical regions of various geological periods and various stratigraphical units. The results of the projects are published in fifteen fascicles, including the Archean, the Lower Proterozoic, the Middle Proterozoic, the Upper Proterozoic, the Cambrian, the Ordovician, the Silurian, the Devonian, the Carboniferous, the Permian, the Triassic, the Jurassic, the Cretaceous, the Tertiary and the Quaternary. This is the fascicle on the Ordovician System of the Stratigraphical Lexicon of

China, which was compiled according to the requirements of the lexicon compilation with the systematization of Ordovician lithostratigraphical units in China, and some 269 articles of such units are included.

***Paleontology of the Karakorum-Kunlun Mountains**
Chief editor: Wen Shixuan
Chinese Edition with English abstracts
1998 / ISBN: 7-03-006007-5
365 pages + 84 plates/185x265mm/
Price: US$38 Postage:US$7 Total US$45

Contents:
Introduction; Stratigraphic outline in Karakorum and Kunlun Region; Palaeontological aspect in Karakorum and Kunlun Region; Devonian and Carboniferous foraminifers from northwest Qiangtang
Fusulinids from Karakorum and Kunlun Region
A radiolari assemblage of Middle Triassic from Karakorum Region; Palaeozoic corals from Karakorum Region; Lower Carboniferous and Middle Permian bryozoans from Karakorum Region; Discovery of Early ordovician brachiopods of Yangtze type in Karakorum Region and its significance; Devonian brachiopods from Karakorum -Kunlun Region; Jurassic brachiopods from Karakorum Region and its palaeobiogeographical significance; Some fossil gsatropods from Karakorum - Kunlun Region; Some Trassic bivalves from Pamir and Karakorum Region; Some Jurassic bivalves in Pamir and Karakorum Region; Late Palaeozoic ostracods from Karakorum and Kunlun Region; Palaeozoic conodonts from northwest -Qingtang and Karakorum Region

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RADIOCARBON ARTICLE ONLINE

The classic article by M. Stuiver and H.A. Polach, "Discussion: Reporting of ^{14}C Data" is now available in PDF (Adobe Acrobat) format on the *Radiocarbon* web server:
http://www.radiocarbon.org.Pubs/Stuiver/Stuiver-Polach.pdf

This article, published in *Radiocarbon* in 1977, systematized the conventions used for calculating and reporting radiocarbon ages and isotopic fractionation.

We're planning to publish an article revisiting radiocarbon terminology in a future issue (aka "Stuiver and Polach 2"). In the meantime, feel free to consult and/or print the original (one copy for personal use only, please).

David Sewell, Managing Editor
Radiocarbon

TEXAS FLORA AND FAUNA

The Texas A&M University Bioinformatics Working Group (TAMU-BWG) maintains a website on the flora and fauna of Texas and the American Southwest. Check it out at

http://www.csdl.tamu.edu/FLORA/bwgpror.htm

PILED HIGHER AND DEEPER

CAP members with web access might be interested to take a look at a bibliography I have called "The Dung File". Over the last few years, I have worked with several students who have been investigating aspects of coprolites and latrine fills (such as plant macroremains, faunal remains, pollen and parasite indicators). As a result, I have made a short bibliography on these topics. It has primarily a North American focus but deals with both human and animal coprolites.

I've put the latest version of this on the web at:

http://www.ualberta.ca/~abeaudoi/stuff/dung.htm

I hope that this will be useful to people involved in similar projects. I'd welcome information on publications that I have missed - I know there's lots more to add!

Alwynne Beaudoin
abeaudoi@gpu.srv.ualberta.ca

CANADIAN SOCIETY FOR LANDSCAPE ECOLOGY AND MANAGEMENT (CSLEM)

The SCLEM has established and maintains a web site to serve as a multipurpose gateway to the Society's services. The planned membership services in this web page are many. For example, it will be a clearing house for information such as membership list/addresses, employment/scholarship opportunities, lists of conferences and other activities, and general landscape ecology news. It will also house a searchable Canadian landscape ecology bibliography database; downloadable landscape ecological databases and software; a limited-access listserv discussion forum; and ther periodic SCLEM Newsletter. Please visit the site, and send your comments or suggestions to Dave Baldwin (cslem@landscape-ecology.com).

