Canadian Association of Palynologists
Association Canadienne des Palynologues

NEWSLETTER

Volume 25 Number 2 December 2002

Season's Greetings

President's Message

I began writing this message during the last weekend in November after going out for an afternoon walk to enjoy the spectacular views of the North Saskatchewan River valley. We have seen some of the mildest November temperatures on record here in Edmonton. Instead of my usual winter outerwear of parka and boots, I was comfortable with a light windbreaker. So on setting out for work the next morning, it was quite a shock to be greeted by icy paths, thin winds, and a temperature of around -16 C. It is ironic that such strange weather and wild temperature swings should be occurring at the same time as the newspapers are full of the debate over ratification of the Kyoto Protocol. Some reporters even cite these striking weather fluctuations as evidence of climate change.

I often find it disheartening to read the newspapers and realize the profound lack of understanding of climate and weather displayed by most commentators. That someone should adduce evidence of climate change from a short term temperature blip reflects a deep misapprehension of the atmospheric processes that surround us. It is here that the historical sciences, among which palynology is placed, can add useful perspective to the debate. Palynology often provides a long-term view of environmental fluctuations, highlighting the millennial or longer scale rhythm of climate. Indeed, rather than being discouraged perhaps we should see the current media furore as an opportunity to raise public awareness of our discipline. In all likelihood, there will never be a better time to bring our studies to public attention.

Next year promises to be a very busy one for CAP.

After the successful completion of the CAP-sponsored special issue of Palaeogeography, Palaeoclimatology, Palaeoecology entitled New Frontiers and Applications in Palynology and Micropalaeontology: A Canadian Perspective, Martin Head and I are now deep into co-editing another special volume. This volume is called "The Palynology and Micropaleontology of Boundaries" and is planned for publication by the Geological Society, London. It springs from the CAP-sponsored Special Session held in May at the GAC/MAC meeting in Saskatoon. I hope to have more to report on the progress with this volume in future newletters.
The assocation will be part of an AASP-CAP-NAMS meeting to be held October 5 - 8 2003 in St Catharines, Ontario. Two CAP-sponsored symposia are planned: "Land-Sea Correlations in the Cenozoic", convened by Martin Head and I, and "Palynology in the Great Lakes region", convened by Sarah Finkelstein and Catherine Yansa. Many other sessions, events and field trips are planned. I encourage you all to consider participating and attending. You can keep up with information about the meeting through the conference web-site at http://www.palynology.org/ meet_AASP36.html .

Finally, it is my pleasure to thank my colleagues on the CAP executive for their assistance over the last year. And I wish you all best wishes for the holiday season and the new year.

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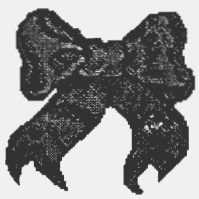

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From the Editor

Once again, thank you so much to everyone who contributed items to this newsletter, especially Alwynne Beaudoin, Luc Bouchet-Bert, Vaughn Bryant, Elliott Burden, Gail Chmura, Bob Clarke, Larry Dyke, Rob Fensome, Sarah Finkelstein, Konrad Gajewski, Martin Head, Renée Hetherington, Terri Lacourse, Suzanne Leroy, Roger McNeely, Robert Mott, David Pasho, Matthew Peros, Pierre Richard, Iain Stewart, John Smol, Zorana Spasojevic, Malcolm Wilson, Catherine Yansa, and Grant Zazula. It is your contributions that make the newsletter possible! Special thanks again go to Rob Fensome, Nelly Koziel and Bill MacMillan for printing and mailing the newsletter, especially at such a busy time of year—thank you!

It is with both a deep sense of sadness at their loss, but also joy for lives fully and well-lived, that we include in this newsletter obituaries for two well-known members of the Canadian palynological community: Hélène Jetté and William Sarjeant. The tributes to these two very special people were written by colleagues and friends, and we thank them for sharing their memories and thoughts with us.

I hope that you enjoy reading this newsletter, and that it will remind you of the special palynological community we have here in Canada and beyond. Have a blessed holiday season.

Mary Vetter
CAP Newsletter Editor
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From the Bureaucrat's Desk

Dues Due

If your name appears below, here is an urgent reminder that **your CAP membership expired at the end of 2001: Boyd, Cumming, Gostlin, Hallett, Lentin, Vardy, Whittmire, and Yu.**

If your name appears below, you are paid through 2002 but your membership for 2003 is now due—see the last page of this newsletter for the renewal form: Asnong, Beaudoin, Bonnel, Ford, Gajewski, Garneau, Haas, Kalgutkar, Larouche, McAndrews, McCarthy, Parsons, Smol, Stancliffe, van Helden, and Yansa. Thank you so much for your continued support of CAP!

Dues Payment

Please note that CAP membership dues are CDN $10 per year, payable annually or up to three years in advance. Membership is open to all. Please make cheques or money orders payable to "CAP". Following a reminder notice, lapsed members are removed from the CAP mailing list after one year.

The membership form is on the last page of the newsletter. Funds and address changes should be sent to:

Marlow Pellatt
Parks Canada
Western Canada Service Centre
300—300 West Georgia Street
Vancouver, BC V6B 6B4
Canada

Special Announcement CAP Annual General Meeting

CAP's Annual General Meeting will be convened at the AASP-CAP-NAMS meeting to be held October 5-8 2003 in St. Catharines, Ontario. Watch for annual meeting details in the May CAP Newsletter and at the CAP website http://www.scirpus.ca/cap/cap.shtml

For AASP-CAP-NAMS meeting details see the meeting website at www.geology.utoronto.ca/aasp2003 and page 3 of this newsletter.

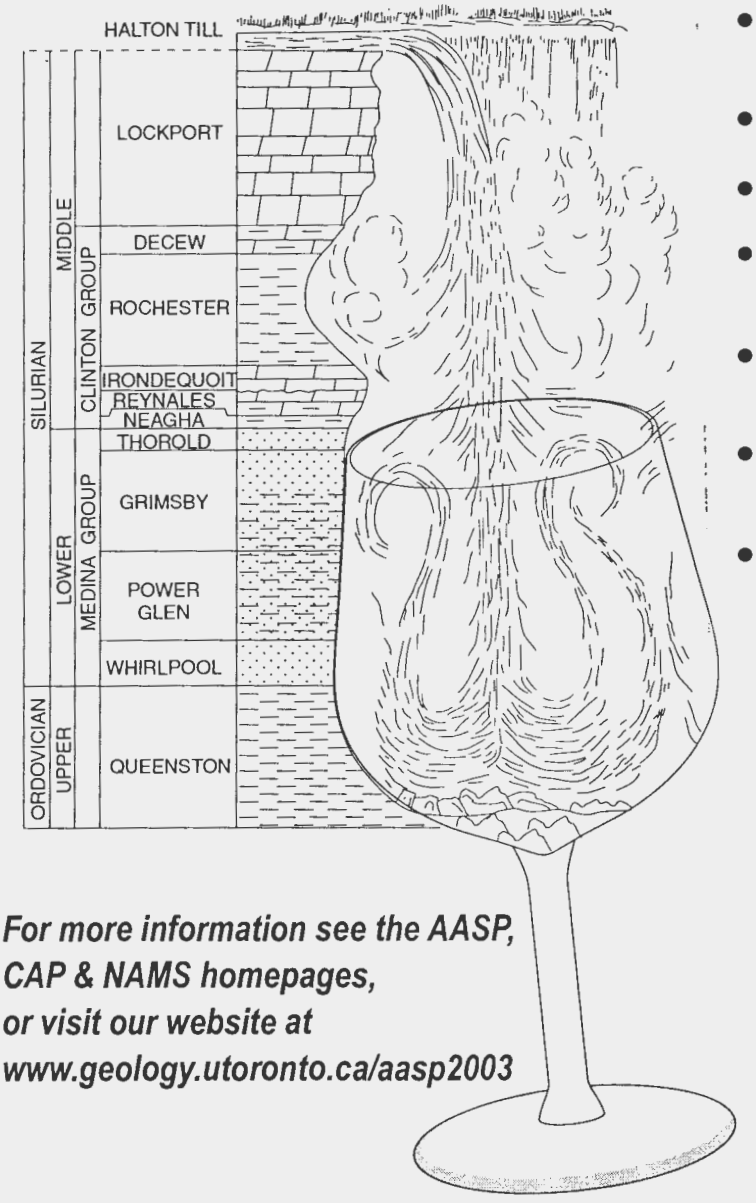
Niagara 2003
Joint Meeting

AASP

CAP

NAMS

Four Points Sheraton Hotel
St. Catharines, Ontario
Niagara Peninsula, Canada
October 5-8, 2003



For more information see the AASP, CAP & NAMS homepages, or visit our website at www.geology.utoronto.ca/aasp2003

Abstract deadline: May 30, 2003

Proposed Symposia:

- Micropaleontology and Palynology of the Atlantic and Gulf Coastal Plains of North America
- Land-Sea Correlation in the Quaternary/ Cenozoic
- Great Lakes Palynology, Paleoecology & Archeology
- Origins and Evolution of Microfossils: links between evolutionary history and paleoenvironmental changes
- Micropaleontological Applications in Geoarchaeological Studies
- Pragmatic Palynology: Melissopalynology, Forensic Palynology, etc.
- Micropaleontological Applications in Ecology and Paleocology

Proposed Field Trips:

- Crawford Lake: Archaeology & Paleoecology
- Geology and Wine
- Niagara Falls: Geology & History
- Botany/Biogeography/Birding, Short Hills Park

Proposed Social Events:

- Theatre Night, Shaw Festival
- Dinner, Winery Restaurant
- Tour of Niagara Falls

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In Memoriam

Hélène Jetté

1953-2002

On August 13, 2002, Hélène Jetté died in Ottawa as a result of cancer. She was 48. Hélène showed little outward sign of her struggle and maintained her love of life, kind disposition and concern for others to the end. She leaves her daughter, Louise Demers, her husband, Larry Dyke, her family and many friends to mourn her passing.

In the small world of Canadian Quaternary Palynology, Hélène's story is unique. Born in the village of St. Honoré, a country childhood was followed by studies at the University of Québec at Chicoutimi, where she earned a B.Sc. in biology in 1976. There she met Pierre Richard where he had been teaching the courses in general botany since 1971. Between 1973 and 1976 Dr. Richard remembers a quiet student working during the summers on marine organisms at the biology laboratory being developed by Denis Larrivée. In 1976 Dr. Richard accepted a post in the geography department at the University of Montréal and moved the palynology laboratory there. He was very surprised to receive a letter from Hélène, offering him her services.

Dr. Richard had nothing permanent to offer but that didn't matter to Hélène. However, she ended up serving as pollen analyst in his laboratory from February 1977 to May 1984. Her work was remarkable for attention to detail and effectiveness in identifying pollen, spores, and other microfossils. Furthermore, she endeavoured to transfer these skills to a host of students embarking on graduate studies. During this period, Hélène undertook a Master's degree and took time for the birth of her daughter in 1979. She wanted to establish the pollen species for northern grasses and sedges, research which would also support the doctoral work of Louise Savoie. Working on this degree was not enough to keep her busy. Excess energy was taken up with night courses in science education at the University of Québec at Montréal, learning German at the University of Montréal, and teaching science at the primary and secondary school level at St. Marcelline Villa School in Westmount. It was her awareness of the precarious nature of research

funding that led Hélène to expand here capabilities in these ways.

In 1984 Hélène accepted a research assistant position in the paleoecology laboratory directed by Robert Mott at the Geological Survey of Canada. Hélène worked at the GSC until 1995, the year the paleoecology group was practically eliminated in the face of massive federal budgetary cuts. During her time at the GSC, Hélène was active in a variety of palynological and paleoecological studies. Supporting Dr. Mott's and Dr. Thane Anderson's work, she aided sampling of lake bottom sediments in New Brunswick, Nova Scotia, Newfoundland, and New York State. In 1987 she helped to organize the 12th INQUA congress in Ottawa and in 1988 presented, with Dr. Mott, an analysis of problems with dating sediments at Chance Harbour Lake at the 6th AQQUA conference in Rimouski. Her Master's thesis, "Postglacial Palynostratigraphy of the Lake Harriman Region (southern Gaspé Peninsula)", was completed by 1991 and published in *Géographie physique et Quaternaire*. She already had two other publications in collaboration with Anne de Vernal and Robert Mott.

The growing interest of the Terrain Sciences Division of the GSC in climate change led Hélène to become active in the paleoecologic component of the Paleoclimate Model Intercomparison Project (PMIP) for 6,000 years BP. This activity culminated in a special volume of *GpQ* in 1995, which she coordinated and edited. The volume described the paleogeography and paleoecology in Canada 6,000 years ago, with 15 contributing authors. It was the first contribution on this scale to PMIP and followed a workshop conducted by the Royal Society of Canada, the Canadian Climate Centre, and the GSC. In 1992, Hélène began a doctoral project at the University of Montréal on the postglacial vegetation and climate history of the Mackenzie Valley. She planned to apply transfer functions linking climate and pollen and evaluate the results in collaboration with Anne de Vernal and Joël Guiot, including an integration with diatom results. Field work during two summers and her residence requirements were completed, but the end of her employment with the GSC also ended her doctoral program. During these endeavours, she also ensured the progress of other projects by supplying pollen analyses to many colleagues, enabling publication of several articles after her termination. Her compilations of pollen data also contributed to PMIP and the early stages of the Climate System History and Dynamics project, organized by Richard Peltier with Konrad Gajewski and Pierre Richard among the collaborators. Her primary role in the compilation of the first paleovegetation map of Canada for 6,000 years ago was essential for this project.

Hélène's last few years at the GSC were marked by outstanding scientific activity. Hélène played a leading role in fostering pan-Canadian cooperation among paleoecologists around the theme of Past Global Changes. But this coincided with a gradual loss of interest by management in paleoecology, despite increasing activity by the wider scientific community in reconstruction of the late Pleistocene and Holocene climate and the established capacity within the GSC to contribute to this objective. She continued to approach her work with openness and devotion but her research career was terminated, along with several others.

