PALYNOS

Volume 13, No. 1 - June 1990

NEWSLETTER of the INTERNATIONAL FEDERATION of PALYNOLOGICAL SOCIETIES

One of the eminent pioneers of Soviet palynology, the President of the Soviet Palynological Commission, Professor Elena D. Zaklinskaya, passed away on October 10, 1989.

ELENA DMITRIEVNA ZAKLINSKAYA (1910-1989)

She devoted more than half a century to the development and advancement of the science of palynology, not only in the Soviet Union, but throughout the world. Although her early training was in geology, she was one of th first to grasp the significance of fossil pollen in stratigraphy from her researches in the Ural Mountains, Kazakhstan and Sakhalin. As a visiting scientist aboard the Soviet research ship Vityaz, she was able to visit many countries in order to build up a large reference collection of recent pollen and spores.

In 1939 Prof. Zaklinskaya founded the Palynological Laboratory at the Geological Institute of the USSR Academy of Sciences in Moscow. Through her efforts this laboratory became a renowned center of paleopalynological research. Her own scientific interests were varied—e.g., systematic palynology; Cretaceous and Paleogene palynomorphs as records of early angiosperm origin and evolution; palynological zonation and stratigraphic correlation; and the palynological evidence for ancient floral provinces. She was particularly interested in problems involved with the determination of the Cretaceous-Tertiary (K/T) boundary. Furthermore, she is well-known for her establishment of key pollen taxa for the correlation of continental and near-shore deposits.

During her lifetime, Professor Zaklinskaya published more than 150 books and research papers. Her publications have become important reference works for Soviet palynologists, and a number of students completed their dissertations under her guidance.

She was also heavily involved with the organization of national and international palynological conferences, symposia and working groups. Perhaps most noteworthy of these meetings were: (1) the All-Union Palynological Conferences (Novosibirsk, 1962; Tyumen, 1981; and Saratov, 1985); (2) the 3rd International Palynological Conference (Novosibirsk, 1971); and (3) the Special Symposium on Palynostratigraphy during the 27th International Geological Congress (Moscow, 1984). [*Ed. note: her report on this IGC Symposium appeared in Palynos 8 (1): 4-6, June 1985*]. The most recent All-Union Palynological Conference in Minsk (December, 1989) was dedicated to her memory.

Professor Zaklinskaya was very active in the palynology section of the Moscow branch of the All-Union Botanical Society. She also served as President of the Palynological Commission on the Scientific Problem Council of the USSR Academy of Sciences. She served as Vice-President of the International Commission for Palynology (1977-80) and also represented Soviet palynologists on the Council of the International Federation of Palynological Societies (1984-88).

She was a member of several commissions of the USSR Interdepartmental Stratigraphic Committee, member of the Scientific Council of Moscow State University, and a member of the editorial board of the journal *Review of Palaeobotany and Palynology*. In 1980 her manifold contributions to the science of palynology were recognized when she was awarded the **Gunnar Erdtman Medal in Palynology** by the Birbal Sahni Institute of Palaeobotany in Lucknow, India.

Elena D. Zaklinskaya demonstrated many notable attributes during her lifetime—she was a kind, loving mother and grandmother, an efficient, dedicated scientist, an indefatigable conference organizer, and a woman of considerable personal charm. Her memory will be forever retained by those whose lives she touched in some way—her family, friends, students and colleagues.

A. F. Chlonova (Novosibirsk)
L. V. Rovnina (Moscow)
M. V. Oshurkova (Leningrad)

AIX-EN-PROVENCE

1992

Olea europæa L.

VIII IPC

8° INTERNATIONAL PALYNOLOGICAL CONGRESS

Meet your organizing committee

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AIX-EN-PROVENCE

1992

Olea europæa L.

VIII IPC

RAISON D'ETRE FOR *OLEA*

Dr. **Annie Vincens** (Marseille) kindly sent me the plate containing the photographs and addresses of the members of the 8th IPC Organizing Committee. As soon as I saw the very attractive logotype of *Olea euopaea* L. (Olive) that the committee had selected for the 8th IPC, I wrote for clarification of their reason(s) for selection this tree for their "trademark." Dr. **Armand Pons**, the President of the Organizing Committee, promptly faxed me the following statement: "The olive tree, which has ben a universal symbol of peace since the Antiquity, has been selected as pictograph for the 8th International Palynological Congress, because Aix-en-Provence is situated in the centre of the French cultivation area of this typically mediterranean tree."