ECOLOGICAL SOCIETY OF AMERICA (ESA) JOURNALS AND BULLETINS NOW ONLINE

The ESA is excited to announce that the 1999 issues of *Ecology*, *Ecological Monographs*, *Ecological Applications*, and the *Bulletin* are available online as a demonstration for ESA members and the public. The online demonstration will remain open and free for the remainder of 1999. In year 2000 the ESA online journals will be offered to ESA members on a subscription basis.

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esahq@esa.org

Dallimore, Audrey. 1998. *Holocene Environmental History of Thermokarst Lakes on Richards Island, Northwest Territories, Canada: Thecamoebians as Paleolimnological Indicators.* M.Sc. Thesis, Carleton University, Ontario, Canada. 119 pages. Supervisor: Dr. Claudia Schroder-Adams.

Richards Island, Northwest Territories, Canada, is characterized by thermokarst lakes which record Holocene limnological change. This study is the first report of thecamoebian assemblages and continuous annual lake water temperatures from these Arctic lakes. Ecological environments on Richards Island are influenced by a climatic gradient resulting from the contrasting influences of the cold Beaufort Sea to the north and the warm waters of the Mackenzie Delta to the east and west. This climatic gradient in turn influences modern thecamoebian assemblages, and is an indication of the complexity involved in interpreting past conditions from core material in this area.

Population abundance and species diversity of thecamoebian assemblages on Richards Island are not significantly different from those reported from temperate and semi-tropical latitudes. However, certain assemblage characteristics, such as large and coarse agglutinated tests, dominance of assemblages by one or two species, and low morphological variation are interpreted to be diagnostic of Arctic conditions. Thecamoebian assemblages in core material from the area indicate that the local paleolimnological conditions may have changed within the last 3 ka, and this is unrecorded in previously reported pollen data.

Paleoenvironmental interpretations in a permafrost landscape have to take into account morphological instability of thermokarst lakes, which can be the cause of paleolimnological and consequently faunal change. In this area ecosystem development is clearly related to geomorphology and local climatic effects and is not exclusively controlled by regional climate change.

Editor's note: If you, as I, don't know much about thecamoebians and wish to find out more, visit these websites:

http://www.wf.carleton.ca/Museum/arcellacea/1arcel.html

http://meguma.earthsciences.dal.ca/~finedioli/Intro.html

Announcements

NEW MSc MODULE IN PALAEOECOLOGY

Queen's University
Belfast, Northern Ireland

The primary aim of this degree is to train graduates to become environmental specialists. The degree can lead to careers as diverse as communication in the news media, industry and in government, teaching, laboratory technical specialists and in the broad area of environmental assessment.

The MSc in Palaeoecology is a new degree course offered for the first time in the academic year 1999/2000. It is a course intended for those wishing to learn a range of environmentally relevant skills such as

the analysis of soils, the identification of pollen, introductory surveying techniques, dating techniques and a host of other practical skills. It is aimed at graduates who require in-service training in environmental theory and practice and will suit a wide range of professions such as teachers, engineers, biologists and archaeologists. It embraces studies on the chronology of change in the natural environment, at a variety of timescales, and aims to give students a practical, in-depth background in environmental studies and skills. The Palaeoecology Centre has an international reputation for research into the timescales and environmental issues of the last 10,000 years. It has research groups working on carbon dating, tree-ring dating, climatic proxy records from lacustrine sediments and pollen, volcanic ash and global carbon cycling. The research programmes are integrated into the teaching and students are given the opportunity to work on current research projects.

Course Content: Students take the six palaeoecology half modules in the first semester and the three full taught modules in the second semester. Those students taking the Master's degree must also complete a dissertation.

