



# PALYNOS

Volume 22, No. 1 - June 1999

NEWSLETTER of the INTERNATIONAL FEDERATION of PALYNOLOGICAL SOCIETIES

## MEETING PROCEEDINGS

### THE SPANISH-SPEAKING SOCIETY OF PALYNOLOGISTS (APLE)

The XII Symposium on Palynology was held in the city of León from September 29 to October 2, 1998 and was organized by the Department of Plant Biology of the University of León (Spain). I am pleased to say that the conference was a great success due initially to the highly competent organization of Dr. M. Amor Fombella Blanco, Dr. Delia Fernández González and Dr. Rosa M. Valencia Barrera. Success was also due to the financial support afforded by the University of León and various local and national institutions and chemical laboratories. Finally, of course, we express our gratitude to the enormous and enthusiastic attendance of the members and guests.

Some 130 contributions were made on subjects ranging from Palaeopalynology, Mellisopalynology, Aeropalynology, and Actuopalynology to Pollen Biology.

There were three plenary lectures:

"A comprehensive palynozonation of the Devonian-Carboniferous of the Gulf region, the Middle East and North Africa", given by Professor B. Owens of the British Geological Survey, Nottingham, and Centre for Palynology, University of Sheffield, U.K.

"Comment apprécier les données paléobotaniques, morphologiques et moléculaires actuelles relatives l'origine des Angiospermes", given by Professor A. Le Thomas of the Laboratoire de Phytomorphologie E.P.H.E. Muséum National d'Histoire Naturelle, Paris, France.

"Reprogración del polen a embriogénesis inducida mediante estrógenos", given by Dr. C. Risueño of the Laboratorio de Organización Nuclear Durante el Desarrollo en Plantas. Centro de Investigaciones Biológicas, CSIC, Madrid, Spain.

In addition to the Symposium, a general assembly was held on 1 October 1998, during which, among other matters, the new council was voted into office. The members of the incoming council are:

President:

Dr. M. Suárez-Cervera,  
[suarez@farmacia.far.ub.es](mailto:suarez@farmacia.far.ub.es)

Secretary:

Dr. M. Valle Hernández,  
[maruja@gugu.usal.es](mailto:maruja@gugu.usal.es)

Treasurer:

Dr. D. Fernández Gómez,  
[dbvdfg@unileon.es](mailto:dbvdfg@unileon.es)

Members:

Dr. A.T. Romero,  
[atromero@goliat.ugr.es](mailto:atromero@goliat.ugr.es)  
Dr. C. Díaz de la Guardia,  
[cdiaz@goliat.ugr.es](mailto:cdiaz@goliat.ugr.es)  
Dr. S. Moreno Geau,  
[stella@plc.um.es](mailto:stella@plc.um.es)

It was also decided that we would hold the XIII Symposium of the society in Cartagena (Murcia) in the year 2000. On behalf of the organizers of this XIII APLE symposium I take this opportunity to invite and encourage your attendance. I am sure you will enjoy both the content of the conference and the city where it is to be held.

The city of Cartagena is in the southeast of Spain. It was founded by the Carthaginian general Hasdrubal in 227 B.C. but shortly afterwards in 209 BC .it was overrun by Scipio's Roman forces. Since then the city's wealth from mining and its strategic geographical situation have made it the focus of attention of numerous other cultures. Thus, in 565 A.D. the Byzantine troops of the Emperor Justinian conquered the city and turned it into the provincial capital of Spain until it fell to the invading Moors in 734. It remained part of the Arab domains in Spain until 1254, when once again it was besieged and taken, this time by the Castillian king who was later to be known as Alfonso X, El Sabio (Alphonse the Wise). In the 18th century it became the capital of the Mediterranean Maritime Department of Spain and, at the same time, it became home to the Royal Arsenal.

Visitors to Cartagena will find a wealth of archaeological treasures preserved in its museums, monuments and many lesser buildings that represent a wide diversity of cultures and periods. Apart from this, Cartagena and its surrounding plain enjoy a year-round mild climate and, for the gourmand, its local dishes are renowned.

For more information concerning the XIII APLE Symposium in Cartagena please don't hesitate to contact Stella Moreno Grau at: [stella@plc.um.es](mailto:stella@plc.um.es)

Submitted by:  
Ana T.Romero Garcia (APLE councillor)  
Depto. de Botanica  
University of Granada  
Granada, Spain.