RECENT BOOKS

Batten, D. J. & M. C. Keen (eds.). NORTHWEST EUROPEAN MICROPALAEONTOLOGY AND PALYNOLOGY. British Micropalaeontological Society Series, Ellis Horwood, Chichester, 1989, 298 p., £69.95 (reduced price for BMS members £42.00).

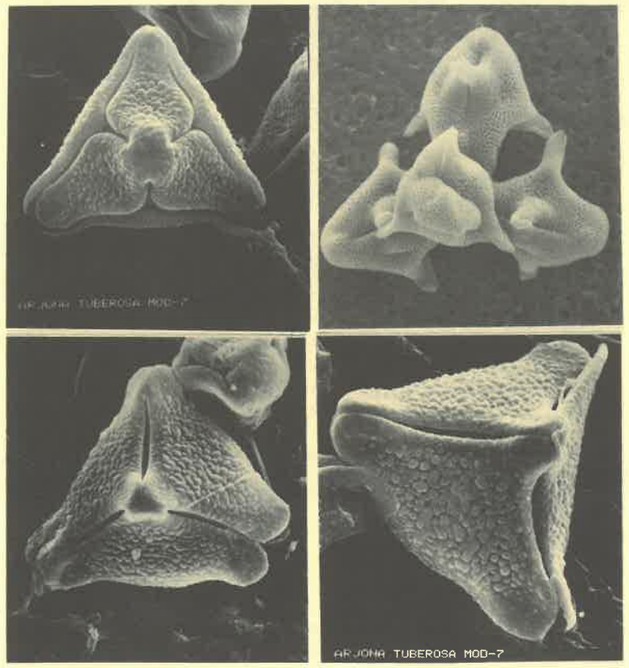
Manspeizer, W. (ed.) TRIASSIC-JURASSIC RIFTING, Continental Breakup and the Origin of the Atlantic Ocean and Passive Margins. (2 vols.) Elsevier, 1988, 998p., $294.75/Dfl. 560.

Taylor, T. N. & E. L. Taylor (eds.) ANTARCTIC PALEOBIOLOGY. Springer-Verlag New York, 1989, 261 p., hardcover $98.00.

Tissot, C. SIXIEME INDEX BIBLIOGRAPHIQUE SUR LA MORPHOLOGIE DES POLLENS D'ANGIOSPERMES. Institut Francais de Pondichery, India, 1989, 120 FF/Rs 270.

Zeist, W. Van. Wasylikowa, K. and Behre, K.--E. (eds.) PROGRESS IN OLD WORLD PALEOETHNOBOTANY, a retrospective view on the occasion of 20 years of the International Work Group for Palaeoethnobotany. A. A. Balkema, 1989, 300p, $42/£26/Hfl. 90.

The organizing committee of the VIII IPC. The last meeting, Paris. May, 1990.



ARE WE RELATED?

The upper right SEM represents the only known occurrence of a triprojectate Aquilapolles type of pollen in a tetrad condition. The individual grains are referred to *Integricorpus reticulatus* (Mtchedlishvili) Stanley and were obtained from the Hell Creek Formation (Maestrichtian) of North Dakota, U.S.A., X ca. 800. (For further details see: **Farabee & Skvarla** - *Palynology* 12: 43-48, 1988). The other three SEMs are different views of the unusual heteropolar grains of the extant *Arjona tuberosa* (Santalaceae) from temperate regions of South America. The morphology of these bizarre pollen grains is often cited as evidence for the possible relationship of the extinct Aquilapolles with modern Santalaceae. (SEMs submitted by **Michael J. Farabee,** Gordon College, Barnesville, Georgia).

Delegates to the NS '90 meeting at the headquarters of the British Geological Survey, Keyworth, Nottingham.

REPORT ON NORTH SEA '90

More than 160 delegates from 19 different countries assembled at the headquarters of the British Geological Survey at Keyworth, Nottingham, England on April 3-6 to attend the North Sea '90 Symposium. This meeting, organized jointly by the *Commission Internationale de Microflore du Paleozoique* (CIMP) and the Biostratigraphy Section of the British Geological Survey, was held to celebrate 25 years of palynological activity in the North Sea Basin. In the summer of 1965, when the first well was drilled in Block 38/29-1 by Amoseas, only a handful of palynologists were available in western Europe to provide the essential palynostratigraphic services; furthermore, the major concentration of expertise of these palynologists was in the Paleozoic. However, during the following quarter of a century, the North Sea Basin has seen an explosion of drilling activity and a diversification of palynological interests to the point where this region must now be regarded as one of the most important in the world.