Semester 1 Modules
Animal Bones: Identification, Uses and Analysis
Pollen: Preparation, Identification and Analysis
Soils: Impact of humans on soils
Dating the Past: A practical review of tree-ring and carbon dating techniques
Macro-fossils: Collection, identification and interpretation
Surveying: Practical course on site surveying

Semester 2 Modules
Environmental History of Ireland
Global Environmental Change
Research Techniques in Environmental Studies

Further details may be obtained from;
Marguerite Hunter, School Secretary
Tel. (01232) 273186
Fax. (01232) 315779
School of Archaeology and Palaeoecology
The Queen's University of Belfast
Belfast BT7 1NN, Northern Ireland.
E-mail m.hunter@qub.ac.uk
Website http://www.qub.ac.uk/arcpal

9th CANADIAN PALEONTOLOGY CONFERENCE - 1999
August 17-21, 1999
Calgary, Alberta, Canada

The first circular of the 9th Canadian Paleontology Conference has been circulated. The meeting is August 21-21 at the University of Calgary and is held in conjunction with the XIV International Congress on the Carboniferous and Permian (ICCP) (August 17-21), and the Pander Society meeting (August 19-210.

The CPC will be its usual small, informal meeting. Talks and posters will be on Saturday, August 21st, and if necessary on Friday afternoon (be sure to arrive for the banquet on Friday night).

The fees are higher than usual for CPC because of the association with the ICCP, but Charles Henderson (Chairman of the ICCP) has given CPCers, Panderers and students a reduced registration fee for the two shorter meetings. The fee includes a banquet on August 20th at Calgary's Heritage Park Historical Village (http://www.heritagepark.ab.ca/), a "frontier town of buildings, furnishings and artifacts which have been collected, assembled and preserved to recreate life as it was a century ago".

Participants must register through ICCP:
http://www.geo.ucalgary.ca/iccp/)
See the ICCP web site (for information on the field trips. Of special interest are the Tyrrell Museum of Palaeontology tour and the Burgess Shale tour after the meeting.

Alexander D. McCracken
Geological Survey of Canada
mccracken@gsc.nrcan.gc.ca

COURSES AVAILABLE IN UK

SHORT COURSES IN ENVIRONMENTAL PALAEOECOLOGY FOR MSc AND PhD STUDENTS 1999/2000

In the coming academic year the ENVIRONMENTAL CHANGE RESEARCH CENTRE, University College London is offering the following two-day, one-week and two-week short courses for palaeoecologists, environmental archaeologists and other interested environmental scientists:

New Course
QUANTITATIVE ENVIRONMENTAL PALAEOECOLOGY
Dr. L. Carvalho, Dr. T.E.H. Allott, Prof. R.W. Battarbee
October 25th - 5th November 1999

New Course
HOLOCENE CLIMATE VARIABILITY
Dr. A.W. Mackay & Dr. Maslin
8 - 18th November 1999

INTRODUCTION TO POLLEN ANALYSIS
Prof. H.J.B. Birks & Dr. S.M. Peglar
29th November - 3rd December 1999

INTRODUCTION TO MACROFOSSIL ANALYSIS
Dr. H.H. Birks
6 - 10th December 1999

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

INTRODUCTION TO DIATOM MICROPALAEONTLOGY
Professor R.W. Battarbee, Dr. Laurence Carvalho, Dr Helen Bennion
7th - 11th February 2000

Now 5 days
INTRODUCTION TO BENTHIC FORAMINIFERA ANALYSIS
Dr. M. Kaminski, Geological Sciences, UCL
7th - 11th February 2000

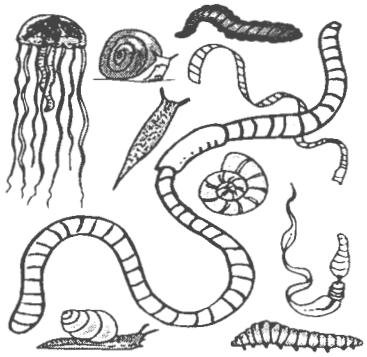
New Course
INTRODUCTION TO DENDROCHRONOLOGY & DENDROCLIMATOLOGY
Dr. M. Bridge, Institute of Archaeology
17th - 18th February 2000

