



# PALYNOLOGOS

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The NEWSLETTER of the INTERNATIONAL FEDERATION of PALYNOLOGICAL SOCIETIES



**Don't Miss the Boat!!  
IXth IPC Meeting  
is less than Six Months Away!**

By now most of the known world has heard that the IXth IPC will be held in Houston, Texas, during the last part of June, 1996. Nevertheless, we feel compelled to remind everyone once again about this upcoming event for several reasons. First, this might be the last IPC to be held in the United States during the careers of many of us. Thus, it would be nice to say, when we retire, that "we attended" the last big IPC blowout of the 20th Century!!! Second, even though we still have six months before the meeting begins, time passes quickly when you are having fun!! From my own experience I know that I have had a tendency to put things off until the very last minute and then frantically have to write my abstracts only days before they are due, and then Federal Express them to the organizing committee. I hate to admit that I am also prone to still be working on my oral presentations on the airplane as I am flying to the meeting locale! Honestly, there has to be a better way of doing this!

Wouldn't it be great to "get your abstract and registration materials sent in EARLY for a change!" Also, this would greatly help the IPC Committee as we try to coordinate and plan the many events that are going to be held during the meeting. If for no other reason than trying to help those of us on the organizing committee sleep better and worry less, PLEASE send your materials in now.

If you need more information about the IXth IPC either John Wrenn or I would be willing to answer your inquiries. All you

have to do is send us an e-mail, Fax, or letter requesting information about the meeting, the symposia, the hotel, or any other aspect of the IXth IPC that is being planned. Once contacted, we will gladly send you a copy of this vital information by air mail.

Finally, remember that each IPC meeting is only as good as the efforts made by those participants who attend and are willing to share their vast knowledge of the discipline. Please help make the IXth IPC not only one that will be remembered as being the "last" one of the 20th century, but also as being the "best" one as well! We need you there! Send in your materials NOW!

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## REGISTER NOW FOR IX<sup>th</sup> IPC FIELD TRIPS

Three pre-congress field trips (A-1, A-2, A-3) and four post-congress field trips (B-1, B-2, B-3, B-4) are being organized in conjunction with IX<sup>th</sup> IPC (Houston, Texas, June, 1996). Participation is limited for each, but trips may be canceled unless minimum registration is obtained. Trip organizers need to know NOW how many people are likely to participate. If you wish to attend one of the IX<sup>th</sup> IPC field trips--and if you have not notified the organizer--please do so immediately. A list of field trips and organizers follows (details are provided in the IX<sup>th</sup> IPC Second Circular).

- A-1 Cretaceous-Tertiary Boundary in the Raton Basin  
F. Fleming  
fax: 303-236-5690  
e-mail f Fleming@greenwood.cr.usgs.gov
- A-2 Geology and Palynology of Wyoming  
D. Nichols  
fax 303-236-5690  
e-mail dnichols@greenwood.cr.usgs.gov



A-3 Palynology of Wetland Environments of the Southern U.S.

F. Rich  
fax 912-681-0668  
e-mail: troutman@gsaix2.cc.gasou.edu

B-1 Brazos River, Southeast Texas

D. Pocknall  
fax 713-366-7565  
e-mail: dtpocknall@hou.amoco.com

B-2 Eocene Fossils of Whiskey Bridge

M. Farley  
fax 713-965-7279  
e-mail: martin.b.farley@exxon.sprint.com

B-3 K-T Boundary and Eocene Localities in Central Texas

D. Pocknall  
Fax: 713-366-7565  
e-mail: dtpocknall@hou.amoco.com

B-4 Palynology of the American Southwest

O. Davis  
Fax: 602-621-2672  
e-mail: palynolo@ccit.arizona.edu

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### Congratulations, Mr. President!



Dr. James E. Canright was given the Award of Merit on August 9, 1995 by The Botanical Society of America at its Annual Meeting held in San Diego, California. Jim is the current President of the International Federation of Palynological Societies and Professor Emeritus of Botany, Arizona State University, Tempe, Arizona.

This prestigious honor was bestowed upon him "for service and outstanding scholarship for advancement of knowledge in the

botanical sciences." Jim is highly regarded as a scholar of the Ranales and his systematic studies of primitive angiosperm groups contributed significantly to the understanding of flowering plant evolution. His pioneering work in palynology established the significance of that discipline in both basic and applied research.

### Short IFPS News Items

- (1) The Palynological Society of China (PSC) has just submitted a formal bid to host the Xth IPC in Nanjing in the year 2000.
- (2) The Precambrian to Tertiary Palynologists of Belgium (PTPB) have requested that their name be changed to Palynologists and Plant Micropaleontologists of Belgium (PPMB) in order to include their actuopalynologists with the paleopalynologists.
- (3) An organization devoted to African palynology called the "Association Internationale de Palynologie Africaine/International Association for African Palynology" (AIPA/IAAP) has applied for membership in IFPS. Further information on this group will appear in the next issue of PALYNOS.

### A Brief History of Some Major Contributors to the Development of Palynology in the United States

#### Introduction

Although the initiation of any science is extremely difficult to pin down, most palynologists today tend to recognize the 1916 publication on pollen analysis of peat by the Swedish geologist, Lennart von Post, as the starting point of the scientific field that is now termed palynology. Nevertheless, the first published observations of pollen morphology by the co-founders of plant anatomy, Nehemiah Grew and Marcello Malpighi, appeared between 1682 and 1687. Naturally, these observations would not have been possible prior to the improvement of the compound microscope by Robert Hooke in 1665 (Wodehouse, 1935). Some of the other early applications of palynology, e.g., pollen causes of allergies and pollen in honey, are discussed in the article by Manten (1967).

Despite the fact that numerous applications of palynology have evolved, early work in the United States commenced about 75 years ago and can be categorized as follows:

- (1) Morphology of pollen and spores, particularly as an aid to systematic botany;
- (2) Quaternary pollen analysis and paleoecology; and
- (3) Paleopalynology of pre-Quaternary sediments that is often related to stratigraphy.

In the present account I will attempt to characterize quite briefly some of the most prominent American scientists who did pioneering work in these three areas of palynology. At the

outset I realize that this approach is foolhardy for at least two reasons: some palynologists will be offended because their names have been omitted; and, of those persons listed, some will have worked in several areas of palynology, other than the one where they have been placed in this account.

#### Pollen and Spore Morphology

Available evidence seems to indicate that Harvard University was an early center for the investigation of pollen and spore morphology, mainly due to the presence there of **Irving W. Bailey** from 1909 until his death in 1967. Although Bailey was basically a plant anatomist, he often collaborated with systematic botanists in the investigation of angiosperm genera and families. In this connection, he firmly believed that evidence of relationships should be based on the microscopic characteristics of all parts of the plants under investigation. One particular approach that he found to be of value was the comparative study of pollen grains. Even though I have not worked on that aspect of palynology for some time, I got my start in 1946 by comparative studies of the pollen of the primitive families Magnoliaceae and Annonaceae (Canright, 1953, 1962). **Elso S. Barghoorn** obtained his Ph.D. in 1941 under Bailey's guidance. After teaching for five years at Amherst College (and starting at the magnificent annual salary of \$2,000), he joined the Harvard faculty to teach paleobotany. He is probably best known for his description of the Precambrian microorganisms from the Gunflint Chert of Ontario. One of his former students, **J. William Schopf**, has become a leader in the investigations of Precambrian bacteria, algae and fungi from many parts of the world. He currently directs an institute for the study of Precambrian biotas while teaching at UCLA.