In 1995, Hélène was again hired by Natural Resources Canada but now in the Minerals and Metals Sector. In the Mineral and Metal Policy Branch she was responsible for coordinating provincial and federal mining policy for Québec. Being fluently bilingual, having a background in environmental science and the ability to organize and rigorously analyse issues not only won her this job but also made her the logical choice to prepare on the first "environmental assessments of policy" as required by then new government guidelines. It was these same qualities that resulted in her being enticed to work with the Sustainable Development Policy Integration Division. There she took on the challenge of coordinating the federal government's response to the reports by a House Standing Committee on Streamlining Environmental Regulations for Mining. The trust and respect that she earned from federal and provincial departments, the minerals and metals industry and non-governmental organizations resulted in her being selected to coordinate a Mines Ministers Task Force to review federal – provincial - territorial environmental regulations affecting mining. For her work on this first national review of its type, Hélène and the federal team won Sector and Departmental awards and the first ever Clerk of the Privy Council's Award for Policy Development.

By this time, Hélène had become the Deputy Director of the Division, the lead policy advisor in the Department on northern mining issues and the environmental assessment of mining projects and a well respected expert in cumulative effects assessment, regulatory reform and decision making processes based on sustainable development. She presented papers and expert advice at forums in both Canada and abroad.

Hélène went on to begin a major initiative looking at ways that governments could work more proactively in minerals and metals regions to facilitate good decision making on issues ranging from environmental assessments to business opportunities to building community capacities to ensure their sustainability when

mines close. Her efforts continue to provide the basis of ongoing work in this area.

Hélène Jetté is an example of determination, courage and devotion. Everybody's memories of her are fond ones. In Robert Mott's laboratory, her potential as a research scientist became obvious. Despite her career in palynology being cut short, it lasted close to twenty years. She has left her mark and an important legacy. Remembering her kindness and thoughtfulness will support us in our own continuing lives.

Pierre Richard, Robert Mott, David Pasho, Larry Dyke, Roger McNeely

In Memoriam

William Antony Swithin Sarjeant, D.Sc., F.R.S.C.

1935-2002

On July 8, 2002, William Sarjeant died in Saskatoon. Bill Sarjeant was a geologist, paleontologist, avid book collector, fantasy writer, folksinger, Sherlockian scholar, and heritage advocate; he was 66. He leaves his loving wife, Margaret "Peggy"; his devoted daughters, Nicola (Peter Ryan), Rachel (Neil Sarjeant-Jenkins) and Juliet (Michael McKague); his grandsons Tristan and Rowan Sarjeant-Jenkins; and many family and friends throughout Canada and England to mourn his passing.

Bill Sarjeant had a long-standing interest in geology going back to a childhood interest in rocks and dinosaurs (not so commonplace then as now), which translated into his enrolling for an undergraduate degree in Geology at Sheffield University in 1953. On successfully completing his Bachelor's degree in 1956, Bill was faced with a momentous decision, the nature and immediate results of which were described by Bill himself in a retrospective article published in 1984, in which he said:

I had wanted to study dinosaurs but could find neither material nor funding for this. Instead, I was given two choices: to work on Carboniferous corals under Professor Moore's supervision, or to study Jurassic dinoflagellates under Charles Downie. On the whole, I was not keen on a thesis that involved much microscope work; and I am still not clear how it came about that I chose the latter alternative. Was it Charles' persuasiveness? Was it that the word "dinoflagellate" was a beguiling echo of the word "dinosaur"? Was it simply my liking for Mesozoic rocks?

Whatever the reason, in October 1956 I found myself on field work in Yorkshire in Charles' company, collecting samples for palynological study; for I had been set the task of determining, whether dinoflagellates could indeed be utilised in the stratigraphical correlation of Jurassic strata. We scrambled about the Corallian rocks of Scarborough Castle Hill under lowering skies; and, progressing inland, we sought to sample the Upper Calcareous Grit at its outcrop in Howldale.

Here there was a slight contretemps. We were perched up on the rock face when we heard a voice calling from below: "Look here, look here, what do you chaps think you're doing up there?" We looked down to see below us a large, moustached gentleman in jodhpurs and gaiters, with large double-barrelled shotgun in hand and large hound at heels, gazing up at us with face purple with fury. I said to Charles: "This is where the supervisor does his stuff!" and he descended hastily to face the empurpled landowner.

That gentleman was soon mollified. "I thought you were quarrying chaps; I don't mind you working here if you are geological chaps."

Despite this slightly inauspicious start, Bill went on in his doctoral thesis to demonstrate that fossil dinoflagellates were indeed stratigraphically useful - the first thesis to show the value that dinoflagellates have in dating rocks. To Charles Downie should go the initial credit of conceiving that this group of palynological microfossils might be useful, but Bill proved it. In so doing, Bill paved the way for other major studies in the field, including generations of students at Sheffield.

After completing his thesis in 1959, Bill was not initially successful in finding a permanent academic position. He taught school in 1959 and 1960 and served as what we would think of today as "post-doc" at Keele and Reading, before landing the lectureship at Nottingham in 1963. Despite the uncertainty of these years, Bill began his palynological writing career as he would go on - prolifically. By the end of 1963, he had already published 17 articles on fossil dinoflagellates, including several in highly prestigious journals such as Nature and New Scientist. Retrospectively, this number could almost be viewed as a slow start: during his tenure at Nottingham and at the University of Saskatchewan, he produced another 167 papers, as author or co-author, on palynological (mainly dinoflagellate) subjects, giving a total of 184 in all.

Many of the micropaleontological articles that Bill has written or co-authored have been important milestones in the field: they include the first book on the subject -

"Fossil and Living Dinoflagellates", published by Academic Press in 1973. Bill was at his most influential scientifically in bringing together the results from three theses: his own; that of another of Charles Downie's student's, Graham Williams; and that of his own student, Roger Davey. The resulting monograph, entitled "Studies in Mesozoic and Cainozoic Dinoflagellate Cysts", co-authored by Davey, Downie, Sarjeant and Williams, was published as a Bulletin of The British Museum of Natural History in 1966. It was re-issued in 1983, an unprecedented step for such an apparently arcane monograph. It remains a vital reference in fossil dinoflagellate studies to this day.

Nor did Bill restrict his studies to fossil dinoflagellates. He carried out detailed studies of another group of microfossils - the acritarchs. He also became a major figure in the study of fossil vertebrate trackways. Although in 1956 he had made that momentous decision to focus the early part of his career on dinoflagellates, as his career matured, he felt able to return increasingly to his first paleontological love - dinosaurs. Or, at least, to the fossil trackways of dinosaurs and their fellow vertebrates. In addition to his 184 papers on dinoflagellates and other palynological topics, Bill wrote or co-authored 55 papers on fossil trackways.

A record of 239 publications in two areas of major focus would alone make for an outstanding career, but Bill had yet a third area of major focus, the history of geology, which yielded another 36 publications. Among these 36 was a massive and unprecedented benchmark in the field – "Geologists and the History of Geology. An International Bibliography from the Origins to 1978". The original volume, published in 1980, ran to 4,526 pages. Later supplements added more than another 4,000 pages. The only word to describe this achievement is "stupendous", and for this work Bill justifiably received the Sue Tyler Friedman Medal from the Geological Society of London in 1990 and the History of Geology Division Award from the Geological Society of America in 1991.

Beyond these three fields, there is yet more: Bill's CV lists an additional 18 articles on other aspects of paleontology, 19 on other geological topics, mostly on mineralogy and, outside geology, 12 on local history and 2 on natural history. As an aficionado of several fictional genres, Bill wrote 15 substantial works - reviews, critiques and original pieces, including his 4 Rockall novels published under the name Antony Swithin. In recognition of his tremendous achievements, Bill was elected a Fellow of the Royal Society of Canada in 1995, an honour that Bill was rightly very proud of indeed.

That Bill's enormous productivity and range often bemused his students and colleagues is easy to imagine. But there is evidence that it sometimes even bemused

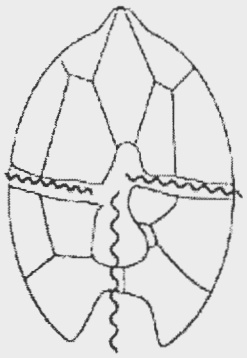
Bill himself. One graduate student, Stan Stancliffe, recalls Bill coming in to his office and asking: "Do you remember that paper on acritachs that I wrote last May? I can't remember where I submitted it - I seem to have lost all trace of it." Stan thinks that that particular paper is still lost out there somewhere - the one that got away.

Lest it be thought that Bill had only time for writing and no time for people, nothing could be further from the truth. Alongside his publication record, his teaching record is equally impressive. His CV reveals that from 1972 to 2002, Bill contributed over 5,000 hours of classroom time. Perhaps surprisingly, his busiest year, with over 300 hours, was his last year - 2001-2002. At a time of career when a professor might be excused for retreating more into research - or even lighter pursuits - Bill was contributing his most significant teaching effort. He was still dedicating a lion's share of his time to students.

Over the years, Bill successfully supervised 12 doctoral theses and 6 master's theses. To many of his graduate students he was not just a supervisor, but also a mentor, providing crucial stepping stones in their careers and enriching their lives beyond measure.

Bill was many things: a devoted husband and father, a colleague, a mentor, a teacher and a friend. He was scientist, geologist, micropaleontologist, palynologist, ichnologist, historian of geology, local historian, archivist, bibliophile, field naturalist, novelist, teacher, communicator, folk musician - the list could continue. More colourfully, he could be described as an enthusiast, an amateur in the best Nineteenth Century sense of the term, a Renaissance Man. Whatever words we use to describe him, his influence in and contributions to this world have been huge by any standard - his legacy is rich and lasting. It is a cliché, but nonetheless true, that as we go forward in life, we stand on the shoulders of giants. William Antony Swithin Sarjeant was such a giant. We will miss him.

Rob Fensome and Malcolm Wilson



Essay

DON'T EAT LIKE A NEANDERTHAL, BUT LEARN A LESSON FROM THEIR DIETS

Vaughn M. Bryant
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Texas A&M University
College Station, Texas 77843

The United States is in the midst of a health crisis! Eighty percent of American women and 60 percent of the men are trying to lose weight or not gain more weight, and they are spending over 30 billion dollars a year in the process. Fewer and fewer of us are considered physically fit, at any age.

According to data collected by the CDC (Centers for Disease Control and Prevention) nearly 65% of all Americans are now overweight, a percentage that is rising each year. In that same group the number of people who are now considered obese (more than 20% over a person's ideal body weight) has nearly doubled since 1980 to an estimated 30% of the U.S. population. Even more alarming are the latest data showing that 13% of all children in the U.S. are now seriously overweight.

As Mark Sorensen of Northwestern University has noted, a European Neanderthal living in near arctic conditions would have needed about 4,000 kilocalories (more commonly called calories) a day to sustain himself. This compares with the modern needs of a typical, urban American male of only 2,600 calories. The problem today is that many of us are still eating as if we were Neanderthals.

How did this happen? Jeffrey Koplan, director of the CDC, notes that during the past two decades the daily consumption of calories for women in America has increased by 7% and for men by 10%. This, he says is the result of changes in our habits that now include a greater variety of fatty foods, foods with more calories, the expansion and availability of fast foods, the successful marketing of new high-calorie snack foods, and a tendency to use food and drink as the centerpiece while socializing. Also alarming is that less than 30% of Americans say they follow the CDC's recommendation to exercise at least 30 minutes three times a week

Is there hope? Yes, but we need to look to earlier times for our answers. As an anthropologist, I have spent more than 35 years sifting through the remains of our prehistoric ancestors searching for information about

how long they lived, how healthy they were, and what they ate. What I am finding indicates that most of them ate better diets and enjoyed better health than we do.

Humans evolved more than four million years ago, and for most of that time we have lived as nomadic hunters and gatherers. It has only been during the last 10,000 years that some groups abandoned foraging to pursue agriculture and animal herding. Throughout those early millions of years during the pre-agricultural era, life was physically demanding, but healthy. Many died early, but their diet was not at fault. Accidents, infection, and a body worn out from a physically stressful lifestyle each took their toll.

The archaeological evidence gleaned from skeletons, trash pits, the remains of meals found in preserved human feces (coprolites), and artifacts tell us quite a bit about the lifestyles of our ancestors and questions the so-called dietary advances created by our lifestyle as farmers and herders.

Nutritionists and doctors tell us that our prehistoric ancestors ate "the perfect human diet and lived the perfect lifestyle," and that we need to return to many of those essential principles. Today the human body and digestive system is essentially the same as it was millions of years ago; yet for most of the people living in the world's most affluent nations lifestyles and diets have changed radically.

The problem is our technology that has advanced far beyond the wildest dreams of our prehistoric ancestors. Yet, for all of our great advancements we are still locked into a body style that is millions of years old. Our body, and our digestive system were honed to perfection during that 99% of human existence when everyone was a nomadic hunter and gatherer. Then, 10,000 years ago in the Middle East our ancestors first domesticated plants and animals and settled down. Soon, this new lifestyle spread to other world areas such as west Africa, southeast Asia, and to Central and South America. How these events affected and altered human cultures are phenomenal, yet human genetics and biology have changed very little.

Many claim that farming should be listed as the single greatest invention in all of human existence. Others, like physiologist and Pulitzer Prize winner Jared Diamond of UCLA, believe, "the adoption of agriculture, supposedly our most decisive step towards a better life, was in many ways a catastrophe from which we have never recovered."

How can his statement be true? Aren't we taught that the growing of crops and raising of animals frees us from the perils of an uncertain food supply and provides us with ample leisure time to develop art, music, and science? For most of the affluent societies of the world, haven't the fruits of the agricultural revolution been a longer life span, electricity, central cooling and heating, automobiles, airplanes, television, computers, and a life of pampered comfort? For most of the world's wealthy people, doesn't the only strenuous physical exertion come from short periods of self-imposed exercise each week?

Should we trade our twenty-first century lifestyle for theirs just because we are told our pre-agricultural ancestors lived the "perfect lifestyle" and ate the "the perfect diet?" I think not. But, it is possible to change aspects of our current lifestyle and diets to mirror the lessons we are learning from the lives of our ancient ancestors. Shouldn't we try to improve our health and daily lives without sacrificing the technological achievements we now cherish?