INTRODUCTION TO PALAEOCEANOGRAPHY
Dr. M. Maslin
21st - 25th February 2000

NUMERICAL ANALYSIS OF BIOLOGICAL & ENVIRONMENTAL DATA
Prof. H.J.B. Birks & Dr. M.Kernan
February 28th - March 10th 2000

Please note the 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



CANQUA
August 23-26, 1999
Calgary, Alberta, Canada

Pre-Conference Field Trip: Canadian Plains Landscape, Environments, and People in the Holocene
August 20-22

Departing Calgary on August 20, this trip will focus on the landscapes, paleoenvironmental record and human history of southeastern Alberta and southwestern Saskatchewan. Stops have been chosen to illustrate aspects of the biophysical, geomorphic and human landscape at each locale. Highlights of the first day include the Okotoks Erratic; Sundial Medicine Wheel (near Carmangay); archaeological locations in Taber area; and Redrock Coulee Natural Area. The second day will be spent in the Cypress Hills area, with planned stops at Elkwater Lake and the Stampede Site; Battle Creek Valley and Police Point landslide; Fort Walsh National Historic Site (admission included in cost) and Bald Butte. On the third day we will drive north across the plains, briefly visiting Ingebright Lake before arriving in the Great Sand Hills. A leisurely three-hour hike will focus on parabolic sand dune morphology and evolution, but will include discussions of ecology and human history. The long drive to Calgary will include a brief visit to Chappice Lake, returning to the University before last call at the conference ice breaker.

Overnight stops will be in Medicine Hat and the Cypress Hills. Travel in Cypress Hills may need to be modified due to road conditions. Participants should be prepared for long days and significant travel times, both inclement and very hot weather, and walking over relatively gentle terrain.

Duration: 3 days (Aug. 20-22), Cost: $290 (Can.) - includes transportation (vans), accommodation (double occupancy), all meals and guide materials
Maximum number: 24

For more details, please contact either of the organizers: Don Lemmen (dlemmen@NRCan.gc.ca) or Alwynne Beaudoin (abeaudoi@gpu.srv.ualberta.ca). Information on the CANQUA conference can be found at http://www.ucalgary.ca/UofC/faculties/SS/GEOG/CANQUA/canquaindex.html

PALYNOLOGY AND MICROPALEONTOLOGY IN CANADIAN GEOSCIENCE: NEW FRONTIERS AND APPLICATIONS

Symposium sponsored by the Canadian Association of Palynologists (CAP) to be held at 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. As part of this meeting, CAP will be sponsoring a 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.

If you are interested in contributing to this Symposium, please contact either of the convenors: Alwynne B. Beaudoin (abeaudoi@gpu.srv.ualberta.ca) or Martin J. Head (head@quartz.geology.utoronto.ca). A page has been set up on the CAP website (at http://www.ualberta.ca/~abeaudoi/cap/cap.htm) for information relating to this Symposium, as it develops.

XV INQUA CONGRESS
August 3-11, 1999
Durban, South Africa

Symposia of interest to Palynologists

Commission on Palaeoclimate: Working group on Milankovitch and Plio-Pleistocene vegetation succession from 2.6 to 0.9 Ma.

The INQUA working group of the Palaeoclimate Commission on "Vegetation successions at the scale of the Milankovitch cycles in between 2.6y and 0.9 Ma" will be represented by a morning symposium with invited speakers and an afternoon poster session on Long Pleistocene Records Friday 6th August 1999, Symposium 6.4. Preference will be given to papers and posters with new high resolution data (at the Milankovitch and sub-Milankovitch scale), revising old interpretations and reviewing the recent progresses made in cyclostratigraphy. It is certainly not limited to palynology provided that detailed palaeoenvironmental data from continuous sections (marine or continental) are presented.
Details: Dr Suzanne A. G. Leroy, Centre for Palaeoecology, School of Geosciences, Queen's University Belfast, Belfast BT7 1NN, N. Ireland. Tel: +44-1232-335 143 and 273 978, Fax: +44-1232-321 280, E-mail: s.leroy@ qub.ac.uk Websites: http://www.qub.ac.uk/geosci/ admin/staff/leroy.html and commission of palaeoclimate website: http://inqua.nlh.no/comm/ palclim.html

Quaternary and Holocene sedimentary records in Central Africa and their palaeoenvironmental interpretation.