### **MONTREAL WORKSHOP ON ARCTIC DINOFLAGELLATE CYSTS**

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

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

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

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

More information about the workshop can be obtained from:

Anne de Vernal [[r21024@er.uqam.ca](mailto:r21024@er.uqam.ca)]  
 Marianne Ellegaard [[mariane@bot.ku.dk](mailto:mariane@bot.ku.dk)]  
 Kari Grøsfjeld [[Kari.Grosfjeld@ngu.no](mailto:Kari.Grosfjeld@ngu.no)]  
 Rex Harland [[rexharland@msn.com](mailto:rexharland@msn.com)]  
 Martin Head  
[\[head@quartz.geology.utoronto.ca\]](mailto:head@quartz.geology.utoronto.ca)  
 Arun Kumar [[akumar@ccs.carleton.ca](mailto:akumar@ccs.carleton.ca)]

---

2

Martina Kunz-Pirrung [[mpirrung@awi-bremerhaven.de](mailto:mpirrung@awi-bremerhaven.de)]  
 Jens Matthiessen [[jmatthiessen@awi-bremerhaven.de](mailto:jmatthiessen@awi-bremerhaven.de)]  
 Peta Mudie [[mudie@agc.bio.ns.ca](mailto:mudie@agc.bio.ns.ca)]  
 Niels Poulsen [[nep@geus.dk](mailto:nep@geus.dk)]  
 Andr  Rochon [[rochon@agc.bio.ns.ca](mailto:rochon@agc.bio.ns.ca)]  
 Jean-Louis Turon [[turon@geocean.u-bordeaux.fr](mailto:turon@geocean.u-bordeaux.fr)]

Submitted by:

Martin J. Head  
 Department of Geology  
 University of Toronto  
[head@quartz.geology.utoronto.ca](mailto:head@quartz.geology.utoronto.ca)  
 22 Russell Street, Toronto  
 Ontario, CaANNOUNCEMENTS1

## MEETING ANNOUNCEMENTS

### APLF to meet in Liege

The next APLF symposium will be held in Liege, Belgium, from September the 13th to 17th. Registration costs are listed as 500 FF for general delegate and 250 FF for students. Two excursions are planned on Sept 16th and 17th, one to the Quaternary of Hautes Fagnes Plateau, and the second one to Cenozoic strata between the Entre Sambre and the Meuse River. The participation in the excursions will cost, respectively, 200 FF (100 FF for students) and 350 FF (180 FF for students).

For any other information please contact the organizer: Emile Roche, e-mail: [warner@dalia.africamuseum.be](mailto:warner@dalia.africamuseum.be) or the APLF secretary, Marie-Pierre Ledru, e-mail: [ledru@usp.fr](mailto:ledru@usp.fr)

The APLF members list with addresses, specialties, e-mail addresses, and announcements is now on the APLF web site at: <http://medias.meteo.fr/epd/1998/aplf.html>

Submitted by:

Marie-Pierre Ledru  
 APLF secretary  
 ORSTROM  
 93143 Bondy CEDEX, France

Problems of Palynology at the Boundary of the Third Millennium," is to be held in Moscow, Russia. The conference is to be held at the Institute of Geology and Development of Fossil Fuels (IGIRGI) September 13-17, 1999. Topics for discussion include pollen morphology, palynostratigraphy, ecology and aeropalynology, genesis of floras, climates, reconstruction of paleogeographical events, and new methods in palynology.

Interested persons should contact the following person:

Prof. Lydia V. Rovnina  
 IGIRGI, Fersmana, 50  
 117312, Moscow, Russia  
 FAX: (095) 129-41-07  
 e-mail: [rovnina@igirgi.ru](mailto:rovnina@igirgi.ru) or,  
[zavial@3.hiplants.bio.msu.ru](mailto:zavial@3.hiplants.bio.msu.ru)

Submitted by:

Lydia V. Rovnina



**For AASP in 1999, it's Simply Savannah**

The Board of Directors of the American Association of Stratigraphic Palynologists is pleased to announce the venue for the 1999 annual meeting - Savannah, Georgia. We have chosen to hold our last meeting of the 20th century between October 26-30 (including a day for a fieldtrip on Saturday).