Ancient Hunters and Gatherers

Humans inherited a body that was originally designed for our tree-dwelling primate ancestors. Fortunately, some of those physical traits became advantages. Large brains, grasping hands, stereoscopic and color vision, and social lifestyles are just some of these. Humans also have the advantage of not being physically specialized, meaning that we can adapt to life in many different environments. It's true that some minor physiological changes have occurred in humans since we first developed. Some groups living at high altitudes have developed larger lung capacities while others living in hot desert regions have dark, protecting skin color and tend to be tall and thin because it maximizes the body's ability to dissipate heat. Nevertheless, in cold climates we use warm clothes in place of body hair, to travel by sea we use boats in place of gills and flippers, and to travel long distances we use airplanes instead of wings.

Our biped walking on two feet instead of four made traveling long distances easier and less costly in terms of calories burned as energy. Our hairless bodies and ability to sweat allowed our ancestors to move around in safety during the heat of the day when most other large animals, and especially predators, had to rest in the shade or risk overheating and dying of sunstroke. Our ability to consume and digest both plant and animal foods is another advantage because it enables us to use many different resources and eat almost anything. More importantly, it helped our ancestors find enough food to feed the needs of our large brains.

The brain is a greedy organ that consumes a tremendous amount of energy. By weight, brain tissue uses about 16 times more energy per minute than does muscle tissue.

Even when resting or sleeping, the human brain still consumes about 25% of the total energy being used by a human. During similar resting stages the smaller brains of most non-primate mammals use only 3-5% of the total body's energy. These data have lead anthropologists such as William Leonard of Northwestern University to suggest that human brains probably grew larger only after our earliest ancestors became skilled at finding sufficient amounts of high-calorie foods (protein and fats) to feed the voracious needs of their expanding brains. Even though an improved diet played a critical role, he notes that it was not the only factor that probably led to an increased brain size in humans.

The archaeological evidence left by our ancient ancestors attests to their skills as hunters and gives us important clues about their lifestyles, diets, and nutrition. In addition, when comparing the skeletons from ancient hunting and gathering societies to the skeletons of early farming cultures we find chilling evidence of what happened to the lives and health of most of the world's early agricultural, and later urban populations.

According to anthropologist George Armelagos of Emory University, high levels of bone porosity in the vault of the skull and around the eye orbits, called *porotic **hyperostosis***, are considered good indicators of long-term anemia, commonly attributed to iron deficiency. Although porosity might be caused by other conditions, such as severe hookworm infections, the most frequent link is to long-term reliance on diets that are low in meat and high in carbohydrates; a common occurrence in early farming cultures where diets consisted mostly of cereal grains.

When Dr. Armelagos compared human skeletons from pre-agricultural foraging peoples who lived in the Illinois and Ohio River valleys with those of later farming cultures in the same region, the evidence of anemia in the farming group was overwhelming. He found a 400% increase in the occurrence of porotic hyperostosis among skeletons from the farming period, whose diets consisted mostly of maize.

Professor Jane Buikstra, of the University of Chicago's anthropology department, notes that humans who experience episodes of severe physical stress often carry a record of those events in the long bones of their arms and legs and in the enamel layers of their teeth. She identifies typical types of stress as periods of prolonged or serious famine, periods of severe infection, or stress caused by malnutrition.

One type of growth-related stress indicator is known as Harris lines, which can be seen during x-ray or cross-section examinations of human long bones. Although most common in the skeletons of farming cultures, Harris lines occasionally appear in the skeletons of some foragers. Many now believe that some types of Harris lines reflect relatively short periods of stress while other lines indicate prolonged periods of stress.

Dr. Buikstra has noted that studies of North American skeletons from foraging groups and from early farming cultures show noticeable differences. The long bones from the farming groups have thinner cortical thickness, and are shorter, indicating a reduction in body height after the switch to farming. These, she believes, represent the physical effects of chronic malnutrition after the switch to farming.

Another reliable indicator of diet and nutritional-related stress is abnormal development in the enamel layer of teeth. One type of tooth abnormality is called ***linear enamel hypoplasia*** and seems to be caused by severe physical stress. This condition, which appears as depressed and pitted areas in the enamel layer of teeth, is more commonly seen in the teeth of early farming cultures than in those of foragers.

Wilson bands, another type of tooth enamel abnormality, are also linked to stress-induced growth disruptions and are much more prevalent in the skeletons from farming cultures than foraging ones. When the teeth from burials belonging to farming cultures are examined, they show large numbers of enamel abnormalities and large numbers of dental caries. By contrast, rarely is either of these conditions found in the teeth of earlier foraging groups.

Susceptibility to dental caries varies with individuals, but in all cases the potential for infection is greater on diets containing large amounts of refined carbohydrates, especially sugars. About 2% of the fossil teeth from ancient foraging cultures contain small or shallow areas of decay of the pit and fissure types and these are found mostly on the occlusal (top) surface of teeth. However, after cultures turned to farming the record of dental decay increased dramatically. Even so, it wasn't until the widespread use of factory-produced refined carbohydrates, including sugar, that human dental decay reached its current epidemic proportions. One study, conducted in 1900 of factory workers in England, revealed that 70% of their teeth contained caries. More importantly, most of the dental decay occurred in between their teeth, which are locations associated almost exclusively with post-agricultural diets composed of finely-ground cereals and sugars.

Examinations of preserved human coprolites provide another valuable source of information about our prehistoric ancestors. Coprolites are ideal records

because they contain the nondigestible remains of human diets, such as fiber, insect parts, bones, hair, feathers, shells, seeds, pollen, and the leaves of foods that were actually eaten. In recent years, the scientific study of coprolites has provided valuable clues about the diets, health, and nutrition of ancient foraging peoples as well as those living in early agricultural communities.

Anthropologist Kristen Sobolik of the University of Maine has spent most of her career examining human coprolites found in prehistoric sites of the arid American Southwest. She has found that for thousands of years ancient foragers ate diets composed mostly of nutritious plant foods that are high in fiber such as sunflower seeds, ground mesquite pods, cactus seeds, acorns, walnuts, pecans, persimmons, grapes, dewberries, the soft basal leaf portion of desert plants such as sotol and agave, and cactus flowers, fruits, and pads. These ancient foragers balanced their mostly plant-food diets with about 15-30% meat protein and minimal amounts of fat obtained from tiny, lean animals such as mice, rabbits, birds, fish ranging from minnows to small catfish and gar, freshwater clams, small rock lizards, caterpillars, grasshoppers, bird eggs, and, when they were lucky, maybe a deer.

Karl Reinhard, an anthropologist at the University of Nebraska, is a leading authority on ancient human parasite infection. He notes that intestinal parasites can be debilitating and potentially fatal, especially when they infect a person who is already weakened by episodes of famine or prolonged malnutrition. His examination of human coprolites recovered from many regions of North and South America indicates that hunting and gathering populations were almost totally free of intestinal parasitic infections. However, once groups settled down and turned to farming, they became heavily infected. High population densities, poor sanitation, and the compactness of living spaces in small farming villages and pueblos skyrocketed the infection rates of nearly a dozen types of intestinal parasites including pin worms, tapeworms, and thorny-headed worms.

The Human Body

Carbohydrates: Humans rely on three primary food sources to provide them with energy and needed building materials—carbohydrates, protein, and fats. The continual need to replenish these components is what gives us the desire to eat. In addition, our bodies also require certain other substances such as sodium, potassium, calcium, and a variety of other important minerals and vitamins.

Plants provide our primary source of carbohydrates and most of the calories we use as energy. Each gram of carbohydrate (about 1/28th of an ounce) provides four kilocalories of energy when it is completely digested. There are two main types of carbohydrates, simple and complex. The simple carbohydrates are sugars. They exist naturally as monosaccharides---different types of single-molecule sugars (glucose, dextrose, fructose, galactose), or as disaccharides---double-molecule sugars (sucrose, maltose, lactose). Our bodies digest both types and both are found naturally in fruits, flower nectar, and the sap of some plants. The complex carbohydrates come mostly from starch and cellulose.

Our taste buds love sweet things. Perhaps this is because our primate ancestors learned that sweet fruits are rarely poisonous and are good sources of food. Tree fruits were a much sought-after food source by primates because ounce for ounce fruits offer more usable calories than do leaves, bark, or stems. In addition, the riper the fruit, the sweeter it becomes as its starch is converted to sugars.

The association of sweetness with "good tasting," ready-to-eat, high-calorie-value fruits served the early primates and our human ancestors well. It encouraged them to search for these tasty food sources and to avoid most sour and bitter-tasting fruits because that often indicates fruits are poisonous or not yet ripe. Our ancient ancestors never ate too much sugar. Except for small amounts of sugar found in fruits, in a few other natural foods, and an occasional lucky discovery of honey, our foraging ancestors, and even early farming peoples, had no access to sugar. No human forager, or early farmer, was ever in danger of overdosing on sugar. Perhaps this is why of the four essential taste sensations (sour, sweet, salty, bitter), humans usually avoid foods that are too sour, too salty, or too bitter, but rarely turn away from foods that are too sweet.

Two events increased our consumption of sugar. First, Columbus carried sugarcane to the New World and found that it grew well in the moist climate and fertile soils of the Caribbean. Second, the Spanish and Portuguese pioneered the importing of slaves as an inexpensive labor source for their plantations that soon produced tons of sugar at competitive market prices. For example, in England, the availability of inexpensive sugar from the New World reduced the per pound cost from the equivalent price equal to the yearly salary of an average worker in 1600, to the same price as a dozen eggs by 1700. As the price of sugar dropped, consumption rose so that soon the United States and most European countries mirrored the English's rapid increase in the use of sugar.

By 1913 the annual consumption of sugar in the U.S. had reached 75 pounds per person. By 1976, U.S. sugar consumption had reached 125 pounds per person per

year, which represents about 11% of the total daily calories eaten by each American. By 1998, sugar was supplying 16% of the total daily calories for each U.S. adult and 20% of children's daily calories.

Anthropologist Sidney Mintz of John Hopkins University believes he knows why the U.S.and world sugar consumption continues to climb. He notes that only a small portion of each person's daily sugar consumption comes from spoonfuls or cubes of sugar those individuals add to foods or drink. Instead, most of the sugar we eat is "hidden." Bakers add sugar to non yeast-rising products because it makes cakes, cookies, and breads smoother, softer and whiter. Sugars also improve the texture of baked goods. Manufacturers produce heavily sugared soft drinks because thicker syrup-like liquids are smoother and more appealing to the mouth and tongue than is flavored water. Sugar also slows staleness in bread, stabilizes the chemical contents of salt, cloaks the acidity of tomatoes in catsup, and when added as a sauce to bland-tasting meats like fish and poultry, sugar makes them taste much "better."

The complex carbohydrates have long chains of linked sugar molecules called polysaccharides. Humans can't digest some types, such as cellulose, so it becomes the "fiber" content of our diets. Other types of carbohydrates, such as starch, are digestible and can be converted to energy.

Paradoxically, until very recently, too much diet fiber was a problem in most human diets. Our ancient ancestors pounded and ground plant foods, techniques that exposed starches but did not reduce the intake of high amounts of fiber. Dr. Boyd Eaton and his colleagues at the Emory University School of Medicine estimate that our foraging ancestors probably consumed about 150 g of fiber each day as compared to the current USDA recommended minimal average of 20-25 g of fiber daily. Even so, the average American usually eats less than 10 g of fiber each day.

My coprolite studies of pre-agricultural groups living in North and South America support Dr. Eaton's estimates of high fiber in ancient diets. In many instances, I find that non-digested fiber is the dominant component of ancient coprolites from pre-agricultural foragers. In some cases I find that fiber accounts for more than one half of the total weight of each coprolite.

Our digestive system still needs lots of fiber. Fiber speeds the passage of food through our small intestines, adds needed bulk for our large intestine, stimulates peristalsis necessary for the excretion process, and minimizes the effects of ingested carcinogens, which might otherwise cause some of the DNA in our digestive tract to mutate into cancers. Low fiber diets are also a factor in the occurrence of disorders such as spastic colon, diverticulosis, hiatal hernia, and hemorrhoids.

Animal Protein: All primates eat some type of animal protein but humans eat the highest amounts. Protein is a high-calorie food that our ancient ancestors needed to feed the high-energy needs of our large brain. When eaten, 3.5 ounces of meat produces about 200 calories of energy while the same amount of fruit yields less than 100 calories and 3.5 ounces of leaves produces only 10-20 calories.

Anthropologist Richard Lee of the University of Toronto has spent a lifetime studying the diets of contemporary foraging societies. He estimates that most of today's foraging societies obtain about one-third of their daily calories from animal protein, with the other two-thirds coming from plant foods. That amount is considerably higher than the average diet of 5-7% animal protein eaten by our closest relatives, the chimpanzees. William Leonard and others note that larger-brained humans need more high-calorie foods than do the smaller-brained chimps. Lee also notes that among contemporary foragers a significant percentage of their meat often comes from small reptiles, birds, and mammals. My examination of ancient human coprolites confirms that reliance on meat protein mainly from small animal hunting seems to be thousands of years old and may represent an essential pattern even from the beginning of humankind.

Humans need a constant supply of protein because unlike fats and carbohydrates, our body cannot store protein as protein. Instead, humans store excess protein as fat. Meat from animals, fish, and fowl contains from 15-40% protein by weight and is called "a complete protein source." By contrast, most plant foods often contain meager amounts of about 2-10% protein and are termed "incomplete proteins" because plant sources often lack at least one or more essential amino acids needed by all humans.

The increased need for protein to feed our larger brains may explain why *Homo erectus*, the first of our species with a brain nearly as large as modern humans, left the grasslands of east Africa and soon ranged over much of Europe, Asia, and the rest of Africa. Anthropologist Susan Anton of Rutgers University and others estimate that by the time *Homo erectus* emerged somewhere between 1-2 million years ago, the human needs for food and especially protein meant that this new species needed eight to ten times more room to search for food than did their smaller-brained ancestors who were restricted to the continent of Africa.

How much protein do humans really need? Nutritionists say about 10-20% of our diets should come from meat protein, a percentage that is within the minimal average eaten by most non-poverty-level Americans. For many of our ancient foraging societies about one-third of their daily calories came from animal sources and most of that came from meat. Nevertheless, archaeological records also indicate that some of our ancient ancestors, especially the ones we call the "big game hunters," probably relied on meat sources for as much as 50-60% of their total dietary calories.