The delegates enjoyed a full three-day scientific programme of 46 papers, which encompassed studies of strata ranging from the Late Silurian to Recent deposits, as well as with most geological aspects of palynology, viz., biostratigraphy, taxonomy, palynofacies and paleoenvironmental studies. In addition, special sessions were organized dealing with post-depositional maturation studies and advances in techniques. The programme clearly demonstrated the degree of finesse which can now be achieved in correlation studies in the North Sea Basin, and especially highlighted the major advances in Mesozoic and Cainozoic palynological studies which have occurred here.

The social programme included the usual Icebreaker session, as well as a special Symposium Dinner attended by the new Director of the British Geological Survey, Dr. **Peter Cook** and his wife, together with guests from the Department of Energy and Industry.

The final evening was devoted to a rousing competition for a new international trophy, the **CIMP Cup**; it is our intention that this trophy shall be awarded for winning some appropriate sport at all future CIMP meetings. At our meeting the chosen sport was 5-a-Side Soccer, with teams from Scandinavia (the Statoil Vikings), Utrecht, Sheffield and the British Survey battling it out in a packed University Sports Hall. Despite providing the referee, the Survey team and the Vikings went out in the first round, with Sheffield eventually overcoming **Henk Brinkhuis** and his Dutch "cloggers" in the final. The fact that the entire Utrecht contingent spent the four days of the Symposium camping out in sub-zero temperatures undoubtedly affected their match fitness. The **CIMP Cup** is now on display in Sheffield until 1992, when it will be competed for again at the 8th IPC in Aix-en-Provence, France.

The Symposium concluded with a one-day excursion to examine sections of the Late Triassic and Jurassic in eastern England. The Proceedings of this Symposium is being edited by **Geoffrey Warrington**; publication is scheduled for a future issue of *Review of Palaeobotany and Palynology*.

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UK

NORTH SEA '90 SCENES

(A) **John Richardson** (British Museum Nat. Hist.) with his "it can't possibly be Devonian" look. (B) **Aideen McNestry** (BGS) modelling NS '90 leisurewear. (C) Palynologists from Sheffield University—winners of the initial CIMP Cup. Back row, L to R: **Keating, Hogg, Ibrahim, Abbot, McLean**. Front row: **Sumner, Medhawi, Snape.** (D) University of Utrecht (Lab. of Palaeobot. & Palynology) runners-up (and still happy!).

(Photos courtesy of **Bernard Owens,** BGS).

International symposium to celebrate 25 years of palynology in the North Sea Basin

LINNEAN SOCIETY PALYNOLOGY SPECIALIST GROUP (LSPG)

The *Linnean Society of London* has a number of specialist groups dealing with many aspects of biology. The Palynology Specialist Group was formed in 1974 with **Keith Ferguson** (Royal Botanic Gardens, Kew) as its Secretary.

One of the first activities of this Palynology Group was the organization of the highly successful international symposium "The Evolutionary Significance of the Exine" held in 1974. As co-convenor with **Keith Ferguson, Jan Muller** (Rijksherbarium, Leiden) brought his considerable expertise and energy to the organization of the symposium. This was the first major meeting primarily concerned with Recent pollen to be sponsored by the *International Commission for Palynology (ICP)*; it was attended by some 90 participants from 15 different countries. The resulting proceedings volume (1976) launched a new Symposium Series for the Linnean Society and, through the quality and originality of its 25 chapters, has become a widely-cited reference in palynology.

A number of half- and one-day meetings were held in the ensuing years until 1985, when the Palynology Group teamed up with the *Systematics Association* to organize a second international symposium "Pollen and Spores: Form and Function." Although **Keith Ferguson** and **Steve Blackmore** were co-conveners of this meeting, the early stages of planning benefited enormously from the advice and encouragement of **Jan Muller,** who unfortunately died prior to the symposium.

A special strength of this Palynology Group is the diversity of disciplines represented by its 75 members, whose interests range from palaeopalynology, reproductive biology, archeology, melissopalynology and plant systematics to aerobiology. Membership is open to all, i.e., it is *not* restricted to Fellows of the Linnean Society. Since 1986 our Group has held regular one-day meetings in the Spring and Autumn and produced occasional newsletters. These meetings are held in the impressive surroundings of the Linnean Society lecture theater at Burlington House, Piccadilly, and are open to all interested palynologists.

Our Palynology Group became affiliated with the *International Federation of Palynological Societies (IFPS)* in 1987 and hopes to continue as an active force in international palynology. Its most recent major event was an international symposium entitled "Pollen and Spores: Patterns of Diversification," held at the Linnean Society on 27-28 March and at the British Museum of Natural History on 29 March, 1990.