For those who are not familiar with this city, on February 12, 1733, James Edward Oglethorpe and 114 colonists arrived in what is now downtown

## 9th Russian Conference

Please note that the 9th Russian Conference "Actual

Savannah to found America's thirteenth colony. Savannah's long and colorful history includes its having been a most important seaport and defensive position during American's early colonial years. It stood as a strategic point in both the Revolutionary War, and the American Civil War, and has long been regarded as one of the most elegant cities of the American South. Savannahians have long been proud of their city and, in fact, rather than risk its total destruction at the hands of Union General William Tecumseh Sherman on December 22, 1864, they surrendered their city. Sherman's now famous message to President Lincoln read "I beg to present to you as a Christmas gift, the City of Savannah with 140 heavy guns and plenty of ammunition and also about 25,000 bales of cotton."

---

3

Those who attend the 1999 annual meeting of the American Association of Stratigraphic Palynologists will find a city that has grown mature facilities, with excellent facilities for conventions and visitors. Our headquarters hotel will be the Days Inn Historic District, a comfortable and affordable lodging that is located right on Bay Street, the main east-west thoroughfare of the historic district. We have secured 45 single/double occupancy rooms that are available for \$72+tax per night. We also have 5 1-bedroom suites at our disposal for \$92+tax per night. The meeting itself will be held in the Coastal Georgia Center (CGC), a facility owned and operated by the University System of Georgia, and administered by Georgia Southern University. The lecture hall in the Coastal Georgia Center will very comfortably seat 362 people, and is equipped with a full complement of audio and visual facilities. Ample parking is available for those who choose to drive; it is also a very comfortable, and safe 10-15 minute walk from the Days Inn.

Registration for the meeting can be done ahead of time (forms will be available in a July issue of the AASP Newsletter), or can be done on-site on October 26th. We will hold an ice breaker the evening of the 26th at the Savannah History Museum, located just a minute's walk from the CGC. The museum houses extensive displays of historic materials, including a full-size steam locomotive, and will provide visitors with an excellent introduction to Savannah's human history. Technical sessions will be held from the 27th to the 29th, with two symposia to be held one of those days. Dr. Arthur Cohen, University of South Carolina, has agreed to organize a special 1/2 day session on Short-term Palynological Records, with emphasis on interpreting anthropogenic impacts. Dr.

travel to the National Wildlife Refuge headquarters where we will board boats for a trip into Chesser Prairie. Members who accompanied Fred on the IPC fieldtrip to the swamp in 1996 will remember what a grand place this is. The trip will end in Savannah that evening, providing attendees ample time to secure flights on Sunday.

Savannah is served by several airlines via Savannah International Airport. Delta and U.S. Air are the most prominent carriers. We have made arrangements for affordable transportation from the airport to the Days Inn. Once you get to the downtown area a great many things are easy to get to simply by walking, including theaters, art museums, nightclubs, parks, and many, many historic sites. Those who want to are welcome to drive to Tybee Island, on the Atlantic, an easy 30 minute trip which takes you across Georgia's storied salt marshes, and past Fort Pulaski National Monument.

More details are available on the AASP website at: <http://opal.geology.utoronto.ca:80/AASP/> In the mean time, you might want to explore Savannah's own website at [www.savannahga.com](http://www.savannahga.com). For further information from the organizer, contact Fred Rich at [frich@gasou.edu](mailto:frich@gasou.edu). Plan on

Joyce Lucas-Clark has agreed to organize a symposium on the Cretaceous and Tertiary palynology of the Atlantic Coastal Plain of the southeastern U.S.

A fieldtrip is tentatively planned for Saturday, October 30, to the Okefenokee Swamp National Wildlife Refuge. Both Art Cohen, and Fred Rich, organizer of the 1999 meeting, have worked extensively in the swamp. Individuals who have not seen this magnificent wetland should plan on attending. We propose to leave Savannah by bus early in the morning on Saturday, and will

visiting the Old South in October, and plan on having a simply wonderful time!