Humans need protein because it provides the essential amino acids used by our bodies to build new tissues such as muscles, tendons, ligaments, and the walls of blood vessels. All of our growth from birth to death, as well as all repairs to our body, depends upon the amino acids we obtain from protein sources. Even our skin, hair, and nails cannot form properly without the correct amount and mixture of amino acids.

Fats: Until very recently human diets were low in fat. Fats are found in some plant foods, such as seeds and nuts, and in the meat of animals. In prehistoric times fat was a hard-to-find food source because most wild, land-dwelling animals have lean bodies with less than 4% fat. By contrast, 30% or more of the total butchered carcass weight of most American domestic cattle and pigs is fat.

Most fats are composed of long chains of triglycerides molecules. They get their name because each contains three fatty acids attached to one glycerol molecule. Cholesterol, sometimes mistakenly called a fat, is needed to produce numerous hormones and bile acids, but it is not really a fat. Instead, cholesterol is a complicated substance composed of molecule rings that reacts more like a wax than a true fat.

There are many types of fatty acids found in nature. Some fats are ***saturated***, others are ***unsaturated*** fats, and the unsaturated group is divided into ***mono*** or ***poly*** types depending on whether they are linked with one, or more, double bonds of carbon. The chemistry of fatty acids is complex, so for most of us knowing how they work in the human body is more important. When digested, fats also offer the most energy calories (9) per gram.

Some polyunsaturated fats are called structural fats because they are used to build and repair nearly all cell membranes. These fats are also important because they are used to build various types of hormones and utilize various vitamins that regulate our body functions. By contrast, most saturated fats occur as adipose tissue, which is where animals store excess amounts of fat for later use. In some animals, such as seals, whales, or bears, a thick layer of subcutaneous adipose fat is essential because it provides insulation against the cold or it becomes stored calories for use during hibernation. However, in most animals excess amounts of saturated fats are stored in other body locations, such as in the abdominal cavity or within muscle tissue where it can be converted into energy when needed.

The meat of wild animals provides much more protein than fat. Wild animals have small amounts of saturated fat that is often distributed uniformly throughout the body, yet most fat in wild animals is the unsaturated type. Animals raised in captivity, our pets, and steers raised in feed lots as food have one thing in common---they all have high amounts of saturated fat.

I often ask students in my classes to list their ten favorite foods. With rare exception, all foods listed contain fats. Of the foods humans like most, the majority contains fats. It is unfortunate for humans that fats will satisfy our hunger pangs quicker than any other food source. Million's of years ago it was nature's way of encouraging our ancestors to find and eat this essential food item. This food craving served our foraging ancestors well, but it has become a liability for many of us today. What is worse is that nature designed our intestines to be very efficient at digesting fats, generally allowing no more than 5% to escape before being absorbed. This digestive advantage provided an essential advantage for our ancient ancestors who rarely ate fat, but it is one of the factors that now contribute to making more than 65% of Americans overweight.

It is the amount of saturated fat and trans fat in our diet that should be cause for alarm. The U.S. Senate's Select Committee on Nutrition and Human Needs reports that the typical American diet consists of 42% fat and a majority of that is saturated fat. However, as nutritionist Walter Willett of Harvard University recently noted, the "amount" of fat we eat is less critical to our health than the "type" of fat we eat. He explains that eating monounsaturated fat (olive oil) is good for us, but eating high levels of saturated and trans fats adds not only pounds but can also ruin our health. He cites his research on trans fat by saying, "This kind of fat is found in many kinds of margarine and other foods, especially fast food." Trans fats, he points out, are created by hydrogenating vegetable oils and are the most commonly used types because they are inexpensive, add texture and taste to commercially prepared foods, and keep fired foods from going stale. By comparison, our ancient foraging ancestors ate meat containing mostly the healthy-type of unsaturated fats and their total daily calories from fat were rarely more than 20%.
It is both the total amount of fat, and the high percentage of saturated and trans fats, that makes our modern diets so unhealthy. In addition to straining our heart and

skeletal system, elevating our blood cholesterol levels, and increasing our chances of developing high blood pressure, being overweight is also the main cause for the recent rise in the number of people suffering from diabetes. Recent research has also linked being overweight with increased chances of developing a variety of cancers including prostate, breast, and colon cancer.

Dr. Boyd Eaton writes in his book, *The Paleolithic Prescription* that he doubts our ancient ancestors ever had to worry about coronary heart disease, one of today's major killers, especially in the world's more developed countries. High levels of serum cholesterol, diet, age, sex, and genetics are all potential contributors to coronary atherosclerosis, yet, of these, we can potentially control only several, the food we eat and the levels of serum cholesterol.

Many people mistakenly believe that their serum cholesterol level is directly linked to the amount of cholesterol they eat. Ironically, a high cholesterol diet usually only slightly raises a person's serum cholesterol level. For example, the cattle herding Masai tribe of east Africa drink large amounts of milk and have a daily intake of cholesterol that often exceeds 1,000-2,000 mg. However, most Masai warriors have low serum cholesterol levels of only 115-145 mg/dl, far less than the level of 200 that is recommended by most American doctors.

Like the Masai, our ancient ancestors probably had low serum cholesterol levels even though we suspect they may have consumed up to 1,000 mg of cholesterol daily, depending on their meat supply. Recent research confirms that genetics and a high fat diet--especially one high in saturated and trans fats--have a much greater influence on raising serum cholesterol levels than does the amount of cholesterol a person eats.

Salt: Mammals normally consume more potassium than sodium (table salt is about 40% sodium). Dr. Henry Blackburn, a professor of physiology at the University of Minnesota's Medical School, points out that the human kidney is a marvelous organ for maintaining the delicate balance between sodium and potassium in. However, because humans first developed in Africa where sodium has always been scarce, our kidneys were designed to *retain*, not *excrete* sodium.

One of the greatest changes in human diets from ancient times to the present has been the switch from ancient diets rich in potassium and low in sodium, to modern diets high in salt. A typical prehistoric forager's diet of 3,000 calories, coming 60% from fresh plant foods (leaves, nuts, tubers, berries, fruits) and 40% from meat (large game, birds, fish, eggs, reptiles) would contain about 7,000 mg of potassium and 900 mg of sodium. By comparison, the U.S. National Academy of Sciences Food and Nutrition Board reports that the average American is now consuming 6000-18,000 mg of salt per day. That, they say, is about 6-10 times too much sodium in the typical American diet that already lacks sufficient potassium.

Medical researchers believe that high sodium use, especially among people who have a genetic predisposition to retain much of the sodium they eat, is a primary cause of high blood pressure. Years ago some believed that the high levels of salt use in our diets resulted from a human craving for sodium. Today, most medical doctors believe that our salty diets are based strictly on an acquired taste, not on any type of physiological need.

Additional evidence links high blood pressure with high levels of salt use. Statistics reveal that the incidence of high blood pressure is greatest in countries with the highest per capita consumption of salt. Likewise, problems of high blood pressure do not seem to exist among many cultures with diets that are traditional low in salt and high in potassium, such as the diets of the Yanomami of Venezuela, the Inuit of the Arctic, the San of the African Kalahari, and natives in areas of Polynesian that have not been affected by tourism. I believe the evidence is overwhelming. One reason our ancient ancestors were so healthy is that they were free from the health problems caused by high blood pressure because their potassium-rich diets contained little salt.

Exercise: Another important difference between our ancient ancestors and modern populations is exercise. Hunting and gathering are activities that require strength and stamina. Hunters often travel long distances in search of game. Once game was killed and butchered, the hunters would carry the meat back to camp. Meanwhile, women spent their days digging for tubers, carrying young children, gathering other foods, finding water, and collecting firewood. Studies of modern foraging groups reveal those types of daily activities will ensure that individuals remain strong, retain great stamina, and will be slim even into their old age. Similar proof comes from the study of skeletons belonging to our ancient ancestors. Their weight-bearing leg bones and arm bones are thick and have pronounced rough areas where large muscles and tendons attached.

Once humans turned to farming their skeletons reveal that they lived a less strenuous lifestyle. Skeletons dating from the early farming era about 10,000 years ago begin to lose these robust features, and skeletons from the period of early urbanization reveal that these robust

features are almost entirely gone. The evidence suggests that even though early farmers may have worked long hours, their efforts no longer required the levels of physical stamina and endurance common in the lives of pre-agricultural cultures. As, human strength was replaced by machines after the Industrial Revolution many people, especially those of the affluent classes, enjoyed a life of leisure requiring little physical effort, stamina, or strength.

During the 1960s, muscular strength and endurance testing of high school and college-age Americans revealed they were considerably weaker than earlier generations at their same age. Much of this resulted from children having fewer opportunities in daily life to burn calories. In recent years some schools have reduced physical education activities, fewer children now walk to and from school, and even today's household chores are assisted by labor-saving machines. Studies conducted in 1997 reveal that children between the ages of 6-18 are now spending an average of 38 hr/wk playing video games or watching TV. The link between adults and exercise has also been declining. As a nation, Americans walk less and drive more and most now work in facilities that are increasingly automated.

The Future

These chilling comparisons can depress us, or we can benefit from what we have learned. Until recently, medical professionals believed the degenerative process, seen in many of today's elderly, was a normal part of the aging process. However, the skeletal remains of our ancient ancestors and current medical evidence suggest that most of our degenerative processes are caused by a lifetime of neglect caused from years of eating the wrong foods and minimal exercise.

We don't have to give up the blessings of civilization, but we do need to live in harmony with our body's physiology. By selecting a diet that approximates the proportions of fats, fiber, protein, and complex carbohydrates eaten by our ancient ancestors, and by reducing our intake of sugar and sodium, we can benefit from eating a near "perfect" diet. Then, by adding regular exercise and avoiding tobacco and other harmful substances, we should be able to maintain good health with reasonable levels of strength and stamina as we age.

This doesn't mean we have to eat insects, mice, and coarse plant fibers, as our ancient ancestors once did. But, it does mean we need to make intelligent decisions at the grocery store or when we eat out in restaurants. We can reject most fried foods and instead eat broiled chicken, turkey, and fish, which are high in protein and low in fats. Most lean, red meats are high in both. Many fruits and fresh vegetables are rich in potassium and low in sodium, but their canned equivalents are often high in both sodium and sugars. Whole wheats and bran are rich in bulk and fiber while foods from refined flour are not.

If we are willing to make some dietary changes, if we try to exercise daily, and if we can balance the total number of calories we eat with the amount we burn, then we can enjoy the best aspects of the "perfect" foraging lifestyle as well as all the comforts of modern civilization.

Lab Scenes

Dr. Catherine Yansa recently "set up a shop" in the Department of Geography of Michigan State University (MSU) where she is continuing her Late Quaternary pollen and plant macrofossil research. Her doctoral research at the University of Wisconsin-Madison involved reconstructing the vegetation changes that occurred on the northeastern Great Plains from approximately 11,500 (after deglaciation) to 6000 yr B.P. (mid-Holocene) through the study of both pollen and plant macrofossils. As a tenure-track assistant professor at MSU in East Lansing, Catherine will engage in similar paleobotanical investigations on both sides of the United States-Canada border in the North Plains and Great Lakes regions. She has already begun a project with Christina Kulas, a Ph.D. candidate at MSU, which involves reconstructing pre-settlement and post-settlement forest changes in the Lower Peninsula of Michigan by using pollen, plant macrofossils, land surveyor records, Geographic Information Systems (GIS), and Remote Sensing (RS). Currently, only temporary laboratory facilities are available for fossil analysis pending a move in one or two years into a different building. Microscopy equipment recently acquired for this lab includes a Leica DM LB compound microscope (for pollen), a Leica MZ6 zoom stereomicroscope (for macrofossils), and a Q-Imaging micropublisher digital camera with Image Pro Express imaging software. Catherine is one of the core faculty in a newly formed Quaternary Landscapes Research Group (QLRG) at MSU, which is an informal group of researchers on campus who are actively reconstructing prehistoric landscapes, particularly those in Michigan (check out our site: http://www.geo.msu.edu/qlrg/).

Editor's Note: Catherine is the new President-Elect of CAP.

Catherine Yansa using a Russian peat corer—actually "trying to reach the handles at the top". This picture was taken by Dr. Randy Schaetzl on a Geography 871 coring trip to a bog in the northern Lower Peninsula of Michigan (NE of the city of Grayling). *"We informally named the site Briggs Bog."*

Far & Wide

Environmental Catastrophes and Recovery in the Holocene: International Conference
Brunel University, London
28 August – 2 September, 2002

The 'Environmental Catastrophes and Recoveries in the Holocene' conference held here at Brunel on 28 Aug.-2 Sept. closed to great acclaim. According to the Secretary General of the international research organisation that sponsored the event (INQUA), "...the meeting at Brunel was excellent, and among the best meetings I have ever attended". This view has been echoed in the post-conference responses from senior scientists and younger scientists alike.

So why the great success? What was so special about the conference? Well, although organised by the Department of Geography & Earth Sciences, the 150 participants from 27 countries represented a startling range of disciplines and spoke on a breathtaking myriad of topics. The majority of the delegates were geographers, geologists, archaeologists and anthropologists, but amongst them mingled historians, astrophysicists, ecologists and health experts. Topics ranged from linkages between major volcanic eruptions recorded in the Greenland ice core with a plague in Ancient Rome, between civilisation collapse in the Middle East and rainforest retraction in equatorial Africa 4000 years ago, and between recent climatic downturns and the incidence of modern droughts such as that of Dustbowl America in the 1920s. Such topics ensured great media interest, with Nature, Science and New Scientist being amongst those picking up on conference highlights, such as the controversial reappraisal of the 1908 Tunguska cometary impact in Siberia, new ideas on a cometary mega-tsunami that devastated eastern Australia several thousand years ago, and the politics of an earthquake fault that lies below Salt Lake City's recently constructed Olympic Stadium.