Another of Barghoorn's former students who has gained prominence is **Alfred Traverse** (Ph. D. Harvard, 1951). His description of the pollen from the Tertiary Brandon Lignite of Vermont (1955) is believed to be the first paleopalynological Ph.D. dissertation in the United States. After a 5-year stint at the Bureau of Mines Lignite Laboratory in the wilds of North Dakota, he was pleased to get an appointment at the Shell Development Company in Houston. Since 1966 he has been a professor of Geology and Botany at the Pennsylvania State University, where he has "turned out" a significant number of graduate students. Traverse was the President of the International Commission for Palynology (ICP) from 1977-1980; concurrently, I founded and edited the ICP Newsletter. At present Traverse is the Archivist of the International Federation of Palynological Societies (IFPS), the umbrella group that succeeded the ICP in 1984 (Canright, 1984). He was one of the authors, including G.O.W. Kremp, of the well known "Catalogue of Fossil Spores and Pollen," which was initiated in 1957 and now includes about 43 volumes. His recent textbook entitled "Paleopalynology" (1988) is one of a kind.

**Roger P. Wodehouse** was born in Toronto in 1889. After obtaining his bachelor's degree at the University of Toronto in 1913, he attended Harvard and earned the A.M. in 1916. After becoming naturalized, he worked as a research chemist and hay fever specialist in several pharmaceutical houses in Boston and New York. He completed the Ph.D. in 1928 at Columbia University, then joined the Lederle Laboratories as Director of Research. His book "Pollen Grains" first appeared in 1935 and was reprinted in 1959. In this book pollen grains are

beautifully illustrated by detailed line drawings. One of these is the chenopod, *Salsola*, which is currently featured in the logo developed for the IXth IPC that will be held in Houston, Texas next June (Nichols, 1994).

**A. Orville Dahl** earned all his degrees at the University of Minnesota between 1932 and 1938. For the next six years he taught at Harvard University. His precise research on pollen morphology and cytology that was begun under Bailey's influence, was continued when he returned to the Minnesota faculty in 1944. He subsequently became Chairman of the Botany Department there; one of his former students is **John Rowley** (now in Sweden), who has published extensively on exine cytology and ultrastructure.



Lucy M. Cranwell (July, 1991. Photo by J. E. Canright)

**Lucy M. Cranwell** (Mrs. Watson Smith) was the Head of the Botany Department in the Auckland Museum from 1929 to 1944. She was discovered there by Watson Smith, a young archeologist, who was on leave from his duties as an officer in the U. S. Air Force. At the close of World War II they moved to Cambridge (MA), where Watson became a Research Associate in Harvard's Peabody Museum. Lucy continued the pollen studies she had begun in New Zealand as a Research Associate in Botany from 1944-1950. Her study of the pollen of monocots of New Zealand was published by the Harvard University Press in 1953, and her "Ancient Pacific Floras--The Pollen Story" (1964) is much quoted.

The Watson Smiths moved to Tucson, Arizona in 1951, where Wat was associated with the Arizona State Museum and Lucy became an Honorary Research Associate in Palynology in the University of Arizona's Geochronology Laboratory. When I talked to her recently (shortly after her 88th birthday), I learned that she is still very interested in the past and present distribution of the southern beech, *Nothofagus*. She was elected an Honorary Member of AASP in 1989.

#### Quaternary Pollen Analysis

Between the years 1920 and 1940, a number of Americans published their observations on the spore and pollen types recovered from bogs and lakes. The resulting analyses led to deductions concerning the vegetation, paleoecology and paleoclimatology of the sites at the times of deposition.



One of the first Americans to follow the research example of Lennart von Post was **John E. Potzger**. He earned his first two degrees at Butler University in Indianapolis, then obtained the Ph.D. in Botany at Indiana University in 1932. He then returned to Butler University, where he spent his entire professional career as an ardent plant ecologist and pollen analyst. When I taught at Indiana University in the 50s, it used to be said (in jest?) that Potzger and his many students had cored every bog in Indiana and surrounding states.

An outstanding scientist in this field was **Paul B. Sears**. He gained the A.B. degree at Ohio Wesleyan University in 1913, then took another bachelor's degree and a master's at the University of Nebraska, before earning his Ph.D. in botany at the University of Chicago in 1922. After teaching botany at the University of Nebraska from 1919 to 1927, he moved to the University of Oklahoma until 1938. For the next 12 years he served as the Head of the Botany Department at Oberlin College in Ohio. Next, he was selected to direct the School of Conservation at Yale University; he wore a second hat as Head of the Department of Plant Science until his retirement in 1960 at age 69.

His many palynological research publications and, especially, his popular books on conservation were so well regarded that he was given honorary doctoral degrees at six different universities. Traverse and Sullivan (1983) have previously described how Sears brought Quaternary pollen workers together by means of regular Pollen Conferences, as well as the publication of the "Pollen and Spore Circular" between 1943 and 1954.

Closely associated with Sears at Yale was **Edward S. Deevey, Jr.**, who joined the faculty there as a limnologist in 1946. Previously he had earned the A.B. (1934) and the Ph.D. (1938) at Yale, then was a Research Associate at the Woods Hole Oceanographic Institute on Cape Cod.

**Herbert E. Wright, Jr.**, received three degrees in geology at Harvard University between 1939 and 1943. After short stints at Brown University and the U. S. Geological Survey, he joined the faculty of the University of Minnesota in 1947. Later (1963) he was appointed as the Director of the Limnology Research Center at the University of Minnesota. Together with David Frey, he edited the very comprehensive volume (922 pages), "The Quaternary of the United States" in 1965. This was a review volume for the VIIth Congress of the International Association for Quaternary Research.

**David G. Frey** earned all his degrees in zoology at the University of Wisconsin between 1936 and 1940. The next 5 years he was employed as an Aquatic Biologist with the U. S. Fish and Wildlife Service in Washington, D. C. After serving on the faculty of the University of North Carolina, he joined the Zoology Department at Indiana University in 1950 to finish out his career. He has published extensively on the limnology and micropaleontology of freshwater lakes.

**Calvin J. Heusser** earned his A. B. and A. M. at Rutgers University (1947-49), then obtained the Ph.D. at Oregon State University in 1952. After a postdoctoral appointment at Yale, he became a Research Associate of the American Geographical Society. This position led to his studies of palynomorphs in Chilean bogs, as well as his handsome book, "The Pollen and

Spores of Chile" (1971). His principal work, "Late Pleistocene Environments of North Pacific North America" (1960), became a standard for Pleistocene research in the Northwest. He joined the faculty of New York University, then the Lamont Laboratory until his recent retirement.

**Stanley A. Cain** completed his undergraduate education at Butler University in 1924, then earned his master's and doctoral degree by 1930 at the University of Chicago. Between 1933 and 1946 he taught at the University of Tennessee, then spent the next four years as a Research Scientist at the Cranbrook Institute of Science. In 1950 he was appointed Head of the Department of Conservation at the University of Michigan, where he completed his professional career.