For approximately the last 20 years most of the data for Quaternary palaeoclimatic and palaeoenvironmental reconstructions for terrestrial sites had been worked out in an indirect way by studying marine cores and cores from northern or southern hemisphere ice deposits. Terrestrial core sites inside the sediment and soil cover of the inner tropics as for example in Central Africa had been mainly believed to contain too less information about our recent past. However, newer research conceptions have now significantly changed by the introduction of so-called "terrestrial transects" which are looking for direct site information in the lower latitudes. Studies with a higher precision of a range of stable isotopes as 13C/12C, 14CAMS, 10Be and the progress in palynology and palaeobotany (analyses of phytoliths) have shown that there is evidence for Quaternary palaeoenvironmental changes inside the soils and sediments of the inner tropics. The workshop/paper session if focussing especially on recent and former environmental changes in former Zaire (D.R. Congo), Central African Republic, Ruanda, Burundi, Uganda, Cameroon, R.P. Congo (Brazzaville) and Angola up to 40,000 yr B.P. (Transition to and back from the Last Glacial Maximum). It is intended within this INQUA poster and workshop session to bring together new findings from scientists of different nations and to include the more or less isolated smaller work programs to get a better and clear synoptic view of the climatic and environmental conditions within the Congo basin and neighbouring regions before and after the LGM (critical discussion of "core-area" conceptions and the evidence for or against it from the geological, geomorphological, pedological and biological point of view).
Details: Dr Juergen Runge, Physical Geography, University of Paderborn, Germany, E-mail: arung1@hrz.uni-paderborn.de, and Dr Daniel Olago, IGBP-START Office, Nairobi, Kenya, E-mail: pagesnbo@form-net.com

***Carbon Cycle Changes: Peak Glacial Versus Interglacial Conditions* - INQUA Commission On Carbon/IGCP-404 Tuesday 10th August**

This Symposium focuses on Global Carbon Cycle Changes from glacial maximum to peak interglacial, and vice-versa. For each of the main components of the carbon cycle a "state of the art" picture of the main reservoirs and fluxes of carbon in the biosphere will be presented, and case studies in key areas will be proposed on what we know about changes in the

carbon cycle which occurred between the LGM and previous interglacial at 125 or the present interglacial at 8Ky. Various speakers have already been booked (including reports from the Paleocarbon Commission working groups), but more speakers on any of these topics will be welcome. There are currently 12 presentations for the Carbon Symposium, taking one full morning. Please e-mail Jonathan Adams or Hugues Faure if you are interested in speaking at this symposium.

Details: Jonathan Adams (jonathan@elvis.esd.ornl.gov) or Hugues Faure (faure@luminy.univ-mrs.fr).

Modern Pollen Records And Their Use In Interpreting Past Tree-Lines And Past Climate.

[n.b. In the INQUA circular this is given the title "Calibration of pollen to climate above the treeline". In some documentation the alternative title of "The implication of modern pollen influx values for reconstructing Quaternary palaeoclimates" can be found. These are intended to be one and the same thing. The Symposium co-conveners (Sheila Hicks and Heather Tinsley) welcome contributions on either theme, particularly any which are able to demonstrate the SIGNIFICANCE of pollen influx (pollen accumulation rates) in investigations involving changing tree-lines and/or changing climate during the Quaternary. The symposium will last for 3 hours and there is space for twelve 15 min presentations. Through these we would like to cover as many different parts of the world as possible. If you are anticipating attending the INQUA congress and have results on this theme which you would like to present do please contact either of the conveners directly. We particularly hope that members of the INQUA Work Group 'European Pollen Monitoring Programme' will also take advantage of this opportunity to present their results to a wider public.