Submitted by:

Fredrick J. Rich  
Dept. of Geology and Geography  
Georgia Southern University  
Statesboro, GA USA

#### **MORE NEW PUBLICATIONS!**

**The Eighth Index to the Pollen Morphology of Angiosperms** has just been published. This volume has been compiled by Dr. R.W.J.M. Van der Ham and K. Thanikaimoni, and is the continuation of the series started in 1971. This eighth volume is in the same format as the sixth and seventh volumes of the series (16 x 24 cm.). It contains 346 pages and lists 12, 243 genera and 995 references ( including publications up to December, 1997). The price is

---

4

US\$ 23 or FF 140; postage is extra; Please be sure to provide your postal address. The Eighth Index can be ordered from:

Librarian, French Institute of Pondicherry  
Rue St. Lois  
Pondicherry, 605 001  
India

Submitted by:

K. Thanikaimoni  
French Institute of Pondicherry

#### **New Book from the Geological Society Publishing House:**

*Fossil Plants and Spores - Modern Techniques*. Edited by T. P. Jones (Cardiff University, UK) & N. P. Rowe (Universite de Montpellier, France) , April 1999  
Available in Hardback and Paperback.

Paperback: ISBN: 1-86239-041-x  
List price: □29.00 / \$48.00  
Hardback: ISBN: 1-86239-035-5  
List price: □75.00 / \$125.00

In recent years the study of fossil plants, spores and pollen has produced an abundance of new methods and modifications of old ones [see the review by Alwynne Beaudoin later in this issue. ed.]. This volume provides

Submitted by:

Fran Clarke, Marketing Executive  
Geological Society Publishing House  
Unit 7, Brassmill Lane Enterprise Centre  
Brassmill Lane, Bath, BA1 3JN, UK  
Tel: +44 (0)1225 445046  
Fax: +44 (0) 1225 442836

#### **New book on mellissopalynology:**

*Mediterranean Melissopalynology*, by Giancarlo Ricciardelli D'Albore, 1998

This is an exhaustive book of 466 pages that deals with honey, phytogeography, and pollen morphology of 210 Mediterranean pollen taxa. For each pollen type a descriptive card and four photos at different focuses are presented.

Gratis available (only postage expenses) from Prof. G. Ricciardelli D'Albore.  
Agricultural Entomological Institute.  
Borgo XX Giugno University of Perugia.  
06121 Perugia Italy

submitted by:

Donatella Magri  
Dipart. Di Biol. Vegetale

the first comprehensive collection of these practical methods - balancing the techniques that have been perfected over decades of research with the very latest methods and ideas.

*Fossil Plants and Spores: Modern Techniques* demonstrates that the study of fossil plants is a modern science and one increasingly applied in many disciplines to address such issues of current concern as evolution, environmental change and occurrence of fossil fuels. It is essential reading for palaeobotanists, palynologists, palaeontologists and academics teaching at undergraduate and postgraduate levels in earth and life science university departments. It can be used as both a laboratory manual and a source of inspiration for what can be discovered from the fossil plant record.

More details and the contents may be found on the Geological Society Internet Bookshop. The address link is <http://bookshop.geolsoc.org.uk>. Ordering from the Internet Bookshop means that the order is processed securely and quickly.

Univ. "La Sapienza"  
Rome, Italy

### **...AND ANOTHER DEGREE PROGRAM WITH PALYNOLOGY**

#### **MSc in Palaeoecology, The Queen's University, Belfast**

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

The MSc in Palaeoecology is a new degree course offered for the first time in the academic year 1999/2000. It is a course intended for those wishing to learn a range of environmentally relevant skills such as the analysis of soils, the identification of pollen, introductory surveying techniques, dating techniques and a host of other practical skills. It is aimed at graduates who require in service

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

#### Course Content

Students take the six palaeoecology half modules in the first semester and the three full taught modules in the second semester. Those students taking the Masters degree must also complete a dissertation.

#### *Semester 1 Modules*

Animal Bones: Identification, Uses and Analysis  
Pollen: Preparation, Identification and Analysis

Submitted by:

Dr. Suzanne A. G. Leroy  
Centre for Palaeoecology, Queen's  
University Belfast,  
Belfast BT7 1NN, N. Ireland.  
Ph: +44-1232-273 978 and 335 143  
fax: +44-1232-335 354;  
e-mail: [s.leroy@qub.ac.uk](mailto:s.leroy@qub.ac.uk).  
<http://www.qub.ac.uk/arcpal/staff/leroy/>

#### **PROPOSED CONSTITUTIONAL AMENDMENT** (second notification)

Article 17 of the IFPS Constitution states, "The Constitution may be amended only at a plenary session of the General Assembly. The text of any proposed amendment(s) shall be circulated to all members through the affiliated societies at least six months before the plenary session."