Bringing together such a rich diversity of researchers was one of the main objectives of the convenors, Professor Suzanne Leroy and Dr Iain Stewart. Breaking down the usual barriers between scientific communities to forge a new mix of people was a real challenge, but one that seems to have been at the heart of the meeting's success. The broad sweep of the conference was about abrupt environmental changes that had affected the planet in the last 10,000 years, whether these changes reflected natural or human actions and the evaluation of

their impact on our past and future societies. The immediate implication of such analyses is to put in a wider time perspective the events that occur at the moment (floods, fires, hurricanes, earthquakes, epidemies, extinctions) and be ready (if possible) for the extreme ones. Nine thousands kilometres or so away at the Earth Summit at Johannesburg was hearing how humans are imposing environmental havoc on an otherwise balanced and passive Earth. The Brunel conference instead heard about a naturally variable and frequently harmful environment in which humans were often incidental.

So what of the future? The conference will spawn a number of special Issues in international science and Leroy and Stewart will convene a follow-up conference in Reno (USA) next July. However the main legacy of the Brunel meeting will be a new INQUA-sponsored research initiative that will build on the energies and synergies generated by the London meeting. That initiative aims to galvanise a new interdisciplinary research community to engage more closely with policy makers in disentangling the natural and human influences on environmental change, and in acknowledging the 'dark side of nature'.

Some words now on the structure of the conference. A programme of carefully selected keynote speakers was organised for the 5 mornings around the 5 key themes of the conference: geological catastrophes, ecological catastrophes, climatic catastrophes, health catastrophes and civilisation collapse. Eleven specialist sessions were distributed over the afternoons. The long day was then wrapped up by a last plenary session: either a more philosophical approach, or a social one. A representative of a series of insurance companies gave his own analysis of risk.
Owing to our academic sponsors (PAGES, INQUA, The British Academy, IUGS-Geoindicators, IUGS-SOTSPI), a programme of 35 posters could also be set up for our younger scientists or scientists who were not fluent enough in English. Enough time was allowed in the programme for detailed discussions of these results. Our social programme allowed also the scientists to meet informally around an ice breaker at the Beldam Art Gallery (Brunel), a sumptuous conference dinner at the Royal Institution (Central London) and a boat trip on the Grand Union canal (near the campus).

More on our web site:
http://www.brunel.ac.uk/depts/geo/Catastrophes/
Abstracts available on website: http://atlas-conferences.com/c/a/i/q/01.htm

Suzanne Leroy and Iain Stewart

Holocene Environmental Change in the Great Lakes Region
Canadian Association of Geographers (CAG) Annual Meeting
28 May – 1 June 2002

In May 2002, we hosted two special sessions at the Canadian Association of Geographers Annual Meeting in Toronto entitled 'Holocene environmental change in the Great Lakes region'. Our sessions comprised 8 talks and were chaired by Dr. Tony Davis of the Department of Geography at the University of Toronto. Several authors (S. Finkelstein, G. Lee, M. Peros) used palynology to address the environmental history of two regionally significant coastal wetlands - Cootes Paradise and Rondeau Park. Methodological issues inherent in the wetland pollen record were discussed including the use of SEM in identifying wild rice (*Zizania aquatica*) pollen and the importance of modern pollen rain studies to quantify large biases in pollen production in important wetland plants. J. McAndrews spoke about decreasing ice cover in Toronto Harbour. A. Stewart addressed floodplain formation processes on the Thames River and their archaeological implications and F. McCarthy talked about water level history and human disturbance at Severn Sound. M. Oakes spoke about cliff- top dunes on the north shore of Lake Erie. We also attracted international attention. R. Meyrick came from Germany and presented research on molluscs as paleoindicators in southern Ontario, and J.-N. Haas joined us from Austria and presented a poster on catastrophic drought 5500 years ago. We were very pleased with the quality of the talks and stimulating discussion generated by the exciting and innovative research in this region. We hope that this session helps to further communication and collaboration between paleoenvironmental researchers in the Great Lakes region.

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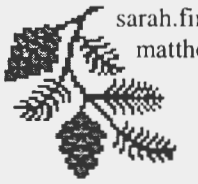


Thesis Abstracts

Luc Bouchet-Bert. 2002. *When Humans Entered the Northern Forests: An Archaeological and Palaeoenvironmental Perspective.* Master's Thesis. Department of Archaeology, University of Calgary. Supervisor: Dr. Gerald Oetelaar.

Abstract:
Pollen analysis on a lake core is used to reconstruct early Holocene environments of the Boreal forest region of northeastern Alberta. Together with the archaeological record of this area, these data indicate that Early Prehistoric Plains groups first exploited northeastern Alberta during the warming period known as the Hypsithermal, starting after 10,000 BP. During this time, forests were more open and may have acted as refugia that supported some Plains big-game. It is theorized that by co-existing in the woodland environment with Plains big-game over the several thousand-year duration of the Hypsithermal, Plains hunter-gatherers not only discovered and learned to exploit the rich fish resources of this region, but gradually lost their Plains cultural identity. By the time the forests closed with the onset of cooler conditions around 7500 BP, Plains-derived Northern Plano cultures had fully acculturated to the forests, and continued their woodland exploitation.

Renée Hetherington. 2002. *Interdisciplinary insights into paleoenvironments of the Queen Charlotte Islands/Hecate Strait Region.* Ph.D. dissertation. Department of Geography, University of Victoria, British Columbia. 435 p. Co-supervisors: Dr. D.J. Smith and Dr. J.V. Barrie

Abstract:
Subsequent to the Late Glacial Maximum, complex coastal response resulted from deglaciation, eustatic sea-level change, and a relatively thin, flexible lithosphere in the Queen Charlotte Islands (QCI) region of northwestern Canada. Presented here is an interdisciplinary study that combines the methodologies and schools of thought from geology, biology, and geography to address a research problem that spans these disciplines, specifically to illustrate the environment, temporal and spatial dimensions of isostatic crustal adjustment and the Late Quaternary coastline of the northeast Pacific continental shelf. Molluscan distribution, lithology, and published sub-bottom profiles are used to deduce sea-levels, outline the influence of glacially-induced crustal displacement, and reconstruct the paleoenvironment of the northeast Pacific Late Quaternary coastline, including the absence of ice and the presence of emergent coastal plains. These data are used to ascertain the region's suitability as a home for an early migrating coastal people.

A series of paleogeographic maps and isostatic crustal displacement maps chart the sequence of evolving landscapes and display temporal changes in the magnitudes and extent of crustal flexure as a forebulge developed. The wave-length and amplitude of the glacially-induced forebulge supports thermal and refraction modeling of a thin (~25 km thick) lithosphere beneath Queen Charlotte (QC) Sound and Hecate Strait. Glacial ice at least 200 m thicker than present water depth began retreating from Dixon Entrance after 14,000 and prior to 12,640 ^{14}C years BP, generating 50 m of uplift in northern Hecate Strait. The position of the forebulge remained essentially constant after 12,750 ^{14}C years BP, implying a fixed ice-front and continued ice presence on the British Columbia (BC) mainland until ~ 10,000 ^{14}C years BP. A 3-dimensional GIS model shows two ice-free terrains emerged: one extended eastward from the QCI, the other developed in QC Sound. By ~11,750 ^{14}C years BP a landbridge connected the BC mainland and QCI.

Malacological evidence indicates a paucity of Arctic molluscan fauna subsequent to glaciation, perhaps a consequence of shallow, narrowed straits, and the presence of ice sheets that interfered with ocean currents. Water temperature, sedimentation rates, turbidity, and photoperiod are factors that limited invertebrate colonization during the Late Pleistocene B Early Holocene. The oldest dated mollusc to colonize QCI region subsequent to LGM was *Macoma nasuta* at 13,210 ^{14}C years BP. Once habitat and sea-surface temperatures were conducive, rates of recolonization appear to be limited only by the availability of ocean currents to bring temperate pelagic larvae into the region from outlying areas. Between ~11,000 and 10,000 ^{14}C years BP the appearance of *Clinocardium ciliatum* and *Serripes groenlandicus*, concurrent with the disappearance, or significant reduction in number and productivity of temperate intertidal molluscs, indicates the onset of a short interval of cool sea-surface temperatures coincident with the Younger Dryas cooling event. Five molluscan species: *Macoma incongrua*, *Musculus taylori* (cf), *Mytilimeria nuttallii*, *Tellina nuculoides*, *Mytilus edulis/Mytilus trossulus* previously categorized as possessing a Recent geologic range were collected in sediments dating older than 10,000 ^{14}C years BP. Fossil mollusc shells indicate edible intertidal biomass densities well within commercially harvested levels on southern Moresby Island by 8,800 ^{14}C years BP, and on northern Graham Island by 8,990 ^{14}C years BP.

The presence and productivity of nutritious intertidal molluscs indicates the QCI region had a suitable climate, possessed open ocean conditions, and provided subsistence resources for potential early humans subsequent to at least 13,210 ^{14}C years BP. Three-dimensional GIS modeling shows subaerially exposed land that could have been inhabited by plants, animals, including coastal-migrating early humans. Early coastlines that have not been drowned, and which may harbour early archaeological sites, are identified along the western and northern coasts of QCI and the BC mainland.

Zorana Spasojevic. 2002. *Biogenic Silica and Diatom Centric/Pennate Ratios as Indicators of Historical Coastal Pollution.* M.Sc. Thesis. Department of Geography, McGill University. Supervisor: Dr. Gail Chmura

Abstract:

Historical environmental changes in two shallow, unstratified, estuaries in Buzzards Bay, Massachusetts are compared, using three diatom paleo-production indicators: sedimentary biogenic silica (BSi), BSi flux and ratio of Centric to Penate diatoms. Both estuaries were exposed to pollution. New Bedford Harbor (NBH) has a history of intensive nutrient loading and industrial pollution, while the control site, Apponagansett Bay, has lower levels of nutrient loading. Consideration of local precipitation history and diatom parameters suggests that salinity-driven changes in diatom production are negligible. Over the past ~350 yrs, BSi concentrations and fluxes are higher in NBH. Thus, overall diatom production is sensitive to nutrient enrichment and less responsive to industrial pollutants. The relationship between the C/P ratio and environmental conditions is not as clear, possibly due to its dependence on eelgrass abundance. The uniqueness of this study lies in its use of the parameters combined, as well as its geographic setting.

Les changements de l'environnement au cours de l'histoire dans deux estuaires concaves, non-stratifiés, à Buzzards Bay, Massachusetts sont comparés en utilisant trois indicateurs de paléo-production de diatomées: la silice biogénique sédimentaire (BSi), le flux BSi et la proportion entre les diatomées cylindriques et elliptiques. Les deux estuaires ont été exposés à la pollution. New Bedford Harbor (NBH) a un historique de chargement nutritionnel et de pollution industrielle intensifs, tandis que le site de contrôle, Apponagansett Bay, a des niveaux de chargement nutritionnel moins elevés. L'examen de l'historique des précipitations locales et des paramètres des diatomées suggère que les modifications dues à la salinité dans la production des diatomées sont négligeables. Au cours des 350 dernières années, les concentrations de la BSi et les flux ont augmenté
à NBH. Ainsi, la production totale des diatomées est sensible à l'enrichissement nutritionnel et moins sensible aux polluants industriels. La relation entre la proportion C/E et les conditions de l'environnement n'est pas aussi claire; il est possible que cela soit dû a sa dépendance à l'abondance de la zostère marine. La présente étude est unique du fait qu'elle utilise les paramètres combinés, ainsi que la position géographique des
sites.

Grant Zazula. 2002. *Full-glacial macrofossils, paleoecology and stratigraphy of the Bluefish Exposure, northern Yukon.* M.A. Thesis. Department of Anthropology, University of Alberta. Supervisors: Dr. Charles Schweger (University of Alberta) and Dr. Alwynne Beaudoin (Provincial Museum of Alberta).

Abstract:

Macrofossil analysis at the Bluefish Exposure (67°23'N, 140° 21.5'W) provides a record of full-glacial steppe, within a mosaic of vegetation types, including mid-rich fens, mesic graminoid meadows, and discontinuous tundra. Local vegetation was dependant on physical factors including, moisture, slope, drainage, aspect, and elevation. Comparisons with other multi-proxy data support the hypothesized "Mammoth Steppe" in the Bluefish watershed and substantial environmental variability across eastern Beringia. Terrestrial plant macrofossils yielded 8 AMS ^{14}C ages between 18,880 ±210 yr BP (AA45509) to 16,440 ±120 yr BP (AA45519), uncalibrated ^{14}C ages, dating the assemblage and deposition of the near-shore deltaic sediments associated with Glacial Lake Old Crow transgression. A synthesis of regional stratigraphic data indicates two phases of Glacial Lake Old Crow; Stage 1, *ca.* 35-22 ka BP, correlative to the all-time maximum advance of Laurentide ice; and Stage 2, *ca.* 22-16 ka BP, correlative to the Katherine Creek Phase Laurentide ice margin.