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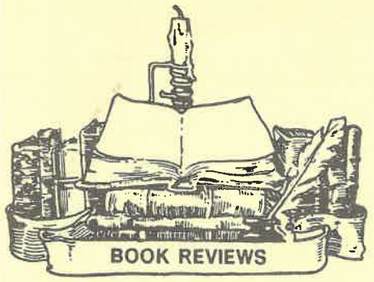

PALYNOLOGY AND PALYNOFACIES OF THE UPPER TERTIARY IN VENEZUELA. Maria A. Lorente. 1986. *Dissertationes Botanicae, Band* 99, J. Cramer (Berlin), 222 pp. + 13 fold-in charts. Distributed by Lubrecht & Cramer Ltd., RD 1, Box 244, Forestburgh, N.Y. 12777. U.S. $72.50.

This study is the most recent and complete published statement on zonation within and between the Eastern Venezuela, Falcon, and Maracaibo Basins based on pollen and spore composition and palynofacies. It follows the earlier work of **Germeraad, Hopping, & Miller** (1968) and was coordinated with the recent publication by **Miller et al.** (1987) on the Cretaceous, Tertiary, and Quaternary of northern South America. The strength of **Lorente's** study is the multiplicity of approaches and modern methodologies applied to the problem of palynostratigraphy and correlation in the Venezuelan basins. This research project was facilitated in part by the involvement of Dutch palynologists long familiar with northern South America (e.g., **T. van der Hammen,** promoter of the dissertation, and to the late **Jan Muller,** to whom the work is dedicated), as well as by the expertise and facilities available through *Maraven, S.A.* and other affiliates of the *Petroleos de Venezuela, S.A.*

The book is divided into the following eight chapters: (1) Introduction (Objectives, Materials, Results, Acknowledgements); (2) Methods (including Sample Preparation Techniques, Quantitative Methods Applied to Palynofacies Preparations, GC-MS [Gas Chromatography-Mass Spectrometry] studies); (3)Characterization of Organic Matter (by optical techniques and by pyrolysis-gas chromatography-mass spectrometry); (4) Venezuelan Upper Tertiary Palynological Zonation; (5) Palynology and Palynofacies of Clastic Sedimentary Environments (tropical models, including models for the fluvial system, delta complex, and marine environment derived from automatic image analysis); (6) Palynological and Palynofacies Analysis of Basins; (7) Systematic Part; and (8) General Conclusions.

Terminology follows **Iversen & Troels-Smith** (1950), and the classification system is a combination of that of **Potonie´** (1956, 1958 et seq.) and **Iversen & Troels-Smith** (1950): e.g., Sporites- Triletes, Monoletes; Pollenites- Inaperturatae, Monocolpatae, Diporatae, Triporatae, etc. Seventy-six genera and 108 species are recognized, including one new genus (*Nijssenosporites, N. fossulatus*) and 12 new species. The stratigraphic occurrence of the species are given for northern South America, as well as for the Venezuelan basins, and Table 21 presents the relationships between different palynological zonations for Venezuela and other countries, particularly Brazil. The specimens are illustrated with LM, and some with TEM.

The production quality of the book is good, and there are only occasional typographical errors: Muller et. al. (1987) reference on p. 144 listed as 1985; van der Hammen et Garcia, 1965 (p. 168) not listed in References; *Echinosporis* spp. plate VII, is actually on plate IX; *Psilaperiporites minimum,* plate XI, is on plate XIII; *Psilatricolporites maculosus,* plate XIX, is on plate XXI; *Psilatricolporites transversalis,* plate XXIII, is on plate XXI; *Psilatricolporites venezuelanus,* plate XXIII is on plate XXI; and there are inconsistencies between some ranges listed in the text and presented in Tables 11-13; *Crototricolpites annemariae* (p. 181) and *Bombacacidites baumfalki* (p. 186) are listed as extending *to* the *Alnipollenites* Zone, while in the tables they extend *through* this zone; *Perfotricolpites digitatus* (p. 181) is said to be present "throughout the stratigraphic interval included in this study," but it is not listed for the *Psilatricolporites caribbiensis* zone on Table 11 or the *Alnipollenites* zone on Tables 12 and 13. There are several other confusing examples, thus it is not possible to know whether the text or the tables gives the intended range; in some cases, an indication of the correct range can be gained by comparison with **Muller et al.** (1987).