One of Cain's graduate students was **Paul S. Martin**, who came to Michigan in 1951 after completing his undergraduate education at Cornell University. After Martin completed his Ph.D. at Michigan in 1956, he held a postdoctoral appointment at Yale University with Sears and Deevey. The following year he became a Research Associate in the Geochronology Laboratory of the University of Arizona in Tucson. After he carried out extensive field work in the Southwest, the University of Arizona Press published his "The Last 10,000 Years--A Fossil Pollen Record of the American Southwest" (1963). Martin has trained many students at the University of Arizona; some have gone on to work in the relatively new field of archeological pollen analysis.

#### Paleopalynology

Whenever the early history of paleopalynology in North America is mentioned today, the name of **Leonard R. Wilson** invariably crops up. He earned all his degrees in botany at the University of Wisconsin between 1930 and 1936. His next ten years were spent teaching both botany and geology at tiny Coe College in Iowa. From 1946 till 1956 he served as Head of the Geology Department at the University of Massachusetts. After a single year at New York University, he joined the faculty at the University of Oklahoma, with a joint appointment in the Oklahoma Geological Survey. Because of his extensive publications on stratigraphic palynology, his services as a consultant to oil companies were eagerly sought. During the '50's and '60's, when American oil companies first started to recognize the value of palynology to stratigraphy (Hopping, 1967), many of Wilson's students were hired directly out of college. Wilson still regularly goes into his office in the Oklahoma Museum of Natural History in Norman, OK and he is now 86 years young!

Two well known palynologists who were influenced by Wilson when they were undergraduates at Coe College are **Aureal T. Cross** and **Robert M. Kosanke**. Cross earned the A.M. and Ph.D. at the University of Cincinnati (1941-43) in paleobotany under J. H. Hoskins. After six years on the faculties of the University of Cincinnati and Notre Dame, Cross accepted an



Notice in English in a Copenhagen  
airline office :

We take your bags and send them in  
all directions

appointment as Professor of Geology at the University of West Virginia, plus a joint appointment with the West Virginia Geological Survey. Here he did extensive research on the correlation of coal seams with spores of Pennsylvanian age. In 1957 he was appointed as Supervisor of the Research Center of the Pan American Petroleum Company (=AMOCO), where he trained many young palynologists in the various aspects of petroleum research and stratigraphic correlation. Since 1961 he has been a Professor of both Botany and Geology at Michigan State University. In 1962 he organized a symposium for the Society of Economic Paleontologists and Mineralogists (SEPM) at their San Francisco meeting entitled "Palynology and Oil Exploration." Sixteen speakers contributed to this symposium and Cross edited the resulting volume (1964). Although now officially retired from his position at MSU, he is still active in research at age 79.

**Robert M. Kosanke** joined his friend Cross in earning his master's degree at the University of Cincinnati. However, in 1943 he took a position as Coal Geologist in the Illinois Geological Survey, which turned out to be a 20-year stint. During this time, he took graduate courses at the University of Illinois, which led to his attaining the Ph.D. in paleobotany under Wilson Stewart in 1952. While with this Survey, he gained the reputation for doing careful, thorough research on spores of Pennsylvanian age in the Illinois Coal Basin. This led to his appointment in 1963 in the Paleontology and Stratigraphy Branch of the U. S. Geological Survey in Denver. Until the recent demise of the P&S Branch, he maintained an office there.

**James Morton Schopf** obtained the B.A. at the University of Wyoming in 1930 at the tender age of 19. He then attended the University of Illinois where he gained his master's degree two years later. He served as paleobotanist and coal geologist with the Illinois Geological Survey in Urbana from 1934 to 1943, yet managed to find time to earn a Ph.D. in plant morphology at the University of Illinois in 1937. From 1943 through 1959 he was appointed as paleobotanist, then a fossil fuels specialist, by the U. S. Bureau of Mines. In 1959 he was made the Director of the Coal Laboratory of the U. S. Geological Survey, which was located on the campus of Ohio State University in Columbus. He remained there until the time of his death in 1978 at age 67.

He was an acknowledged leader of international repute in the difficult areas of taxonomy and nomenclature of fossil plants and Paleozoic palynomorphs. His publication (with Wilson and Bentall) in 1944 was once the primer for the description of Paleozoic spores and generic groups. Towards the end of his career, he spent several summers in the Antarctic and described the plant fossils and coals he found there. He had a remarkable memory for details of numerous paleobotanical and palynological subjects, and he always loved to discuss these matters with his colleagues and friends.

**William S. Hoffmeister** took his A.B. and Ph.D. at Hopkins University in Baltimore (1923-26). He accepted a position as micropaleontologist with the Creole Petroleum Company in Venezuela in 1926 and remained there until 1941. Probably due to the fact that the oil rich Maracaibo Basin is principally composed of terrestrially derived sediments, it is presumed that he trained himself in the stratigraphic aspects of

palynology. From 1941 until 1946 he was employed as a stratigrapher for the Carter Oil Company, then went with the Jersey Production Company (=Exxon) through 1957, when he turned to private consulting. Traverse (1988) indicates that Hoffmeister caused considerable alarm among oil company palynologists when he received a patent for "Microfossil Prospecting for Petroleum" in 1954. However, only a year later, he turned this patent over to the public domain. His 1959 report of the occurrence of spores of the presumed oldest land plants in Libya also created a stir among palynologists. He was the first person to receive honorary membership in the AASP (1975).

**Robert H. Tschudy** obtained three degrees in botany from the University of Washington (Seattle) between 1932 and 1937. After a few years of teaching botany at the University of Wyoming and Willamette University, he was hired in 1945 as Research Biologist and Director of the Palynology Laboratory of the Creole Petroleum Company in Venezuela. He and his wife, Bernadine (who was also a palynologist) returned to the United States in 1950 and established a consulting laboratory near Boulder, Colorado. In 1962 both of the Tschudys were hired by the P & S Branch of the U. S. Geological Survey in Denver. After retiring in 1973, Bob still maintained an active research program right up to the time of his death in 1986. His textbook, "Aspects of Palynology" (edited with R. A. Scott), appeared in 1969 and was generally well regarded in the palynologic community. His publications included palynofloras of the Late Cretaceous and early Tertiary from the Rocky Mountains and the Mississippi Embayment, pollen of the Normapolles group and magaspore studies. A memorial article and complete bibliography of Tschudy has been written by Douglas Nichols (1987).

**Charles J. Felix**, a native Kentuckian, spent four years in the U. S. Marine Corps before matriculating at the University of Tennessee. After gaining his bachelor's degree there in 1949, he attended Washington University in St. Louis for his graduate studies in paleobotany under the direction of Henry Andrews. He earned the Ph.D. in 1954 with a dissertation on Carboniferous plants found in coal balls. From 1954-56 he was a Research Associate with Jim Schopf in the USGS Coal Laboratory at Ohio State University. From 1956 until 1981 he was employed as a research geologist with the Sun Oil Company in Dallas, Texas. Next, he served as a Professor of Geology at Abilene Christian University until his recent retirement. One of his major contributions (with Patricia Paden Phillips) was a lengthy treatise on Cretaceous palynomorphs from the Southeastern U. S. (1971).