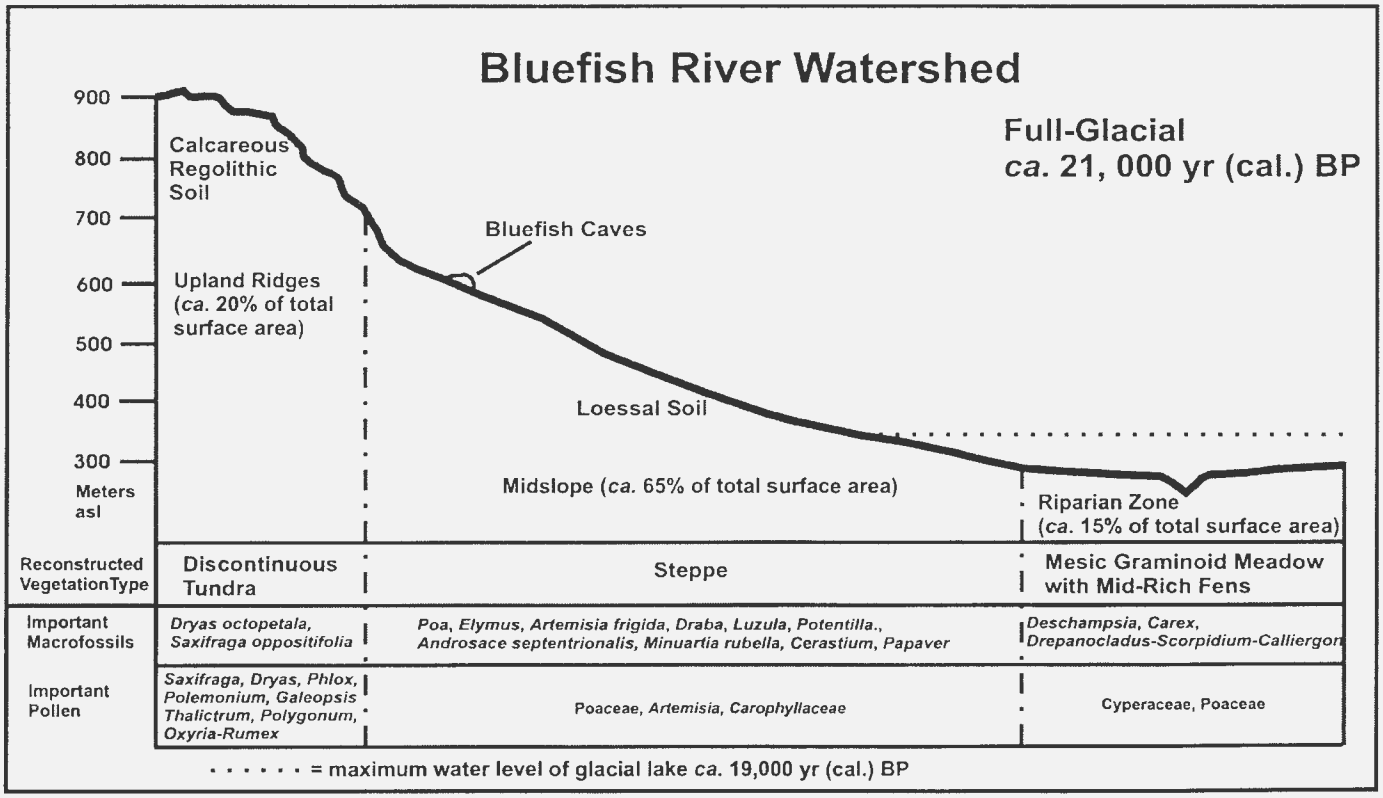


Fig. 1. Schematic diagram of reconstructed vegetation types in relation to generalized topographic zones within the Bluefish River watershed, northern Yukon. Full-glacial vegetation reconstruction established by plant macrofossils and pollen from Bluefish Exposure site, dating to ca. 21,000 yrs (cal.) BP.

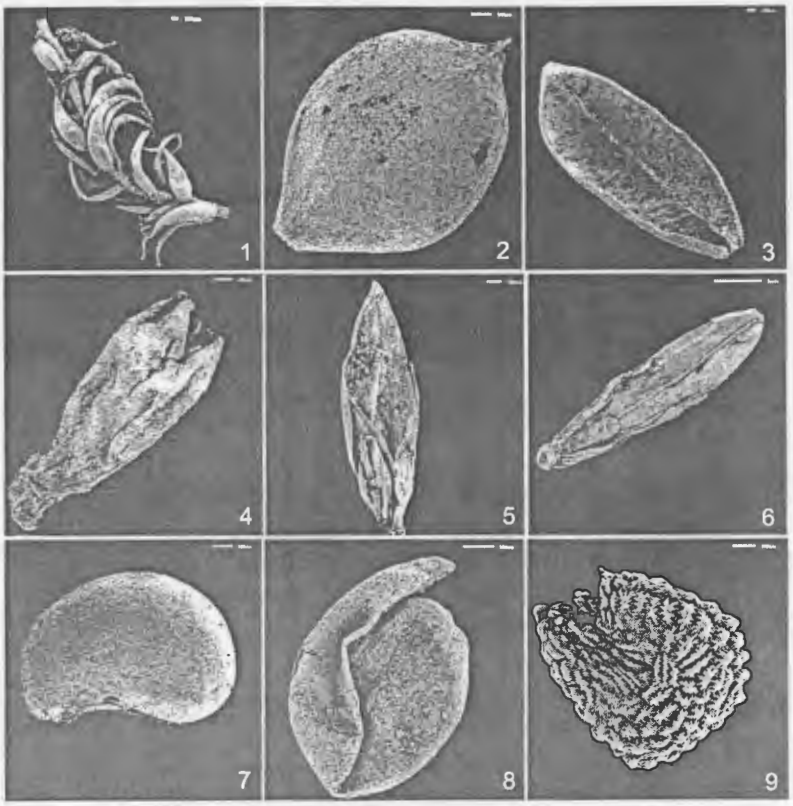
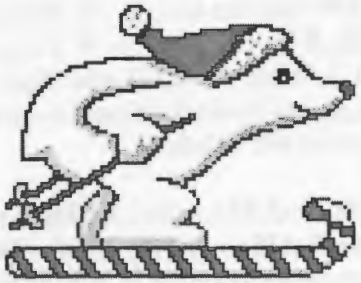


Fig. 2. Selected plant macrofossils from the Upper Bluefish Unit (ca. 21,000 yr cal. BP), Bluefish Exposure, northern Yukon. 1) *Drepanocladus vernicosus* branch with leaves; 2) *Carex* sp. achene; 3) Juncaceae silique fragment; 4) *Artemisia frigida/campestris* flower; 5) *Poa* type caryopsis; 6) *Elymus* sp. caryopsis; 7) *Potentilla* sp. achene; 8) *Draba* type seed; 9) *Cerastium* cf. arvense seed. (Zazula, 2002)



Graduate Student News

Terri Lacourse, a Ph.D. candidate in the Department of Biological Sciences at Simon Fraser University, has won the Geological Society of America's Gretchen Louise Blechschmidt award. The $3,000 USD prize is given to women pursuing doctoral research in the geological sciences, specifically dealing with the analysis of biological fossils and oceans through geological time. She has used this award primarily for radiocarbon dating. Her research proposal was praised for its exceptional merit and presentation.

The objective of Terri's research is to reconstruct the late Pleistocene vegetation history of the Queen Charlotte Islands, northern Vancouver Island, and the adjacent continental shelf of British Columbia. Emphasis is placed on the period between 15,000 and 10,000 yr BP, when large portions of the continental shelf along the Pacific Coast were subaerially exposed due to significantly lower relative sea levels. It is possible that this coastal corridor served as the earliest migration route for humans entering the Americas. The vegetation history is being reconstructed using pollen analysis and other paleoecological tools on sediments from extant lakes. Lowered sea levels of more than 150 m isolated basins and created sediment-trapping lakes on the continental shelf. To study the lowland vegetation during the period of subaerial exposure, the lacustrine portions of marine sediment cores retrieved from these submerged lakes are also being analysed. This research provides the first detailed record of the vegetation growing on the shelf and will help elucidate the development of the coastal rainforest. In addition to the nature, composition and extent of the vegetation, the paleoecological reconstructions also document evidence of potential food plants and other plant resources available to early migrating humans.

Terri's senior supervisor is Dr. Rolf Mathewes, and co-supervisors include Dr. John Clague and Dr. Ian Walker.

On the Shelf

RECENT PUBLICATIONS BY CANADIAN AND OTHER PALYNOLOGISTS – 18

(CAP Members are denoted by *)

Carcaillet C, H Almquist, *H Asnong, RHW Bradshaw, JS Carrin, *K Gajewski, *JN Haas, SG Haberle, P Hadorn, BV Odgaard, *PJH Richard, I Richoz, MF Sanchez Goi, H von Steding, AC Stevenson, B Talon, C Tardy, W Tinner, E Tryterud, L Wick, and KJ Willis. 2002. Holocene fires and global dynamic of carbon-cycle. *Chemosphere* 49: 845-863.

*Gajewski, K, A-M Lezine, A Vincens, A Delestan, M Sawada & APD members. 2002. Climate-vegetation-pollen relations in Africa and adjacent areas. *Quaternary Science Reviews* 21: 1611-1631.

*Gajewski, K. 2002. Modern pollen deposition in lake sediments from the Canadian Arctic. *Arctic, Antarctic and Alpine Research* 34:26-32.

*Head, MJ and *AB Beaudoin (eds.). 2002. New frontiers and applications in palynology and micropaleontology: a Canadian perspective. Special issue of *Palaeogeography, Palaeoclimatology, Palaeoecology* 180(1-3): i + 1-251.

Michelutti, N, MSV Douglas, DCG Muir, X Wang, and *JP Smol, J.P. 2002. Limnological characteristics of 38 lakes and ponds on Axel Heiberg Island, High Arctic Canada. *International Review of Hydrobiology* 87(4): 385-399.

Paterson, AM., *BF Cumming, SS Dixit and *JP Smol. 2002. The importance of model choice on pH inferences from scaled chrysophte assemblages in North America. *Journal of Paleolimnology* 27(3): 397-391

*Pellatt, MG, *RW Mathewes, and JJ Clague. 2002. Implications of a late-glacial pollen record for the glacial and climatic history of the Fraser Lowland, British Columbia. *Palaeogeography, Palaeoclimatology, Palaeoecology* 180(1-3): 147-157.

Ponadar, K, R Pienitz, W Vincent and *K Gajewski. 2002. Limnological conditions in a subarctic lake (northern Qubec, Canada) during the late Holocene: analyses based on fossil diatoms. *Journal of Paleolimnology* 27: 353-366.

Pospelova, V and *MJ Head. 2002. *Islandinium brevispinosum sp. nov.* (Dinoflagellata), a new organic-walled dinoflagellate cyst from modern estuarine sediments of New England (USA). *Journal of Phycology* 38: 593-601.

Ruhland, KM and *JP Smol. 2002. Freshwater diatoms from the Canadian arctic treeline and development of paleolimnological inference models. *Journal of Phycology* 38(2): 249-264.

* Smol, JP. 2002. *Pollution of Lakes and Rivers: A Paleoenvironmental Perspective*. Arnold Publishers, London; Co-published by Oxford University Press, New York. 280 pp.

Viau, A, *K Gajewski, P Fines, D Atkinson and M Sawada. 2002. Terrestrial evidence for a 1500-yr cycle in Holocene climates. *Geology* 30: 455-458.

Viau, AE, *K Gajewski, P Fines, DE Atkinson, and MC Sawada. 2002. Widespread evidence of 1500 yr climate variability in North America during the past 14000 years. *Geology* 30(5): 455–458.

Wilson, S and *K Gajewski. 2002. Surface sediment diatom assemblages and water chemistry from 42 subarctic lakes in the southwestern Yukon and northern British Columbia, Canada. *Ecoscience* 9: 256-270.

*Yu, Z and U Eicher. 2001. Three Amphi-Atlantic century-scale cold events during the Bolling-Allerød warm period. Géographie physique et Quaternaire 55(2): 171-179.

New Books

Pollution of Lakes and Rivers: A Paleoenvironmental Perspective

Smol, J.P. 2002. Co-published by Oxford University Press, New York. 280 pp. Glossary, Index. Paperback ISBN: 0 340 69167 0; Hardcover ISBN: 0 340 74146 5

Summary

Water is essential to life, yet the pollution of lakes and rivers has become an international problem that has reached crisis proportions in many regions. As our demands on aquatic resources escalate, we must find new approaches to meet the challenges of the coming decades. One of the most pressing problems to effective management is the lack of long-term monitoring data. This book shows how paleolimnological approaches can be used to interpret the physical, chemical, and biological information stored in lake and river sediments, and to reconstruct past environmental conditions. Such data are required to assess the trajectories of environmental degradation and recovery, set realistic mitigation goals, and evaluate models.

Pollution of Lakes and Rivers addresses many of the current-day water quality problems from an international perspective, covering critical issues such as acidification, eutrophication, land-use changes, pollution by metals and other contaminants, introduction of exotic species, and biodiversity losses.

The field of paleolimnology has been rapidly evolving, with new applications and approaches being developed at a frenetic pace. This up-to-date volume provides wide-ranging insights into the multi-disciplinary science of paleolimnology that can help us address many of the most pressing environmental problems of modern times.

- First textbook dedicated to paleolimnology, focusing on water quality issues
- Includes comprehensive overviews of the myriad approaches and techniques used by paleolimnologists to track environmental change
- Fully illustrated throughout, with original drawings
- Addresses critical water quality issues that are high on international political, social and scientific agendas

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ORDERING INFORMATION

The *Arnold Publishers* website at: http://www.arnoldpublishers.com has the paperback listed (July 2002) at £19.99
http://www.arnoldpublishers.com/Scripts/webbook.asp?isbn=0340691670
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New Book Series: Developments in Paleoenvironmental Research

Kluwer Academic Publishers has begun a new monograph series: Developments in Paleoenvironmental Research (DPER) with John P. Smol and William M. Last as series editors.

Aims & Scope of DPER Series

Paleoenvironmental research continues to enjoy tremendous interest and progress in the scientific community. The overall aims and scope of the *Developments in Paleoenvironmental Research* book series is to capture this excitement and document these developments. Volumes related to any aspect of paleoenvironmental research, encompassing any time period, are within the scope of the series. For example, relevant topics include studies focused on terrestrial, peatland, lacustrine, riverine, estuarine, and marine systems, ice cores, cave deposits, palynology, isotopes, geochemistry, sedimentology, paleontology, etc. Methodological and taxonomic volumes relevant to paleoenvironmental research are also encouraged. The series will include edited volumes on a particular subject, geographic region, or time period, conference and workshop proceedings, as well as monographs. Prospective authors and/or editors should consult the series editors for more details. The series editors also welcome any comments or suggestions for future volumes.

The first 4 volumes of this new series, all dealing with methodology/techniques in paleolimnological and related research, are now available. The titles of the completed volumes are:

Last, W.M. and Smol, J.P. [Editors]. 2001. Tracking Environmental Change Using Lake Sediments. Volume 1: Basin Analysis, Coring, and Chronological Techniques. Kluwer Academic Publishers, Dordrecht. 548 pp. ISBN 0-7923-6482-1. $110.00 US

Last, W.M. and Smol, J.P. [Editors]. 2001. Tracking Environmental Change Using Lake Sediments. Volume 2: Physical and Geochemical Methods. Kluwer Academic Publishers, Dordrecht. 504 pp. ISBN 1-4020-0628-4. $120.00 US

Smol, J.P. Birks, H.J.B., and Last, W.M. [Editors]. 2001. Tracking Environmental Change Using Lake Sediments. Volume 3: Terrestrial, Algal, and Siliceous Indicators. Kluwer Academic Publishers, Dordrecht. 371 pp. ISBN 1-4020-0681-0. $87.00 US

Smol, J.P. Birks, H.J.B., and Last, W.M. [Editors]. 2001. Tracking Environmental Change Using Lake Sediments. Volume 4: Zoological Indicators. Kluwer Academic Publishers, Dordrecht. 217 pp. ISBN 1-4020-0658-6. $63.00 US.