Therefore, as proposed during the June 27, 1996 meeting of the IFPS Council, I post the following proposed amendment

Soils: Impact of humans on soils  
 Dating the Past: A practical review of tree-ring and carbon dating techniques  
 Macrofossils: Collection, identification and interpretation  
 Surveying: Practical course on site surveying  
*Semester 2 Modules* Environmental History of Ireland  
 Global Environmental Change  
 Research Techniques in Environmental Studies

Further details may be obtained from:

Marguerite Hunter, School Secretary Tel. (01232) 273186 Fax. (01232) 315779  
 School of Archaeology and Palaeoecology,  
 The Queen's University of Belfast  
 Belfast BT7 1NN, Northern Ireland. E-mail  
[m.hunter@qub.ac.uk](mailto:m.hunter@qub.ac.uk)  
 Visit the web site at: <http://www.qub.ac.uk/arcpal>

to the IFPS Constitution, to be voted upon by the IFPS Members present at the Plenary Session at the opening of IPC 10, Nanjing, China, June 24-30, 2000.

The amendment to Article 16 reads.

"Up to \$6000 shall be made available to the organizing committee of the International Palynological Congress, upon their request, to assist with the expenses that may be incurred for organizing the Congress. The amount loaned shall be returned to the Secretary-Treasurer of the IFPS; and in addition, half of any profit accruing from the meeting shall be transmitted to the IFPS along with a detailed account of the financial status of the Congress".

It is to replace the last sentence of Article 16, which currently reads.

"Surplus funds remaining after the final settlement of financial affairs of each InternatPalynological Congress shall be sent in trust to the Secretary-Treasurer of the IFPS for transmittal, if needed, to the organizing committee for the next congress."

Owen K. Davis, President, IFPS

## BOOK REVIEWS

The following review was originally printed in the Newsletter of the Canadian Association of Palynologists, vol. 22, no. 1, May, 1999.

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

*New Developments in Palynomorph Sampling, Extraction and Analysis* consists of 16 papers and an introduction by the editors. Most papers presented in a symposium at the 27th AASP Annual Meeting held in College Station, Texas, in 1994. As Bryant and Wrenn observe in their overview papers, they span the range from "new ideas [to] refinements of older techniques and procedures". Techniques and data interpretation are the focus of most papers, which deal primarily with Quaternary palynology, including melissopalynology, entomopalynology, and forensic palynology, with only two papers (Wrenn, and Rich and Pirkle) focussing on pre-Quaternary palynology. However, the issues raised among them, quality control, cost reduction, and

Four papers deal explicitly with archaeological or historical samples. Three of these concern the recovery of palynomorphs from artifacts, namely, amphorae and their contents, and textiles. Jones, Bryant and Weinstein attempt the "Pollen Analysis of Ceramic Containers from a Late Iron Age II or Persian Period Shipwreck near Haifa, Israel". They concentrate on five sediment samples that they believe "represent decomposed materials originally stored in amphora" rather than later inwashed sediment (p. 62) and four samples of pitch and resin from ceramic containers. They were able to identify pollen from several plants of economic significance, such as grape, olive, and pistachio, and pollen from other plants, such as oak and hazel, that perhaps represent later contamination or the contemporary pollen rain. Pollen evidence for grape was supplemented by the recovery of seeds from two samples. Jones et al. note the coincidence of well-

statistical validity are not the monopoly of the Quaternary community and indeed have implications for other areas of micropalaeontology beyond palynology.

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

preserved pine pollen in some samples with olive or grape pollen or both. They suggest that this might result from amphorae sealed with pine pitch and used to transport olives, olive oil, grapes, or wine. In a related paper, Jacobsen, Bryant and Jones present "Preliminary Pollen Analysis of □ Terebinth Resin from a Bronze Age Mediterranean Shipwreck" found off the shore of southwest Turkey. The resin, traded and valued for its use as incense and presumed medicinal properties, was obtained from the sap of a species of pistachio tree. Based on the analysis of eight samples, the assemblage includes conifer (predominantly *Pinus*) and *Pistacia* pollen but is dominated by NAP, especially cereal pollen grains. Their data suggest an origin for the resin in the eastern Mediterranean, perhaps the area now encompassed by north Israel-south Syria-northwest Jordan.