**Jane Gray** completed her undergraduate training at Radcliffe College in 1951, then moved to the University of California at Berkeley to work in paleobotany with Ralph Chaney. Her Ph.D. dissertation in 1958 was on Miocene palynomorphs from the Columbia Plateau of Oregon. After teaching two years at the University of Texas, she joined the Geochronology Laboratory of the University of Arizona as a Research Associate. However, in 1962 she was invited to direct the Paleocology Laboratory of the Museum of Natural History at the University of Oregon, where she remains today.

**Estella B. Leopold** is the youngest of five offspring of the famous conservationist, Aldo S. Leopold, who was a professor



at the University of Wisconsin. Remarkably, all five siblings have become naturalists or professional scientists, and three (Luna, Starker and Estella) have been elected to the National Academy of Sciences (Carter, 1980). Estella got her bachelor's degree in botany at the University of Wisconsin in 1948, then went west to gain her master's degree at the University of California (Berkeley) in 1950. Next, she joined Paul Sears in the conservation program at Yale University, where she earned her Ph.D. in 1955.

For the next 20 years she was attached to the P & S Branch of the USGS in Denver, where she published numerous papers on Tertiary and Quaternary floras. Possibly one of her best known contributions was the lengthy chapter on late Cenozoic palynology in the Tschudy & Scott textbook. Another significant publication describes the Miocene palynomorphs recovered from Eniwetok Atoll after atomic bomb tests there

(1969). In 1975 she was named Director of the Quaternary Research Center at the University of Washington in Seattle. Currently she is a Professor of Botany at that University.

**William R. Evitt** earned the Ph.D. in geology at Hopkins University in 1950. He taught at the University of Rochester until 1956, when he received a 6-year appointment as a Research Geologist with the Jersey Production Research Corporation (=Exxon). Desirous of returning to academia, he joined the Stanford University in 1962 as a Professor of Geology, where he remained until his recent retirement. Evitt is usually regarded as the most outstanding authority in the United States on the taxonomy and morphology of dinoflagellates and acritarchs. Over the years he has taught special courses that trained numerous palynologists, particularly in the oil industry, where these unique microorganisms have been shown to have remarkable value in stratigraphic studies.



April 26, 1962: Group photograph of the First International Conference on Palynology, University of Arizona. (Photo by J. E. Canright)

### The First International Conference on Palynology

I have previously published a tribute to the recently departed Gerhard O. W. Kremp (1994); thus details of his life and career will not be repeated here. However, I wish to emphasize Gerhard's important role in organizing the First International Conference on Palynology, which was held at the University of Arizona, April 23-27, 1962. When Gerhard joined the faculty there as a Professor of Geochronology, he found as colleagues Paul Martin, Jane Gray, and Lucy Cranwell. At that time, I believe this represented the largest and most distinguished assemblage of palynologists in a university setting. This group soon began to formulate plans for an international meeting of palynologists. The General Chairman appointed by the university for this meeting was Terah L. Smiley, a dendrochronologist, who was the Director of the Geochronology Laboratory at that time. Gerhard Kremp was selected as Program Chairman and Paul Martin was put in charge of field trips. Because of his numerous contacts with European palynologists, Kremp succeeded in getting such well known persons as Gunnar Erdtman (Sweden), Sir Harry Godwin (UK), and Robert Potoni (Germany), not only to attend this conference in the Sonoran Desert, but also to give the main

lectures at the opening Plenary Session (see figure at the top of Page 6, showing these speakers in the order listed above).

Two other papers at this plenary session attracted considerable attention of the media. Elso Barghoorn first described the many unique microfossils that he and Stanley Tyler had recently discovered in the Gunflint Formation of Precambrian age. George Claus and Bartholomew Nagy next described supposed primitive algae and flagellates they had found in meteorites. (Despite the furor raised by these claims, it was later shown that the meteor fragments had been contaminated by earth borne microorganisms).

Although originally there were 235 registrants, the last minute withdrawal by 33 Soviet palynologists created numerous gaps in Kremp's well organized program. The rumored explanation (never corroborated) for the defection of the Soviet palynologists, was that the Soviet authorities were upset because the U.S.-issued visas that restricted travel outside the Tucson area, because the Department of Defense had several guided missile silos around the city at that time.

# ARIZONA WILDCAT

Covering The University Community

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No. 56

## 350 World Scientists To Meet Here



Dr. Otto Gunnar Elias Erdtman



Professor Harry Godwin



Dr. Robert Potoni

### 30 Countries Send Experts

About 350 scientists from 30 countries are expected on campus during the spring vacation to attend The University's International Conference on Palynology.

Palynology is the study of fossil pollen and spores. The conference, the first of its kind in the world, will be held April 23-27.

Gov. Paul Fannin and Dr. Richard A. Harvill, University president, will welcome the scientists.

**Smiley Is Chairman**  
Terah L. Smiley, director of The University's Geochronology Laboratory, is the general chairman of the conference.

Part of the front page from the April 18, 1962 issue of the University of Arizona school newspaper discussing the 1st International Palynological Congress that was hosted at the University by the Geochronology Laboratory. Shown left to right are: Drs. Erdtman, Godwin and Potoni. (Provided by J. E. Canright)

Practically all of the American palynologists discussed in this article were Chairmen of the 21 wide ranging sessions on the program. Because these meetings were so enthusiastically endorsed by the delegates, Norman Hughes (University of Cambridge) chaired a special meeting to discuss continued international cooperation among palynologists, an International Palynological Conference Committee was formed, with Frank Staplin (Calgary) as chairman. This committee's task was to insure that a second palynology conference would be convened 4-5 years later (McGregor, 1987). Obviously, these plans bore fruit when the 2nd IPC was held in Utrecht, The Netherlands, in 1966 with 270 registrants.

Submitted by:  
Dr. James E. Canright  
President IFPS

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International Federation of Palynological Societies 1992-1996 Roster of Officers and Representatives

Many changes have been made in the roster of IFPS representatives during the past 3 years. The following list of all current officers and representatives to IFPS should be applicable through June, 1996. Major changes will be made at the IPC in Houston, Texas, when newly elected Officers will take up the responsibilities of the IFPS for the next four years and new Councilors will be appointed.

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**MEETING REPORTS**

**"Palynology and Global Change"  
14th Symposium of the Association of  
French-Speaking Palynologists**

The fourteenth A.P.L.F. symposium was held in Paris, France (September 18-20, 1995). One hundred and fifty six participants from Europe (France, Spain, Italy, England, Belgium, Germany, Sweden, Switzerland, Poland, Hungary, Romania, Russia, Belaruss), Asia (India, China, Japan), Africa (Togo, Ivory Coast, Congo, Cameroon, Morocco, Algeria), Madagascar, and the Americas (Brazil, Canada, the USA) attended the conference. Seventy-three oral contributions and thirty-nine posters were presented during four main sessions: (1) Pollen Record of Past Environmental Changes From Continental and Marine Sequences: The Last Climatic Cycle (2) Pollen Record of Past Environmental Changes From Continental and Marine Sequences: The Older Time Periods (3) Origin and Radiation of Floras, and (4) Quantification of Past Environmental Changes.