The DPER web page at:
http://home.cc.umanitoba.ca/~mlast/paleolim/dper.html
provides detailed Tables of Contents for each volume (as well as other information about the DPER series).
For further information, please contact the series co-editors:

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Woody-Plant Seed Manual

Originally issued in 1948, "Woody-Plant Seed Manual" (Miscellaneous Publication No. 654 of the U.S. Department of Agriculture) was the first comprehensive handbook on the seeds of trees and shrubs in the U.S. The manual was developed in response to a need for reliable information, based on field practices and laboratory tests, to guide early reforestation efforts. It has just been brought back into print by The Blackburn Press, making it available to libraries, archaeologists, foresters, horticulturists, nurserymen and others who would like to own or replace a copy of a classic work in the field. The manual consists of two main parts. Part 1 formulates general principles on the various phases of seed handling from formation of the seed to sowing. Part 2, which forms the larger part of the manual, provides relatively detailed but concise information for 444 species and varieties of trees and shrubs; this includes data on distribution and use, discussions of seeding habits, methods of seed collection, extraction and storage, seed germination, and nursery and field practice. The handbook is richly illustrated with black and white drawings and photographs.
For more information, please see:
http://www.blackburnpress.com/woodplanseed.html or
http://www.amazon.com/exec/obidos/tg/detail/-/1930665636/qid=1038938151/sr=1-2/ref=sr_1_2/102-8138791-6065716?v=glance&s=books

Andrea Herbert
The Blackburn Press
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AASP Foundation
Palynology: Principles and Applications

Edited by Jan Jansonius and Colin McGregor. Reprinted 2002 (soft cover, perfect binding)

32 major chapters; 1330 pages, 125 photographic plates, 8 in color.

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New AASP Foundation Publication

Proceedings of the 9th International Palynological Congress

Edited by David K. Goodman and Robert T. Clark

The Ninth International Palynological Congress was held in Houston, Texas, June 23–28, 1996 and was attended by approximately 415 palynologists from around the world. Participants were able to select from 421 oral papers and 141 posters and attend the topics of their choice during the five days of technical sessions. This volume contains 65 articles, which represent slightly more than 10% of the papers presented. The program was divided into 30 symposia and topical sessions, and this proceedings volume certainly reflects the diversity, if perhaps not the sheer volume, of subject matter presented and discussed during the Congress.

The field of palynology spans an incredibly wide and diverse variety of technical disciplines and scientific applications, from melissopalynology and forensic palynology in the modern world to the deliniation of paleoclimates and the reconstruction of fossil floras in early geologic time. We trust that the variety of papers contained in this volume provides an accurate measure of the impact that palynology has made in the past, as well as an indication of its expanding role in the future.

The 65 articles in this proceedings volume are divided into five sections: the Paleozoic and Mesozoic Sections each have ten articles and are 130 and 100 pages in length, respectively, the Tertiary Section has nine articles covering 85 pages, the section on Quaternary/Pleistocene palynology contains 13 articles and 130 pages, and the final 167 pages contain 23 articles dealing with Recent palynology. Published 2001.

The format is 8 1/2 x 11, hard bound, 618 pages, with numerous photographs and text-figures.

Orders for AASP publications should be sent to: Vaughn M. Bryant, Jr., Secretary AASP Foundation, c/o Palynology Laboratory, Department of Anthropology (TAMU 4352), Texas A&M University, College Station, Texas 77843-4352. (Telephone: 979-845-5255; fax: 979-845-4070; e-mail: vbryant@neo.tamu.edu). Payment should be in U.S. currency, checks drawn on a U.S. bank, and made payable to: AASP Foundation. Payment may also be made with VISA, AMERICAN EXPRESS, or MASTERCARD. Price for the *Palynology: Principles and* Applications is $100 USD per copy, postage included. Price for the *Proceedingsl* is $90.00 USD per copy, postage included.

Soils of the Past: An Introduction to Paleopedology - 2nd Edition

Greg J. Retallack

It is 10 years since publication of the first edition of soils of the past. In that time the subject of paleopedology has grown rapidly, and established itself within the mainstream of geological research. Ancient soils contain vital mineralogical, geochemical, textural, and paleontological information about the continental environments in which they formed. Advances in isotope geochemistry and sequence-stratigraphic models allow ever more detailed reconstructions of environmental change from paleosols, and new insights into such diverse topics as atmospheric chemistry, global change, palaeoecology, geobiology and mass extinction.

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Forests in Peril: Tracking Deciduous Trees from Ice-Age Refuges into the Greenhouse

Hazel R. Delcourt

Published by McDonald & Woodward Publishing Co.

This review of the history and future prospects of the broadleaf deciduous forest of eastern North America will be of interest to biogeographers, Quaternary paleoecologists, archeologists, botanists, forest historians, conservation biologists, environmental educators, and students of the greenhouse world. A description of this book, notes about the author, and 7 sample pages may be viewed at http://www.mwpubco.com/forests.htm.

Atlas of pollen and spores of the Polish Neogene, Volume 1: Spores

With the first volume we are beginning the edition of an Atlas of pollen and spores of the Polish Neogene, which will be published in four volumes: 1: Spores; 2: Gymnosperms; 3: Angiosperms I and 4: Angiosperms II. The four volumes will be published between 2001 and 2006 with the approximate dates of publication for Volumes 1 and 2 in 2001; Volume 3 in 2003/4 and Volume 4 in 2005/6. The main goal of this series is to present a synthesis of palynological studies from the Polish Neogene carried out during the last 50 years. During this time more than 300 pollen floras have been studied. Many of the results have been published in Polish and international scientific periodicals; many others remain in the archives of Polish geological institutions, mainly in the Polish Geological Institute in Warsaw, the Geological Department of Warsaw University, Museum of the Earth, Polish Academy of Sciences in Warsaw, the Institute of Geological Sciences of Wrocaw University, and the Wadysaw Szafer Institute of Botany, Polish Academy of Sciences in Krakaw. Most of the existing archival materials stored in these institutions have been studied and revised for this

synthesis, and many previously unpublished original photographic materials have been used for the purposes of this contribution. Our intention is to give a complete overview of all identified pollen and spore taxa from the Neogene sediments of Poland. We hope, that this contribution will be of a great value for scientists dealing with stratigraphy and palaeobotany of European Neogene, as well as for the students studying palaeobotany, palaeoecology and palaeophytogeography.

Volume 1: SPORES ISBN: 83-85444-73-4
Publisher: W. Szafer Institute of Botany, Polish Academy of Sciences, Lubicz, 46, PL-31-512 Cracow, Poland or by e-mail to ed-office@ib-pan.krakow.pl

Announcements

Journal of Paleolimnology - Special Individual Subscription Rates for 2003

We are happy to report that Kluwer Academic Publishers is once again offering a special personal subscription rate to the *Journal of Paleolimnology* (JOPL). The special rate for 2003 (which includes volumes 29 and 30, of 4 issues each), is again $140.00 US (including postage). If you would like to take advantage of this special rate (2 volumes, 8 issues in total, including special issues), please follow the instructions at:
http://www.kluweronline.com/issn/0921-2728
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The *Journal of Paleolimnology* is an international journal, which publishes papers dealing with all aspects of paleolimnological research. JOPL will be publishing its 100th issue this January 2003.

Memorial University Post-Doctoral Research Opportunity

As a part of a regional petroleum geology initiative by a consortium of Atlantic Canada universities <http://sparky2.esd.mun.ca/>, the Palynology Laboratory at Memorial University of Newfoundland has a Post Doctoral research position available for a recent Ph. D graduate for as early as January 2003. Applicants should be familiar with fluorescence analysis of fossil material as pioneered by van Gijzel and others. Candidates should be comfortable with independently designing and conducting experiments leading towards commercialization of applied fluorescence microscopy in palynology. Mechanical skills in the assembly and calibration of a high end fluorescence microscope and peripheral software are an asset.

Memorial University hosts one of the largest and most modern Earth Sciences departments in Canada. Significant research capacity lies in mineral geology and ore deposit research, environmental geology, and in hydrocarbon exploration and production. The palynology laboratory has 7 fume hoods for research and for commercial applications. Past projects by students and faculty cover nearly all aspects of palynology from the Proterozoic to Recent. Their one common element lies in developing and promoting applications for palynology in Earth and Environmental sciences.

For additional information on this project and for submitting your letter of application, CV, and references, please contact Dr. Elliott Burden, Department of Earth Sciences, Memorial University, St John's, Newfoundland, Canada A1B 3X5. E-mail: etburden@mun.ca

Calcium Gluconate Gel

Laboratory safety while working with hydrofluoric acid. Available from
Attard's Minerals, San Diego, California. Phone 619 275-2016.
E-mail attard@attminerals.com A 30 g tube is $28 and a 60 g tube is $46.

Short Courses in Environmental Palaeoecology

For MSc and PhD students, available in 2003
Details of all of these courses, as well as on-line registration can be found on our website:
http://www.geog.ucl.ac.uk/ecrc/teaching.stm

OSTRACOD ANALYSIS
(Dr. J.A. Holmes & D. Horne, University of Greenwich)
20th-24th January 2003 Course Tuition Fee: 330 GBP

INTRODUCTION TO PALAEOCEANOGRAPHY
(Dr. M. Maslin & Dr. A. Ridgewell)
27th - 31st January 2003 Course Tuition Fee: 330 GBP

CHIRONOMIDS: WATER QUALITY AND CLIMATE CHANGE
(S.J. Brooks, Natural History Museum & Dr. L. Ruse, Environment Agency)
3rd - 7th February 2003 Course Tuition Fee: 330 GBP

INTRODUCTION TO DIATOM ANALYSIS
(Dr. V.J. Jones & Prof. R.W. Battarbee)
10th - 14th February 2003 Course Tuition Fee: 330 GBP

INTRODUCTION TO BENTHIC FORAMINIFERA ANALYSIS
(Dr. M. Kaminski, Geological Sciences, UCL)
24th - 28th February 2003 Course Tuition Fee: 330 GBP

NUMERICAL ANALYSIS OF BIOLOGICAL & ENVIRONMENTAL DATA
(Prof. H.J.B. Birks & Dr. M. Kernan)
3rd - 14th March 2003 Course Tuition Fee: 700 GBP

STABLE ISOTOPES IN THE LACUSTRINE & MARINE ENVIRONMENT
(Dr. M. Leng, NERC Keyworth & Dr. M. Maslin)
17th - 21st March 2003 Course Tuition Fee: 330 GBP + Keyworth Visit Costs

For more information please contact
Helene Coleman
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Palynobytes

AQQUA

Please update your bookmarks. The AQQUA site has been moved to the GSC-Québec server effective now. The address is http://cgcq.rncan.gc.ca/aqqua/ . A warm thank you to Pierre Bédard for maintaining the site at UQAM. You are all welcomed to visit the site regularly to enjoy updates as they come.
Andrée M. Bolduc, PhD
Secrétaire-trésorière de l'AQQUA
Commission géologique du Canada - Québec
880 Ch. Sainte-Foy, bureau 840
Québec, Qc, G1S 2L2
tél.:418-654-2635, téléc.:418-654-2615
abolduc@nrcan.gc.ca
http://cgcq.rncan.gc.ca/aqqua/

MICROSCOPY PRIMER

An online microscopy primer is available at www.microscopy-uk.org.uk/primer/ Although the text is obviously aimed at microscopy in general, particular reference is made to diatoms. The website has the option of downloading the complete text and illustrations as a zip file, which after extraction with a suitable unzip programme will run from its own separate folder in your computer. The text of the 8 chapters is about 260 k, the 55 jpeg illustrations take about 1.8 Mb, the zip file is about 1.3 Mb. Feel free to run or print it for instructional purposes and I hope you'll find it useful. If you have any technical glitches to report, please contact Dave Walker at micscape@ntlworld.com . Comments on contents should be sent to Frithjob A.S.; Sterrenburg at fass@wxs.nl .

MICROPALEONTOLOGY

A new Web-site has been produced at University College London as a teaching and learning resource in the field of micropalaeontology. The site was developed for undergraduates and postgraduate students in particular but also for professional stratigraphers and palynologists. The URL is http://www.micropal.ucl.ac.uk

Matthew Olney
MIRACLE Project
Department of Geological Sciences, University College London, UK

PALANTH

We are very pleased to announce the arrival on the Web of a new scientific journal called PALANTH - International Journal of Palaeoanthropology, and in so doing, to come up with our first, preliminary call-for-papers.

Clicking on http://www.palanth.com/preview/ will give you access to a poster-like presentation of what the Journal is all about in terms of its goals and purposes, its scope and structure, and its original presentation and design. In addition, you will note that we have made available a downloadable (PDF) version of the poster that, should wish to turn it into a colour or black & white brochure, can be passed around to colleagues, students and other interested parties. As indicated in the poster, the regular (quarterly) publication schedule (to begin early in the year 2003) will be preceded by an Inaugural Issue -- a demonstration if you will of the Journal's overall demarche or approach -- that will be freely accessible to all individuals interested in palaeoanthropological international discourse and ongoing developments. This issue will online by mid December 2002.

You will also note that the only means of subscription presently available through the poster (PDF subscription form) is by regular mail. An electronic version that will allow credit card payments is now undergoing tests and will soon be circulated. Finally, we should mention that if, for one reason or another, you cannot gain access to the online poster, you will be able obtain a copy of it (as a PDF or as text file) by sending your request to: info@palanth.com or jacques.cinqmars@sympatico.ca

PALANTH - Editorial Committee.
Margherita Mussi, Raymond Le Blanc, Nicolas Rolland, Greg Laden, Ken Antanaitis-Jacobs, and Jacques Cinq-Mars.