Details: Sheila Hicks (Oulu, Finland, sheila.hicks@oulu.fi) and Heather Tinsley (Bristol, UK, R.C.Tinsley@ Bristol.ac.uk)

BACK ISSUES OF *CAP NEWSLETTER* AVAILABLE

Are you missing a few recent issues of the *CAP Newsletter*? I know you'd all like to have a complete set of the newsletters adorning your bookshelves! To help fill in those gaps, I have copies of back issues of the *CAP Newsletter* available as follows:

Vol 20 No 2 (Dec 97), Vol 20 No 1 (May 97), Vol 19 No 2 (Dec 96), Vol 18 No 3 (Dec 95), Vol 18 No 2 (Oct 95 - AASP 95 Special Issue), Vol 18 No 1 (May 95), Vol 17 No 1 (May 94), Vol 16 No 2 (Dec 93), Vol 16 No 1 (May 93), Vol 15 No 2 (Dec 92), Vol 13 No 2 (Dec 90), Vol 11 No 2 (Dec 88), Vol 11 No 1 (May 88), Vol 10 No 2 (Dec 87), Vol 10 No 1 (May 87), Vol 9 No 2 (Dec 86), Vol 9 No 1 (May 86)

Anyone wanting copies of any of these back issues, please contact me, specifying issues required, and I will send them along to you.

Alwynne B. Beaudoin
Provincial Museum of Alberta
12845-102nd Avenue, Edmonton
Alberta, T5N 0M6, Canada
Tel: (403) 453-9192
E-mail: abeaudoi@gpu.srv.ualberta.ca

DEADLINES

Please submit items for the next issue of the *CAP Newsletter* (Volume 22, Number 2, December 1999) by **November 15 1999**. 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. Colour slides may also be submitted. Illustrations may be submitted in digital format. Pending the appointment of a new editor for the *CAP Newsletter*, 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

1999

June 1-5 1999. **Canadian Association of Geographers (CAG) Annual General Meeting**. Lethbridge, Alberta, Canada. Details: Dr. Robert Rogerson, Local Arrangements Committee Chair, E-mail: rogerson@hg.uleth.ca
Conference e-mail: cag99@uleth.ca
Website: http://home.uleth.ca/~cag99

June 14-18 1999. **Canadian Society of Petroleum Geologists (CSPG) and Petroleum Society Joint Convention**. Theme: "Digging Deeper: Finding a Better Bottom Line". Calgary, Alberta. Details: John L. Chipperfield, Tel: (403) 294-5540, Fax: (403) 294-5580, E-mail: john.chipperfield@sproule.com
Website: http://www.cspg.org/index.html

July 29-August 3 1999. **International Association for Landscape Ecology.** The Canadian Society For Landscape Ecology and Management is sponsoring a symposium on "Progress and problems in applying landscape ecology to forest management: examples from Canada".
Website: http://lamar.colostate.edu/~iale/Congress.htm

August 107 1999. **International Botanical Congress.** St. Louis, Missouri, USA.
Website: http://www.ibc99.org/

August 3-11 1999. **XV INQUA Congress**. Durban, South Africa. Theme: "The Environmental Background to Hominid Evolution in Africa". XV INQUA Congress details: Dr. D. M. Avery, Secretary-General, South African Museum, P.O. Box 61, Cape Town 8000, South Africa. Tel: +27-21-243330, Fax: +27-21-246716, E-mail: mavery@samuseum.ca.za See also http://inqua.nlh.no/congress/congress.html

August 17-21 1999: **9th Canadian Paleontology Conference**. Calgary, Alberta. In association with the International Conference on the Carboniferous and Permian systems and the Pander Society. Details: Charles Henderson, Department of Geology and Geophysics, University of Calgary, Calgary, Alberta, T2N 1N4, Canada. Tel: (403) 220-6170, E-mail: henderson@geo.ucalgary.ca
http://www.geo.ucalgary.ca/iccp/

August 17-22 1999. **Geological Society of America Penrose Conference: The Marine Eocene-Oligocene Transition.** Olympia, Washington, USA. Details: D. Prothero, Department of Geology, Occidental College, Los Angeles, California, CA 90041, U.S.A. Tel: (213)259-2557, Fax: (213)259-2704, E-mail: prothero@oxy.edu