Each session was introduced by an invited presentations:

- **Robert C. and F. Werth**: *Climate-deposition interactions during the late Quaternary: the example of the coastal basin of Santa Barbara (California).*
- **Dercourt, J.**: *Paleoenvironmental evolution of the Tethys from the Permian to the Miocene.*
- **Doyle J., Pons, D., and A. Le Thomas**: *Mesozoic and Tertiary "roots" of the modern flora.*
- **Guiot, J., Cheddadi, R., Harrison, S., Peng, C.M., Prentice, C., and E. Van Campo**: *Pollen Data and Biomes: three applications.*

The fourth session "Quantification of Past Environmental Changes" was co-sponsored by IGBP-Data Information System. In particular, it provided the opportunity to develop relationships between the European Pollen Database, the World Data Center and the contributing palynologists. A workshop for the elaboration of the African Pollen Database will be held in France in 1996 [with a provisional organizing committee composed of A.-M. Lezine (Paris), D. Jolly (Lund) and L. Scott (Bloemfontein)]. Papers related to the conference will be published as a special issue of "Geographie physique et Quaternaire" (Montreal, Canada) after acceptance by the reviewing committee.

The 14th APLF symposium was organized by A.-M. Lezine, E. Masare, N. Combourieu-Nebout and G. Lachkar (Paris).

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## ANNOUNCEMENTS

### Would you like to be PAID to study Palynology?

Is that a serious question? Yes, indeed, it is! The Board of Regents' Graduate Fellowship provides full tuition and an annual stipend of \$15,000-\$17,000 (taxable) for four years study at LSU. Applicants must be a US Citizen, an incoming Ph.D. graduate student, and have a 3.5 GPA (or higher) and a 1250 GRE (or higher). A slightly lower GPA score (e.g., 3.2) may be acceptable if it is offset by a higher GRE score (e.g., 1400). Up to three Fellowships may be open to competition within the Department of Geology and Geophysics this year. Competition for these Fellowships is only within the Department, not the entire University.

Other scholarships are available on a competitive basis.

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### Worldwide E-mail Directory of Palynologists

A global e-mail directory of palynologists (paleo- and actuo-) is being compiled on the web site of the American Association of Stratigraphic Palynologists (AASP). The purpose of this initiative is to simplify and broaden communication within the palynological community. The address of the directory is:

<http://opal.geology.utoronto.ca:80/AASP/aaspeemail.html>

Palynologists need not be members of AASP to be listed in this directory. The directory also contains links to personal home pages. If you are not listed in this directory, but wish to be, please e-mail me a short message with:

- 1) your full name (use upper case letters, e.g., SMITH, JOHN B.)
- 2) your e-mail address
- 3) if available, your personal home page address.

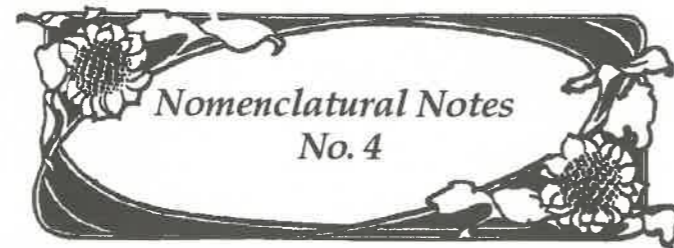
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### A Panbiological Code by the Year 2000?

A milestone in biological nomenclature may be in the offing - potentially the most significant milestone since formal Codes were established. The first draft of a panbiological "International Code of Biological Nomenclature" (or perhaps less preferably, but more officially, the "International Code of Bionomenclature" - ICB for short), has already passed through the relevant committees, including ours - the International Association for Plant Taxonomy sponsored Committee for Fossil Plants (CFP) - in preparation for a redrafting meeting in March, 1996. The goal is to have the ICB ready and ratified by the various congresses in order to come into effect by the year 2000. Before giving selected committee reactions to the first draft, some background to the ICB project is necessary. This is summarized partly from Hawksworth (1995, *Taxon*, v.44(3): 447-456).

There are currently five Codes of biological nomenclature: one each for bacteriology, botany, cultivated plants, virology and zoology. There have been earlier discussions on the possibility of a unified Code, but current interest stems from similar problems facing the various Codes created by new technologies and a greater emphasis on the unity of biology including paleontology. In 1985, a committee drawn from all five international nomenclatural authorities was given a mandate by the International Union of Biological Sciences (IUBS) "to achieve maximum harmony between the different systems of nomenclature."

Emphasis in the early years seems to have been on working towards registration of new names and compiling lists of names and granting them protected status, neither of which have become fully operative yet. These directions, however, were endorsed by the 24th General Assembly of IUBS in 1991,

which passed a resolution that "... encourages those concerned with biological nomenclature actively to seek ways of increasing harmonization in the various Codes, for example, with regard to the protection of names in current use, the registration of newly proposed names, the treatment of protists, homonymy between different groups, and where possible, the use of identical terms".

The 15th International Botanical Congress at Yokohama in 1993 established a Special Committee on Harmonization of Codes to address issues of harmonization within the context of the present Botanical Code. This includes for example, uniform treatment of form/organ taxa and the study of problems related to intercode groups such as dinoflagellates. This Special Committee is thus independent of efforts to merge the Codes and might be viewed as a back-up for botanists if the ICB is not successfully promoted.

The first significant move to merge the Codes, directly resulting from the 1991 IUBS resolution, was the Exploratory Meeting on Harmonization between Codes of Nomenclature at Egham, England in the Spring of 1994. The following highlights are excerpts from the "executive summary" of that meeting, which:

- Recognizes the crucial importance of scientific names of organisms in global communication to all concerned with the conservation, management, trade in, and use of the world's resources.
- Agrees that it would be highly advantageous to work towards a unified system of biological nomenclature ...
- Recognizes that while there are differences in procedures between the current Codes, which could not be reconciled for the nomenclature of the past without an unacceptable disruption of names in use, there is considerable scope for harmonization which is to be actively pursued.
- Considers that the availability of lists of published names, and the registration of new names in bacteriology, botany, virology and zoology, will make possible the harmonization of nomenclatural procedures in biology.
- Recommends that, considering divergent rules and traditions concerning author citations for scientific names, use of such author citations be made optional (and be recommended only in a strictly taxonomic context), as is already the case in zoology.

Hence, the tendency in 1993 seems to have been towards harmonization of existing Codes rather than formulation of a new panbiological Code. However, the latter direction was actively sought at another Egham meeting earlier this year. An Ad Hoc Meeting on Stability and Harmonization of Bionomenclature, chaired by the President of IUBS and attended by individuals from the five nomenclatural bodies, produced a first draft for the ICB, which is where we began this article.

So what was the general CFP reaction to the first draft of the ICB? Perhaps predictably, it was mixed. There was some excitement that such a project exists and some members could see little that need alarm paleobotanists and palynologists. However, some reaction was negative, primarily due to concerns over instability caused by changes. It was pointed out that there seemed to be little emphasis in this first draft to limiting retroactivity of the new Code despite the previously recognized importance of this aspect. There was a sense among

committee members that the draft did not deal effectively with the question of whole organism versus partial organism nomenclature. Debate among committee members centered on the question of whether there should be a name for the whole organism as well as, or rather than, names for individual parts.

Thus, should the a new Code prescribe a method to formally name a complete fossil, for example *Lepidodendron*, or should the procedure remain informal, as now, with use of the bark generic name for the whole plant and names for other individual parts being used in parallel, as appropriate? A related point of discussion was the confusion in the draft ICB over the concept of form genera: should we suggest some new term such as "fossil genus" to avoid future confusion, with more specific names such as pollen genus, bark genus, etc. when possible? Perhaps readers would give us some feedback on these issues - some examples would be helpful of cases where there might be confusion if names referring to parts of fossil plants (including palynomorphs) were not clearly treated in a new code.