ALASKA PaleoGlacier ATLAS

A new geospatial dataset, the Alaska PaleoGlacier Atlas, is now available online at http://instaar.colorado.edu/QGISL/ak_paleoglacier_atlas

The APG Atlas is a GIS-based summary of Pleistocene glaciation across Alaska. Visit the website to view statewide and regional maps depicting the extent of glaciers during the late Wisconsin glaciation (i.e. the Last Glacial Maximum, about 20,000 years ago), as well as the maximum extent reached during the last 3 million years by valley glaciers, ice caps, and the northwestern Cordilleran Ice Sheet. Deposition and erosion by glaciers in the recent geologic past have greatly influenced Alaska's landscapes and ecosystems.

Feel free to download print- and screen-resolution versions of featured maps. Also available are shapefiles and coverages for use in Geographic Information Systems (GIS).

A broadly collaborative effort, the atlas combines glacial-geologic information from 26 publications and 42 source maps, including previously unpublished mapping. Further contributions are encouraged, and the atlas will be periodically updated. Our goal is a comprehensive and consistent overview of former glacier limits across Alaska. Our hope is to facilitate outreach, education, and interdisciplinary research in the fields of geology, geography, biology, archeology, and natural history.

William Manley (University of Colorado; William.Manley@colorado.edu)
Darrell Kaufman (Northern Arizona University; Darrell.Kaufman@nau.edu)
With contributions from: T.A. Ager, Y. Axford, N. Balascio, J.E. Beget, J.P. Briner, P. Carrara, T.D. Hamilton, D.J. Lubinski, R.D. Reger, H.R. Schmoll, R.M. Thorson, C.F. Waythomas, F.R. Weber, A. Werner, and F.H. Wilson.

Conferences, Special Sessions, and Calls for Papers

EARLY / MIDDLE PLEISTOCENE TRANSITIONS: THE LAND-OCEAN EVIDENCE

A one-day international conference at the University of Cambridge, April 4th, 2003. Sponsored by: the Godwin Institute for Quaternary Research, INQUA Commission on Stratigraphy, The Quaternary Research Association, and the INQUA Subcommission on European Quaternary Stratigraphy

The transition from Early to Middle Pleistocene is marked by fundamental changes in Earth's climatic cyclicity. Orbital obliquity at 41 ka cycles which had dominated the earlier part of the Pleistocene was superceded progressively about a million years ago by a 100 ka rhythm of orbital eccentricity, crucially accompanied by increased-amplitude climatic oscillations. The glacial-interglacial world in which we now live is the result of these changes, and the impact on terrestrial and marine biota has been profound and manifold. However, the timing and correlation of events during this transition has been problematic, leading to uncertainties over cause and effect. The purpose of this one-day meeting is to explore the biotic responses to climatic and physical changes that characterized the Early / Middle Pleistocene transition in both the marine and terrestrial realms. In doing so we hope to explore the very origins of our present biota.

This first announcement invites expressions of interest in this meeting. In addition to invited presentations, limited time will be allocated to oral contributions from others, and there will be space for posters. Those wishing to present their research, either as a poster or talk, are asked to contact Martin Head (mh300@cam.ac.uk) with a provisional title in the first instance.

It is intended that the proceedings of the meeting will be included in a special published volume.

Limited accommodation in Cambridge will be provided for those who require it.

Martin J. Head and Philip L. Gibbard
Godwin Institute for Quaternary Research
Department of Geography
University of Cambridge
Downing Place, Cambridge CB2 3EN
ENGLAND, U.K.
Email: mh300@cam.ac.uk

SPECIAL SESSIONS AT THE INTERNATIONAL LIMNOGEOLOGY CONGRESS

March-April 2003
ILIC website
http://w3.arizona.edu/~uaextend/ilic3/

Holocene Catastrophic Events Recorded in Lakes

Organizers: Daniel Ariztegui and Suzanne Leroy
Abstract submission deadline is January 2, 2003.
Please contact Prof. Suzanne A. G. Leroy, Department of Geography and Earth Sciences, Brunel University, Uxbridge, Middlesex UB8 3PH, (West London), UK.
suzanne.leroy@brunel.ac.uk,
http://www.brunel.ac.uk/depts/geo/people

Limnological Evidence and Impacts of Rapid Climate Change during the Last Glacial-Interglacial Transition

Organizers: Glen MacDonald and Katrina Moser. The late glacial and early Holocene is a period punctuated by periods of rapid climate change, such as the Younger Dryas and 8.2 K yr events. It is planned that this session will bring together participants who use a variety of paleolimnological techniques and who are working in many different regions of the world in order to examine the spatial distribution, the signature (magnitude and character of change) and the synchroneity or asynchroneity of these events. Combining these findings with our understanding of modern climate systems it is further planned that this session will provide opportunities to discuss teleconnections between atmospheric and oceanic circulation that could result in the distribution and character of these climate episodes. The abstract deadline is Jan. 2, 2003. If you are interested in attending contact either Katrina Moser - katrina.moser@geog.utah.edu or Glen MacDonald - macdonal@geog.ucla.edu

SPECIAL SESSIONS AT INQUA
Reno, Nevada
July 2003
http://inqua2003.dri.edu

Poster Session: Developments in pollen calibration and quantitative reconstruction of past vegetation cover

Convenors: Marie-Jose Gaillard (marie-jose.gaillard-lemdahl@ibp.vxu.se) and Sheila Hicks (Sheila.hicks@oulu.fi)

This poster session, which is instigated jointly by the INQUA Holocene Work Group "Pollen Monitoring Programme" (PMP) and the NorFA Network "Pollen Landscape Calibration (POLLANDCAL)", welcomes contributions on all aspects of pollen calibration and their application to quantitative reconstructions of past natural or human-induced vegetation cover, particularly those at a high temporal, spatial and ecological resolution. The rationale behind the session can be summarized as follows: Pollen based reconstructions are widely used in studies of Holocene vegetation development, global climate change and land-use history. There is a real need, however, to quantify various vegetation/landscape and climate parameters in the past, both spatially and temporally, in order to provide a solid ground for the understanding of past environmental processes. Investigations on the pollen/vegetation and pollen/climate relationship (using both pollen percentages and pollen influx values), the use and development of models of pollen dispersal and deposition, and various simulation approaches are ways to further our quantification tools. We envisage that the session will attract an exciting mix of pollen analysts who are exploring different approaches to quantified pollen data interpretation, and that it will show new potentials and encourage new areas of collaboration. All the signs so far seem to indicate that the XVIth INQUA Congress will be a really interesting and well attended meeting. We personally hope that there will also be a strong representation of younger researchers and doctoral students and we will certainly be delighted to have work from such groups included in this poster session.

Poster session: Quaternary Paleolakes: Their utility in paleohydrologic, paleoclimatic, tectonic, and biogeographic studies

Convenors: Ken Adams (kadams@dri.edu) and Marith Reheis

Records contained within Quaternary lake basins throughout the world have long been utilized to interpret changes in hydrology, climate, and landscape stability. These records have also been used to assess tectonic deformation and to probe deeper Earth processes, as well as to delineate past hydrologic connections based on the distribution of aquatic pecies. T goal of this session is to bring together scientists conducting research on all aspects of Quaternary paleolake basins to exchange new ideas and information gleaned from these important continental archives.

Symposium "New Developments in Quaternary Numeric Dating Methods"

Conveners: Glenn W. Berger (Desert Research Institute, USA, gwberger@dri.edu);

Rainer Grun (Australian National University, Australia, rainer.grun@anu.edu.au);

Marek Zreda (University of Arizona, USA, marek@hwr.arizona@dri.edu).

Invitation: We invite active researchers to submit pre-abstracts of proposed presentations directly related to the Symposium on New Developments in Quaternary Numeric Dating Methods. In addition to invited oral keynote presentations, there will be a limited number of volunteered oral slots (15+5 minutes duration each). The remainder of presentations will be included in the poster component of this Symposium. Interested colleagues should send the following information directly to Glenn Berger (gwberger@dri.edu):

1)--Presentation Title;
2)--Author(s) names and affiliations;
3)--Preference for Oral, Poster or No-preference presentation;
4)--Brief (one paragraph) summary of the main points that will be covered.

Deadline for this "pre-abstract" is 1st January 2003. Authors of accepted poster/oral presentations will be asked to submit full abstracts via the INQUA website. On-line, full-abstract deadline is 31st March.2003.

Topic: Chronometric dating of Quaternary terrestrial deposits is essential for validation of indirectly determined, relative chronologies. Dating of Quaternary deposits requires chronometers with unique capabilities, not only because of the "short" (geologically) time scale, but also because most of the archival records of the Quaternary occur in unheated, soft sediments, often containing large quantities of reworked material. The demands of varied time scales and deposits confound any single Quaternary geochronometer for all useful deposits. Quaternary scientists now have access to a larger variety of geochronometers than ever before. What are the

newest dating techniques, approaches, calibrations, applications, and understandings thereof? We invite abstracts across the spectrum of earth science applications that use, integrate or establish the potential for accurate dating, of any of the following techniques: U-series, 40Ar/39Ar, 14C, in-situ cosmogenic radionuclides (14C, 10Be, 26Al, 36Cl, 3He, 21Ne), fission-track, luminescence, electron-spin-resonance, and (U-Th)/He thermochronology.

Oral and poster symposium: "Fire, climate, and vegetation change in the Holocene"

Convenors: Cathy Whitlock and Christopher Carcaillet
Topic: We think that this symposium will be of wide interest to the paleoclimate and paleoecological communities, because fire is the most ecologically important climate-linked disturbance in terrestrial ecosystems, from grasslands to shrublands and woodlands to forests. The objective of the symposium is to present recent research that: (1) addresses the relationship between climate change and fire and ecosystem response on interannual to orbital time scales; (2) considers high-resolution fire records in different regions and the relative influence of climate and humans in prehistoric fire regimes; and (3) uses modeling strategies and data/model comparisons to examine fire regimes in the past and the future.
For further information contact
Cathy Whitlock
University of Oregon
whitlock@oregon.uoregon.edu
Christopher Carcaillet
CNRS-Univ. Montpellier
carcaillet@univ-montp2.fr

Environmental catastrophies and recovery in the Holocene

Convenors: Suzanne Leroy (Suzanne.Leroy@brunel.ac.uk), Iain Stewart (iain.stewart@brunel.ac.uk), Holocene Commission, Neotectonics Commission, Commission on Sea-Level Changes and Coastal Evolution

NATO Advanced Research Workshop on 'Dying and dead seas' and the 35th International Liege Colloquium on Ocean Hydrodynamics 5-10 May 2003.

Conference contact: Damien Sirjacobs
(d.sirjacobs@student.ulg.ac.be)
http://modb.oce.ulg.ac.be/natoarw/
Special session: Holocene palaeolimnology of abrupt lake level changes , salinisation, eutrophication and other catastrophes
Convenor: Suzanne Leroy
(suzanne.leroy@brunel.ac.uk).

32nd International Geological Congress

Florence, Italy,in 20-28 Aug. 2004.
http://www.32igc.org/plug-in.htm
Topical Symposium T13 : Geosciences for Cultural Heritage, session T13.4 : Geoarchaeology for climatic change and catastrophic events in human history. Convenor: Suzanne Leroy
(suzanne.leroy@brunel.ac.uk)

Meeting Calendar 2003

January 4 - 8 2003. **Inaugural meeting of the International Biogeography Society** Mesquite, Nevada, USA. Website: http://www.biogeography.org

March 29 - April 2 2003. **3rd International Limnogeology Congress** Tucson, Arizona, U.S.A. Theme session proposals to Andrew Cohen, General Chair of the Congress (acohen@geo.arizona.edu). Field trip proposals to David Dettman, field trip coordinator for the Congress (dettman@geo.arizona.edu). Note that all conference business, circulars and details will be posted through the website only. Website: http://w3.arizona.edu/~uaextend/ilic3/

May 27 - June 1 2003. **52nd Annual Meeting of The Canadian Association of Geographers / l'Association canadienne des géographes** Victoria, British Columbia, Canada. Details: cag2003@mail.geog.uvic.ca Website: http://www.geog.uvic.ca/cag2003acg/

May 25-29 2003. **GAC/MAC Meeting** Vancouver, British Columbia, Canada

June 8 - 11 2003. **CANQUA Meeting** Halifax, Nova Scotia, Canada. Details: Ralph Stea, E-mail: rrstea@gov.ns.ca Website: http://www.gov.ns.ca/natr/meb/canqua/Canqua.htm

June 8 - 10 2003. **3rd Canadian Conference on Geotechnique and Natural Hazards** Edmonton, Alberta, Canada. Website: http://www.geohazards2003.eba.ca

July 23 - 31 2003. **INQUA XVI Congress** Reno, Nevada, USA. Theme: "Shaping the Earth: A Quaternary Perspective" Website: http://www.dri.edu/DEES/INQUA2003/inqua_home.htm

August 2003. **9th International Paleolimnology Symposium** Helsinki, Finland. Website: http://www.gsf.fi/9th_paleolimnology/

September 1 - 5 2003. **18th International Radiocarbon Conference** Wellington, New Zealand. Details: 18th International Radiocarbon Conference, Rafter Research Centre, PO Box 31 312, Lower Hutt, New Zealand. E-mail: 14Conf-info@gns.cri.nz Website: http://www.14Conference2003.co.nz

October 5 - 8 2003. **Joint AASP-CAP-NAMS Meeting** St Catharines, Ontario, Canada. Details: Francine McCarthy (francine@craton.geol.brocku.ca) or Kevin Gostlin (gostlin@geology.utoronto.ca)

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

2004

Date: TBA. **GAC/MAC Meeting** St Catharines, Ontario, Canada

July 4 - 9 2004. **XI IPC (International Palynological Congress)** Granada, Spain Website: http://www.ugr.es/~bioveg/ingles.htm

August 20 - 28 2004. **32nd International Geological Congress** Florence, Italy. Theme: "From the Mediterranean Toward a Global Renaissance - Geology, Natural Hazards and Cultural Heritage". Details: Ms Chiara Manetti, Università degli Studi di Firenze, Dipartimento di Scienze della Terra, Via La Pira, 4, 50121 Firenze, Italy, Tel:/Fax: 055-2382146, E-mail: cmanetti@geo.unifi.it Website: http://www.32igc.org

2005

Date: TBA. **GAC/MAC Meeting** Halifax, Nova Scotia, Canada

Have you renewed your CAP membership for 2003?
See list on p. 3!