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

Moving forward in time, Jarzen summarizes his "Pollen Analysis of the Gondar (Ethiopia) Hanging". Determining tannin authenticity, history, and authenticity were the objectives of the investigation. Jarzen analyzed debris from the packing and wash and rinse water from the conservation treatment of this historically-important two-hundred-year-old silk hanging. Most data were retrieved from the packing debris, and did yield two pollen types (*Olea* and *Justicia*) that suggested residence in Ethiopia for the artifact, although most pollen types were more cosmopolitan and probably related to its residence in Ontario since the late 19th century. The small sample size available, and the necessity to

these may give a contemporary palynological signature. This is a concern for the authors working in the southeast US where the floras of the late Tertiary and Quaternary are very similar and so contamination from modern sources may be difficult to detect.

Two papers focus on entomopalynology and deal with the pollen loads of insect pests on economically-important crops. Jones and Coppedge explore "Pollen Analysis of the Boll Weevil Skeleton" by using SEM imagery to examine pollen

eliminate sources of contamination, Involved processing techniques similar to those used in forensic palynology.

Cummings considers sample spatial variation in "Sampling Prehistoric Structures for Pollen and Starch Granules". Her samples were obtained in 1979 from an Anasazi Pueblo 1 pithouse in Coloragrindingte over a thousand years old. By gridding the floor into 50 cm x 50 cm squares, and sampling within this grid, she was able to identify probable activity areas, based on characteristic pollen components. Not surprisingly, pollen from food plants was often found in squares near the hearth in areas where artifacts indicated food preparation had probably occurred. As a sidelight on contamination, she had to consider the problem associated with the interpretation of *Nicotiana* pollen as a consequence of tobacco use by the field crew. Cummings was able to identify certain areas of the pithouse that provided most information on probable plant use, then used this as a guide for sampling in a subsequent pithouse excavation. Cummings' analysis shows the importance of considering spatial variability in the assessment of archaeological pollen samples, and the importance of a research design that allows this variability to be revealed. Stratigraphic (and thus temporal) variability is often a consideration in pollen studies; it is less common to take areal variability into consideration. I was, however, mystified by the reference to starch granules in the title of this paper, since these are only mentioned briefly in one sentence and are not a focus of the research presented here.

Moving away from archaeology and stepping back in time, Rich and Pirkle look at "Steinkerns as Pollen Traps". Steinkerns, I found out, are not beer-glasses but Because these ment infillings of mollusc shells. Because these are likely to have formed soon after the mollusc shell became part of the deposit and because the shell has protected the contents from contamination or reworking,

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

Another theme that is strongly evident in several papers in this compilation is the evaluation of costs of doing pollen analysis. Perhaps this is a reflection of the increasing importance of consulting and contract work in the palynological world. The opening paper in the volume by Wrenn on "The Importance of Palynological Sampling to the Oil Industry" introduces this theme. His central argument is that using external contractors to process samples, while initially perhaps attractive from a cost perspective, is not effective if there is no quality control over the product being produced. He illustrates this proposition by presenting the results produced by three consulting firms in southeast Asia who were asked to process mainly Eocene samples from the Chindwin Basin of Myanmar. Their preparations were generally poor and often debris-laden in comparison to the relatively clean slides produced by Amoco Production Company staff. These preparations would have involved significantly greater counting times. Chances are that debris may have also obscured some palynomorphs. The age assignments provided by the consultants were also broad and inaccurate. His results show quite cogently that there is no substitute for

expertise, especially from in-house experts who are able to assess the validity of results being presented and maintain continuity in quality. This may be a powerful argument to present to managers who are simply looking at a "bottom line" assessment, rather than considering value and reliability. Certainly, when decisions are being made about spending millions of dollars in development, it would seem prudent to be confident of the validity of the data underlying those decisions. His paper takes tilt at the myth that somehow outside consultants can do things better, quicker, and cheaper than in-house staff.