These are early days yet and the next draft, resulting from the March 1996 meeting, will be open to examination and feedback by biologists generally. The question can validly be asked "Do we really need a new panbiological Code? But regardless of the answer, it would seem from the support at international meetings that the momentum is strong for formulating and applying a new nomenclatural structure in biology. As paleobotanists and palynologists, we need to ensure that we are involved in the decision making processes. As David Hawksworth has aptly stated (Hawksworth, 1995, *Taxon*, v. 44(3), p.448) "... if any unified Code is to ... become operative ..., the biological community as a whole must be confident that it serves their best interests and that it will facilitate rather than inhibit their scientific endeavors."

We welcome input from everyone on this and any other nomenclatural matter. Contact either of us or any member of the Committee - see *PALYNOS* 17(2): 9-10 or IOP Newsletter 51 for a list of committee members.

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Notice in English in *The Soviet Weekly*:

There will be a Moscow Exhibition of Arts by 15,000 Soviet Republic painters and sculptors. They were executed over the past two years.





## Book Reviews

### Pollen of the Southeastern United States: With Emphasis on Melissopalynology and Entomopalynology

by G.D. Jones, V.M. Bryant, Jr., M.H. Lieux, S.D. Jones,  
and P.D. Lingren

American Association of Stratigraphic Palynologists  
Foundation Contributions Series No. 30 (1995), AASP  
Foundation, Dallas, Texas, 76 pages with 104 plates including  
616 illustrations, \$27.00. (Order from Vaughn M. Bryant, Jr.,  
Palynology Laboratory, Texas A&M University, College  
Station, Texas, USA, 77843-4352).

When I was asked to review this book I was a little uncertain  
about the task because I know the second author well enough  
that I was afraid I might upset him should the review turn out  
to be less than glowing. Shortly after looking the book over,  
however, I realized that a good review would be forthcoming  
because the book sold itself very quickly. I shall suppress my  
enthusiasm so that I can get through some of the descriptive  
details, then I'll get on with the personal remarks.

The area "served" by the book includes the states of Texas,  
Oklahoma, Arkansas, Louisiana, Mississippi, Tennessee,  
Alabama, Florida, Georgia, South Carolina, and North  
Carolina. The book is of excellent construction; the authors  
intended for it to be used as a key, not merely admired as a  
pretty picture book. It has been designed to function as a  
utilitarian tool which is easy to use, and it has a generous 8.5  
x 11 inch page size. The paper is of moderately heavy weight,  
and it was wisely bound with a hidden wire-o metal spiral  
binding so that the pages lie flat when the book is open. The  
weight of the paper and the number of perforations in the  
binding (21) would seem to make it virtually impossible to  
tear pages out by mistake, and even frequent turning of the  
pages seems unlikely to wear them out at the binding. Poor  
binding is a most aggravating characteristic of so many keys  
and bound periodicals and I find my own collection shedding  
pages as the years go by. The cover is of sufficiently heavy  
stock that I am sure it will withstand any reasonable amount  
of shelving and dropping, and you would have to make a real  
effort to bend the covers in spite of their large size. The  
photomicrographs are approximately 2.75 x 3.25 inches, and  
pollen grain image sizes vary from 1-3 inches. The photos are  
exclusively SEM black and whites, resolution is excellent, and  
lithography equally well done. Contrast is very good, electrical  
charging of surfaces was carefully avoided, and minute details  
are quite clear. The atlas contains representative photographs of  
plants representing 398 taxa in 112 families of angiosperms

and gymnosperms (heavy on the angiosperms because of the  
goals of the authors).

I used the book for a week without looking at the text because  
that was the best way for me to evaluate its true function. The  
authors do not assume that all the book's readers will be  
palynologists, however, and that makes the book much more  
interesting, I believe. The text is written in the easy,  
informative style which I associate with Vaughn Bryant, Jr.,  
and it contains a clearly understandable synthesis of what  
pollen is and how it relates to plant reproduction. There is a  
concise explanation of what palynologists do with the data  
they collect, and there are very clear descriptions of the  
techniques that were used in preparing the specimens for the  
book. Collecting and sampling protocols are described, as well  
as the chemical preparation procedures. The types of film that  
were employed, photographic mounting procedures, and other  
such details lead the reader to a clear understanding of just how  
the whole atlas was put together. There is, furthermore, an  
annotated bibliography of similar atlases and helpful  
suggestions as to how to collect plants and how to label and  
curate them properly.

Clearly, an Herculean effort was put forth in completing this  
project. One might ask, though, how well the book functions  
as a key. As I said above, I used it without reading the  
directions, and had no difficulty at all. Each photograph has its  
own number, and the various indices relate those numbers to  
different means of approaching pollen identification. One can  
find pollen using the "List By Family" which identifies all the  
families represented in the book, the representative species  
within those families, the ornamentation of the grains within  
those species and their aperture, and the micrograph  
number. If one prefers one can locate photographs according to  
genus in the "List By Genus." All genera appear there, listed  
alphabetically, with their constituent species, micrograph  
numbers, ornamentation, and aperture. If you don't know  
the family or genus, there is a listing by aperture and another  
one by ornamentation so that you can chase down an unknown  
by considering all the possibilities within groups that have  
similar morphologies. Finally, for those that must resort to  
the window-shopping approach to identifying unknowns, there  
is a list by micrograph number. You can go looking through  
the pages for the most likely look-alike, then go back to this  
list and discover the probable species, familial affiliation, and  
morphology just in case you didn't know. Sculpturing terms  
are defined in Table 1, and grain sizes are clearly demonstrated  
by size bars.

I've been working on pollen from the Southeastern U.S. for  
twenty years now. While some things are easy to identify I  
have been puzzled many times, and have oftentimes wished for  
a key that would suite my particular needs. I never begin an  
analysis without feeling just a little trepidation because I  
invariably find something I can't identify. If it turns out to be  
some species reworked from the Eocene I feel I've been  
unfairly tricked, but many times it is something that may  
indeed be growing in my own back yard.

With something like 3200 species of just angiosperms in the  
Carolinas alone, the prospect of truly coming to grips with the  
Southeastern pollen flora is daunting. Granted, many of those  
plants probably don't produce pollen you're likely to find

preserved, and some of them (e.g., Gramineae) produce pollen  
which we can in good conscience lump rather indiscriminately.  
There are many pollen which should be identified carefully,  
though, and a good key is the only substitute which most of  
us have for a comprehensive collection of modern pollen.

I firmly believe that individuals who work in the Southeastern  
U.S. will find this atlas a most welcome source of help. No  
book is ever likely to contain photos of all the species we  
have in the Southeast, but this one seems to contain the most  
important types. Some that I routinely encounter, such as  
loblolly bay, *Gordonia*, are not figured, though I would have  
put them there. Others, such as *Itea*, Virginia willow, are in  
there in spite of the fact that the pollen are uncommon.

Of course one has to remember what the motivation for  
producing this text was; it was put together to assist  
palynologists who routinely work either with pollen  
eating/carrying insects and who may be somehow involved  
with commercial honey production and analysis. Don't expect  
to find spores, and don't look for very many gymnosperms  
because they aren't in this particular atlas. Much of the rest of  
the Southeastern flora is, however, and it is available in the  
most accessible fashion I have seen yet.