August 20-29 1999. **CANQUA Meeting**. Calgary, Alberta, Canada. Technical and poster sessions August 23-26, Field trips August 20-22, and August 27-29. (**See notice of the field trip p. 22 of this newsletter.**) Details: Dr Derald G. Smith, CANQUA Conference Chair, Department of Geography, University of Calgary, Calgary, Alberta, T2N 1N4, Canada, Tel: (403) 220-6191, Fax: (403) 282-6561, E-mail: dgsmith@acs.ucalgary.ca
Conference website: http://pc56.ss.ucalgary.ca/

September 6-10 1999. **9th International Conference on Luminescence and Electron Spin Resonance Dating.** Rome, Italy. Details: Scientific Secretariat, Dr. Emanuela Siblia, Dipartimento di Scienza dei Materiali, Milano, E-mail: sibilia@mater.unimi.it or Organizing Secretariat, PR & Co., Roma, b.fersini@flashnet.it
Website: http://www.mater.unimi.it/LED99/

September 13-17 1999. **8th International Conference on Accelerator Mass Spectrometry**. VERA Laboratory, Universität Wien, Vienna, Austria. Details: Conference Secretary Gabriele Kratschmann, Tel. +43 1 40480-700, Fax +43 1 4076200, E-mail: gabikra@pap.univie.ac.at

September 22-25 1999. **15th North American Diatom Symposium.** Pingree Park, Colorado State University, Colorado, USA. Details: Dr. Sarah A. Spaulding, Department of Invertebrate Zoology and Geology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA. Tel: (415)750-7078, Fax: (415)750-7090, E-mail: spauldin@cas.calacademy.org or Dr. John C. Kingston, U.S. Geological Survey, 5293 Ward Road/MS 407, Arvada, CO 80002, USA. Tel: (303)467-8144, Fax: (303)467-8240, E-mail: kingston@usgs.gov
Website: http://www.calacademy.org/research/diatoms/nads/nads.htm

September 26-30 1999. **The Society for Organic Petrology (TSOP), 16th Annual Meeting**. Salt Lake City (Snowbird Resort), Utah, USA. Details: Jeff Quick, Utah Geological Survey, 1594 West North Temple, Suite 3110, Salt Lake City, Utah 84114- 6100 USA, Tel: (801) 537-3372, Fax: (801) 537- 3400, E-mail: nrugs.jquick@state.ut.us Website: http://www.tsop.org

October 25-28. **Geological Society of America, Annual Meeting**. Denver, Colorado, U.S.A. Theme: "Crossing Divides". Details: General Co-chairs - Mary J. Kraus Tel: (303) 492-7251, Fax: (303) 492-2606, E-mail: kraus@spot.colorado.edu and David Budd Tel: (303) 492-3988, Fax: (303)492-2606, E-mail: budd@spot.colorado.edu
Department of Geosciences, Campus Box 250, University of Colorado, Boulder, CO 80309-0250, USA; GSA HQ, Box 9140, 3300 Penrose Place, Boulder, Colorado 80301, U.S.A. Tel: (303) 447-2020, X133, E-mail: meetings@geosociety.org

October 26-30 1999. **AASP 1999 Annual Meeting.** Savannah, Georgia. Details: Frederick J. Rich, Department of Geology and Geography, Georgia Southern University, Statesboro, Georgia 30460-8149, USA. E-mail: frich@gasou.edu
Website: AASP web site

n.b. Venue of the CAP AGM (see p. 3 of this newsletter).

November 11-14 1999. **32nd Annual Chacmool Conference**. Calgary, Alberta, Canada. Theme: "Indigenous People and Archaeology: Honouring the Past, Discussing the Present, Building for the Future". Details: 1999 Chacmool Conference, Department of Archaeology, University of Calgary, Calgary, Alberta, T2N 1N4, Canada.
Tel: (403)220-7120, E-mail: chacmool@ucalgary.ca
Website:
http://www.ucalgary.ca/UofC/faculties/SS/ARKY/chacmool.html

2000

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

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. 22 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 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

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 (week of) 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

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**. 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

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