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

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

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

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

Several papers, besides that of Dean, focus on both processing techniques and aspects of the statistical validity of samples. Jones and Bryant explicitly examine whether a single-drop sample is representative in one of two papers dealing with melissopalynology ("Are All Counts Created Equal?"). Honey is characterized or classified according to the analysis of one drop of pollen residue. From this the honey will be judged as to its floral source, a judgement that may have financial implications for the producer. Hence, it is critically

important to know whether the sample strategy used gives representative and reliable results. Not surprisingly, Jones and Bryant found that assemblage diversity increases with increasing pollen count. They counted 500 grains in each of five single drop samples, finding 130 taxa in total. They note that none of the samples contained more than 60% of the total number of taxa. The implication is that large counts, as a minimum 500 grains, are needed to adequately characterize a honey bee's floral sources.

However, I was left questioning how these data relate to honey classification. Presumably, "clover honey", for example, would be expected to have an assemblage dominated by clover pollen. So how does the total number of taxa identified in a sample help in this assessment?

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

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

In the last paper, Bryant and Mildenhall bring us a glimpse of the regrettable but necessary application of "Forensic Palynology: A New Way to Catch Crooks". They survey many cases in which pollen evidence was useful, especially to tie suspects or objects to a particular locale. All themes are well exemplified in this review: the necessity for meticulous and well-documented laboratory technique, concerns about statistical validity, and the need for cost-effective procedures. Besides having credentials as a scientist, the forensic palynologist must be prepared to deal with varied samples, from clothing to hair to drugs, maintain an impeccable chain of custody protocols, including locked storage, that will withstand legal scrutiny, and be ready to face, perhaps hostile, cross-examination in a courtroom. Given these strictures, I'm not surprised that most palynologists would opt for the calmer atmosphere of a research lab!

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

First, I was quite surprised that several of the papers (e.g., Dean, Smith, Gish) refer to a 200 grain count as though it were a standard. Several other papers (e.g., Jones et al., Rich and Pirkle) also mention this target. I was perplexed to find this thinking embedded in a volume devoted to new methods and approaches. Dean, for instance, states that a count of 200 grains has been "standard in

sample and, if so, would the effects be minimized with a precursor step for clay disaggregation and removal? A careful consideration of this paper will point the way to additional research questions.

palynology since the early years of this century" (p. 53). Although this may have been true at one time, I believe that palynological thinking has moved far from this view.

Several basic palynological textbooks provide guidance in this matter. As far back as 1980, Birks and Birks (pp. 165-166) were presenting data showing that a count of at least 300 - 500 grains is necessary to obtain stable pollen percentages for the main components of the assemblage. Moore et al. (1991: 168-169) suggest that a count of around 600 grains (in the pollen sum) may be adequate if the objective is "gross forest history". Much greater counts (over 1000 grains) will be necessary if minor components of the pollen assemblage are the focus of study. In another recent AASP volume, MacDonald (1996: 890) also summarizes these recommendations and indicates that "Quaternary palynologists generally count between 300 and 1000 grains of terrestrial plant pollen per sample".

Berglund and Ralska-Jasiewiczowa (1986) suggest a minimum pollen sum 500 grains, and recommend that at least 1000 grains in the pollen sum be recorded where anthropogenic influence is suspected. Their experience suggests that "a pollen sum of 2000 will facilitate the identification of human impact" (p. 462). Because not all palynomorphs are included in the sum, the actual count may be much greater.

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

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

have a range of contents, rather than an absolute number of spores. Jones et al. indicate that they added tablets containing 11,300 ± 400 *Lycopodium* spores; Jones and Bryant (both papers) used tablets containing 11,300 ± 300 spores. I was left wondering if these were actually from the same batch. The statistics associated with the use of a spike have been well explored by Maher (1981, 1997, see also Stockmarr 1971). Ideally, when assessing variability of spiked samples, the variability in the quantity of spike added needs to be taken into account. For instance, Dean's discussion of counting limits based on spike values would have been enhanced by a consideration of the confidence intervals on the amount of tracer added (see Maher 1997). I felt that a number of the papers, especially Smith's and Dean's, would have been much stronger with a more rigorous examination of the underlying statistical issues.