A few words about the aesthetic appeal of the photos are  
certainly in order. The photographs of *Passiflora*, *Polygonum*,  
*Ruellia*, and *Opuntia* are simply beautiful. The grains are  
wonderfully sculpted, and the people who took and processed  
the images obviously knew what they were doing so as to best  
display the details of these beautiful little things. Lately I have  
found skeleton weed, *Polygonella*, in some Pleistocene  
sediments and I can better appreciate why it looks as though it  
is trimmed with lace. The photographs of all but the  
unfortunate grasses, and all those reticulate tricolporate things,  
will at the very least be pleasing to most eyes. Perhaps the  
most striking photo of all is the one that made its way to the  
front cover, "A serendipitous occurrence of *Helianthus annuus*  
L." - a striking hexagonal array of seven sunflower grains  
showing great symmetry, simplicity, and beauty.

Some palynologists may balk at acquiring this volume  
because it is, after all, all SEM photos. We usually use  
transmitted light microscopy and there is a difference in how  
the grains appear in one medium or the other. On the other  
hand, the SEM's show details which can be readily related to  
transmitted light images, such as the incomplete reticulations  
at the poles of *Viburnum*, or the lacey fringes of *Polygonella*.  
In any case, the authors (and Vaughn Bryant personally) have  
said that there is a similar volume forthcoming which will  
contain transmitted light photomicrographs. That will be most  
useful to this palynologist, and I know that the two books  
will make life much easier for those who work in this  
complex, floristically diverse region.

In the mean time I intend to keep this atlas at my left elbow,  
with my much-fingered copy of "Key to the Quaternary Pollen  
and Spores of the Great Lakes Region," and a few other things  
which I still rely upon to find my way through the pollen flora  
of the Southeastern United States. If you work in any of the  
states included in the region represented, or if you work on  
ancient floras which are similar to those of the Southeastern  
United States (e.g. the German brown coals) you really should

have this book. Order it now before they run out because this  
one will go fast!

Submitted by:  
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Georgia Southern University  
Statesboro, Georgia 30460

### Pollen Flora of China

by Wang Fuhsiung, Chien Nanfen, Zhang Yulong, and Yang  
Huiqiu.

Science Press, (second edition, Chinese edition), 1995,  
Beijing, 461 pages with 205 plates, \$89.00. (Order from: Dr.  
Qinhua Jiang, Department of Geology, Peking University,  
Beijing 100871, Peoples Republic of China) E-mail:  
qjiang@geoms.geo.pku.edu.cn

The POLLEN FLORA OF CHINA provides an extensive look  
at Chinese pollen flora and is a useful substitute guide to that  
region of the world, if modern reference slides are not available  
for comparison. The authors have described and illustrated over  
1,400 pollen species, representing 912 genera and 121 plant  
families. The 205 plates of light photographs are mostly high  
quality, though a few are too dark or too light to provide  
excellent resolution. Also included is a bibliography and an  
index listing all of the pollen types discussed in the text.

For serious palynologists, almost any published pollen atlas  
or guide to the pollen flora of a region is a must for their  
bookshelf. The cost of these types of publications can be  
expensive, but they become an invaluable reference source  
when one needs to know specific facts about the pollen flora  
of a given geographical region. The POLLEN FLORA OF  
CHINA is no exception. Although it is the second edition, I  
doubt that many palynologists outside China have ever seen  
copies of the earlier first edition.

The book's major drawback, for those who do not read  
Chinese, is that the morphological descriptions, the common  
Chinese names, the distributional range in China, and the  
ecological habitat for each species is written only in Chinese.  
Nevertheless, even in the text portion most will recognize  
the Latin names of each pollen type, and will be able to  
determine the dimensions of each pollen taxa, which are listed  
in numerical form for each type. Often it was necessary to  
note the size range for each taxa from in the text because  
many of the photomicrographs lack any explanation about the  
size of the illustrated grain and none include a bar scale on the  
photograph. Occasionally, one can determine from the plate  
caption that a specific photomicrograph might be illustrated  
at some specific scale (i.e., 1,000x, 2,000x, 2,800x etc.).

Even for those who do not read Chinese, this book is a bargain  
at its price because it is a valuable reference tool and pollen  
key to a wide area of Asia. Several years ago, as part of a legal  
case, I was asked to examine a number of samples taken from  
vats of imported honey, purported to have come from  
Mongolia. As I progressed with that study, my greatest  
problem was not having ample examples of key pollen types



from some of the major floral types in Mongolia. A copy of the Flora of China might have made my study of those samples much easier.

I urge each of you to order your copy now, before this book goes out of print. Most pollen atlases and pollen guides seem to be printed in limited numbers, and soon are unavailable at any price.

Reviewed by:

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### Neogene-Quaternary Dinoflagellate Workshop

A Neogene-Quaternary Dinoflagellate Workshop is being organized by Martin J. Head and John H. Wrenn. It will be held during the (9th International Palynological Congress, in conjunction with a Symposium on Neogene-Quaternary Dinoflagellates. The Workshop will be held on Sunday, June 23rd. The Workshop will be dedicated to examining and discussing materials brought by participants, including holotype and topotype material, assemblage slides, photographs and 35mm slides of specimens. Microscopes, photomicroscopes, video equipment, 35mm slide projectors etc. will be available.

We encourage participants to bring materials for examination and exchange with colleagues. Be sure to bring film for use with the photomicroscopes. Use of an Englnad Finder™ would help expedite locating specimens.

A round table discussion of problematical and special-interest taxa will be held in the afternoon. A transcript of this discussion will be drawn up for possible publication, such as was done for previous Neogene-Quaternary Dinoflagellate Workshops (See Head et al., 1993, *Palynology*, 17:201-239).

If you wish to participate in the Workshop, contact Martin J. Head before March 31, 1996. Indicate what materials you may be able to bring and suggest taxa to be considered for the round table discussion. Thank you and we will see you at the Workshop!

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Toronto, Canada, M5S 3B1  
E-mail: head@quartz.geology.utoronto.ca

### C.I.M.P. Acritarch Subcommission Meeting and Workshop

The third in a series of Commission Internationale de Microflore du Paleozoique (C.I.M.P.) International Meetings and Workshops on Acritarchs, which originated in Keyworth-Nottingham in September, 1991, will be held April 10th to 12th, 1996, at Charles University in Prague, Czech Republic.

As decided at the meeting of the C.I.M.P. Subcommission at Sheffield in September, 1994, a major aim of our meeting is the presentation and discussion of the results of the two working groups created in Sheffield.

A general technical session on all topics of Acritarch Research will be organized. We encourage all acritarch workers to consider presenting either an oral contribution or a poster.

There will be time to have a look at material during the microscope session. With the hope of stimulating discussion and interchange, we invite everybody to bring along some palynological preparations, slides, or photographs.

A major objective of the Subcommission is to keep down the costs of our meetings to allow participation of a greater number of acritarch workers. We are happy to announce that the estimated fees for our meeting are very low. For additional information, contact the Acritarch Subcommission Secretary:

Dr. Thomas SERVAIS  
Services associés de Paléontologie  
Université de Liège  
7, place du XX Août  
B-4000 Liège, Belgium  
Phone: 00 32 41 665 440  
Fax: 00 32 41 665 700

### Birbal Sahni Institute To Host Meeting

Birbal Sahni Institute of Paleobotany, Lucknow is organizing a conference on "Physical and Biological Changes Across Major Geological Boundaries" from 10-12th September, 1996 on the occasion of its Golden Jubilee Year.

Oral presentations for the following seminars are welcome:

- Precambrian-Cambrian Transition
- Permo-Triassic boundary
- Cretaceous-Tertiary boundary

D. Pleistocene-Holocene boundary  
Additionally, presentations on geological boundaries not covered during oral sessions may be made in the "Poster Seminar". For details, write to the meeting Convenor:

Dr. P. K. Maithy  
Birbal Sahni Institute of Paleobotany  
53, University Road  
Lucknow 226 007, INDIA

### Meeting Calendar

March 14-16, 1996  
26th Annual Arctic Workshop, Institute of Arctic and Alpine Research (INSTAR), Boulder, Colorado, U. S. A. Contact: M. Duvall. Fax: 1-303-492-0246; E-mail: duvall@colorado.edu

May 19-22, 1996  
American Association of Petroleum Geologists-SEPM Annual Meeting, San Diego, California. Contact: AAPG Meetings, Box 979, Tulsa, Oklahoma 74101, U. S. A. Phone: 918-584-2555; Fax: 918-584-0469.

June 3-7, 1996  
European Association of Exploration Geophysicists and European Association of Petroleum Geologists, Amsterdam, Netherlands. Contact: EAPG, Attention of Mr. E. van der Gaag, PO Box 298, NL-3700AG, Zeist, Netherlands.

June 9-12, 1996  
North American Paleontological Convention (6th), Washington, D.C., USA. Contact: NAPC-VI, c/o Dept. of Paleobiology, Mail Stop 121, National Museum of Natural History, Washington, DC, 20560, USA.

June 21-30, 1996  
International Conference on Quaternary Glaciation and Paleoclimate in the Andes Mountains, and Surrounding Tropical and Subtropical Mountains. Contact: W. C. Mahaney. Phone: 1-416-736-2100, ext. 33923; Fax: 1-416-736-5103

June 22-29, 1996  
IXth International Palynological Congress, Houston, Texas, USA. Contact: Dr. V. W. Bryant, Jr., Department of Anthropology, Texas A & M University, College Station, Texas 77843, USA. Phone: 409-845-5242 Fax: 409-845-4070

June 23-28, 1996

7th International Symposium on Pollination: From Theory to Practice, Lethbridge, Alberta, Canada. Contact: Ken Richards, Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, Alberta, T1J 4B1. E-mail: richards@abrsle.agr.ca

June 30-July 5, 1996

International Association of Paleobotany, University of California, Santa Barbara, California, U. S. A. Contact: Dr. Bruce H. Tiffney, Department of Geological Sciences, University of California, Santa Barbara, California 93106, U. S. A. Fax: 805-893-2314; E-mail: tiffney@magic.ucsb.edu

September 11-13, 1996

Ist European Symposium on Aerobiology (CA 96), Santiago de Compostela, Spain. Contact: Dr. Maria-Jesus Aira, Departamento de Biología Vegetal, Facultad de Farmacia, Campus Sur 15706-Santiago de Compostela, Spain. Phone: 34-9-81-563100, ext. 4973/4974; Fax: 34-9-81-594912; E-mail: bvaira@usc.es

September 21-23, 1996

6th Canadian Paleontology Conference, Corner Brook, Newfoundland. Contact Dr. Elliot Burden, Department of Earth Sciences, Memorial University of Newfoundland, St. John's Newfoundland, A1B 3X5, Canada. Phone: 709-737-8395; Fax: 709-737-8142; E-mail: etburden@morgan.ucs.mun.ca

October 28-31, 1996

Geological Society of America Annual Meeting, Denver, Colorado, U. S. A. Contact: GSA HQ, Box 9140, 3300 Penrose Place, Boulder, Colorado 80301, U. S. A. Phone: 303-447-2020.



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# Interuniversity Master's Degree in Plant Micropaleontology and Palynology

University of Liège

This degree is for life science and earth science students who want to receive advanced training in pure and applied research in plant micropaleontology and palynology. Students will integrate their new knowledge into the broader context of oil industry and of geological and archeological exploration. The writing and presentation of reports as well as teamwork will be emphasized.

Courses will be taught in French or in English according to the demand.

The period of study is one year at least. Requirements include 360 hours of courses, of which students can choose elective topics up to 100 hours, laboratory work and field work, as well as writing a thesis which should be a research project conducted with a team of experts.

Courses are given by experts from various Belgian research institutions and universities. The degree offers a balanced program in each of the palynomorph groups and plant microfossils.

COURSES TO BE TAKEN BY ALL STUDENTS	ELECTIVE COURSES
1. <i>Introduction to plant micropaleontology and palynology</i> M. VANGUESTAINE, Université de Liège.	9. <i>Precambrian to Carboniferous Acritarchs</i> M. VANGUESTAINE, Université de Liège.
2. <i>Distribution of particular organic matter in the sedimentary basins</i> M. ROCHE, Université de Liège.	10. <i>Ordovician to Devonian Chitinozoa</i> J. VERNIERS, Gent Universiteit.
3. <i>Basic notions of organic matter petrography</i> Y. SOMERS, Institut scientifique des services publics.	11. <i>Ordovician to early Cretaceous cryptospores and miospores</i> Ph. STEEMANS, Université de Liège.
4. <i>Analysis of sedimentary basin</i> J. THOREZ, Université de Liège.	12. <i>Pollen and spores in-situ, wood debris and cuticles</i> M. FAIRLON-DEMARET, Université de Liège.
5. <i>Late Cretaceous to Neogene pollen and spores</i> E. ROCHE, Musée royal d'Arfrique centrale	13. <i>Quaternary palynology in temperate regions</i> A. V. MUNUAT, Université catholique de Louvain.
6. <i>Permian to Neogene Dinoflagellates (and acritarchs)</i> J. DE CONNICK, Gent Universiteit	14. <i>Quaternary palynology in Mediterranean regions</i> F. DAMBLON, Institut royal des sciences naturelles de Belgique.
7. <i>Stratigraphy</i> M. VANGUESTAINE, (ULg) with the collaboration of the teachers and of MM. M. COËN (ULC), C. DUPUIS (Mons), M. DUSAR (Serv. géol.), P.J. FELDER (ULg), E. GOEMAERE (ULg), E. POTY (ULg), Y. QUINIF (Mons), F. ROBASYNSKI (Mons).	15. <i>Quaternary palynology in intertropical regions</i> E. ROCHE, Musée royal d'Arfrique centrale
8. <i>Data processing and quantitative biostratigraphy techniques</i> G. VAN GROOTEL, Gent Universiteit.	16. <i>Coccolithes</i> E. STEURBAUT, Koninklijk Belgisch Instituut voor Natuurwetenschappen.
	17. <i>Diatoms</i> C. CORNET, Faculté Univ. Notre Dame, Namur.
	18. <i>Quaternary geology and geomorphology</i> E. JUVIGNE, Université de Liège.

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**Final date for registration:**

**31 August for citizens of European Union countries**  
**30 June for other countries.**