On the production side, benefited book is nicely laid-out and designed, the volume would have benefitted from the attentions of a noticeable typographical error

beyond the 500 grain count (p. 117). To assess adequately assemblage diversity, whether of a honey or a sediment sample, large counts are probably necessary.

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

Second, given that several papers take a statistical approach and eight mention using tablets containing *Lycopodium* spores as a spike or tracer, I was surprised that more attention was not paid to the statistics of these. None of the papers give the batch number for the tracers, only four indicate whether one or more tablets were added, and only three acknowledge that the tablets

inconsistencies in word use and there are noticeable typographical errors. The articles are generally well illustrated. With a fine laboratory (the images in Wrenn's and Jones and Ellin's papers, and the laboratory view in Jarzen's paper), the photomicrographs are generally adequate, especially for the palynomorph photo-micrographs. The very modest price for the volume means that it should be in reach of a wide readership.

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

The publication can be ordered from Vaughn M. Bryant Jr, Secretariat Station, c/o Palynology Laboratory, Texas A&M University, College Station, Texas 77843-4352, USA. E-mail: [vbryant@tamu.edu](mailto:vbryant@tamu.edu)

Reviewed by:

Alwynne B. Beaudoin  
Archaeological Survey, Provincial  
Museum of Alberta  
[abeaudoi@gpu.srv.ualberta.ca](mailto:abeaudoi@gpu.srv.ualberta.ca)

## References

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

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

Berglund, B. E., and M. Ralska-Jasiewiczowa (1986) "Pollen Analysis and Pollen Diagrams". In *Handbook of Holocene Palaeoecology and Palaeohydrology*, edited by

## CALL FOR NOMINATIONS

For the past eight years it has been my pleasure to serve IFPS as Secretary-Treasurer, then as President. It is my duty, now, to call for nominations for President of IFPS for the term 2000-2004. It is this individual's duty to chair the IFPS Council and General Assemblies, and to oversee the routine tasks of producing the IFPS Newsletter, Directory, and Web Page. To this end, the IFPS President selects and appoints the Newsletter Editor and Secretary-Treasurer. I urge you to nominate individuals who have the resources and the devotion to IFPS that are needed to complete this task. All current IFPS Councillors of Affiliate Societies in good

B. E. Berglund, pp. 455-484. John Wiley and Sons, Chichester.

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

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

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

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

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

Moore, P. D., J. A. Webb and M. E. Collinson (1991) Pollen Analysis, 2nd edition. Blackwell Scientific Publications, Oxford, U.K. Stockmarr, J. (1971) Tablets with Spores Used in Absolute Pollen Analysis. Pollen et Spores 13:615-621.

standing (societies who have paid their dues) are eligible - provided that they agree in advance to stand for election. In addition, any member in good standing of an affiliate society can run for President, if he/she is nominated in writing by another member in good standing to the Secretary-Treasurer of IFPS two weeks in advance of the deadline for mailing the ballot to the IFPS Council. Therefore the due date for nominations for President of IFPS shall be FRIDAY, SEPTEMBER 24, 1999, and the ballots shall be mailed to the Council Members before FRIDAY, OCTOBER 15, 1999, in accordance with the IFPS Constitution. Furthermore, it is my pleasure to call for invitations for the location of IPC-11. Two IFPS societies have already expressed to me their interest in hosting IPC-11, in the year 2004. I urge the other affiliate societies to also consider this opportunity. Again, only Affiliate Societies in good standing are eligible to submit proposals. All invitations and proposals for the venue of the IPC-11, 2004, are due in the office of the President of IFPS before FRIDAY, MARCH 17, 2000.

Owen Davis, President, IFPS

---

**PALYNOS** (ISSN 0256-1670) is published semiannually (June and December) and is distributed to all individual members of the scientific organizations affiliated with the International Federation of Palynological Societies (IFPS). News items, photos, member and society activities are welcome. (Scientific papers will not be published in PALYNOS.) Please forward materials for PALYNOS to the Editor:

Dr. Fredrick J. Rich  
 Department of Geology and Geography  
 P.O. Box 8149, Georgia Southern University  
 Statesboro, Georgia 30460 U.S.A.  
 Phone: (912) 681-5361  
 FAX: (912) 681-0668  
 E-Mail: [frich@gasou.edu](mailto:frich@gasou.edu)