Overall, the study is impressive in its scope, and excellent in the variety of analyses applied to establishing the zonation, correlation, and palynofacies of Tertiary deposits in northern South America.

REFERENCES

Germeraad, J.H., C.A. Hopping, and **J. Miller.** 1968. Palynology of Tertiary sediments from tropical areas. *Rev. Palaeobot. Palynol.* 6: 189-348.

Iversen, J. and **J. Troels-Smith**. Pollenmorfologiske definitioner og typer. *Danmarks Geol. Undersogelse* 3: 1-52.

Muller, J., E. Di Giacomo, and **A.W. Erve.** 1987. A palynological zonation for the Cretaceous, Tertiary, and Quaternary of northern South America. *Amer. Assoc. Stratig. Palynol., Contrib. Ser. No.* 19: 7-76.

Potonie´, R. 1956. Synopsis der Gattungen der Sporae Dispersae. I. Teil: Sporites. *Geol. Jahrb.* 23. 123 pp. . 1958. Synopsis der Gattungen der Sporae Dispersae. II Teil: Sporites (Nachtrage), Saccites, Aletes, Praecolpates, Monocolpates. *Geol. Jahrb.* 31. 114 pp.

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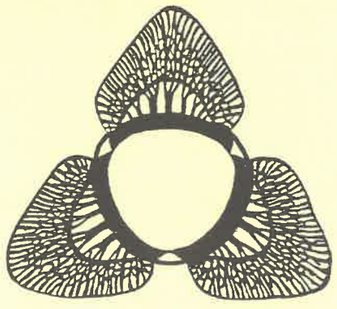

POLLEN: ILLUSTRATIONS AND SCANNING ELECTRON MICROGRAPHS.

Yozo Iwanami, Tetsuo Sasakuma, and Yoshio Yamada. Kodansha Ltd. and Springer-Verlag. 198 pages. ISBN 3-54018833-9 (Springer-Verlag), ISBN4-06-202690-2.

This book consists of seven chapters discussing various aspects of pollen grains, but is essentially a pollen atlas of scanning electron micrographs (SEMs). The authors include 91 pages of SEMs in Chapter 2. the main chapter (*Pollen Morphology of Flowering Plants*). One or two SEMs are used on most pages, a low magnification of a whole pollen grain and then a high magnification of the surface. The quality of the SEMs is the poorest I can ever recall viewing in publication. The majority of the pollen grains in low magnification are collapsed or otherwise distorted and appear as harsh silhouettes, while the magnified surfaces are frequently obscured by shadowed and blackened areas. All of the micrographs are extremely grainy, usually overexposed, and enigmatically, printed on very high contrast paper which enhances the inadequately prepared and highly electronically "charged" and "noisy" pollen grains. My disappointment with these SEMs is that modern day scanning electron microscopy is not accurately represented by the pollen grain micrographs in this book; rather, the impression is that the micrographs reflect the infancy of SEM to pollen studies of 25 years ago. To paraphrase a colleague who, years ago, in regard to a publication with similar quality micrographs, these pollen SEMs are "throwaways."

The poor quality of the micrographs may also be influenced by the preparation method. As outlined on page 122, fresh pollen was either air-dried or critical point-dried and then coated with gold/carbon. While such preparation is acceptable in some pollen studies, it is highly limiting when pollen wall characterization is the primary objective. Without initially "cleaning" the pollen surface with a solvent such as ethyl alcohol or, more drastically, with acetolysis, the amount of morphological information obtained is obscured by the natural accumulation of waxes, oils, proteinaceous substances, tapetal debris, etc. Since the objective was to show pollen morphology, it is surprising that the standard acetolysis methodology was not utilized.

While other chapter headings, *Genesis of Pollen* (Chapter 1), *Pollination and Pollen Tube Growth* (Chapter 3), *Physiology of Pollen* (Chapter 4), *Genetics of Pollen* (Chapter 5), *Pollen in Air and Pollinosis* (Chapter 6), and *Pollen in Soil* (Chapter 7), imply a text providing comprehensive treatment of pollen grains in addition to exine morphology, they actually present little more than elementary school explanations. Each chapter is divided into subchapters and none provides more than a few sentences of discussion, all of which are extraordinarily superficial. Indeed, the most impressive parts of these chapters are the drawings and light photographs. In fact, the irony in this book is that although the authors strongly emphasize the superiority of scanning electron microscopy over light microscopy, their micrographs show a *decided reversal*—the light photographs are exquisite!!

Perhaps the tone of the book is set by the authors' preface in which they state that ". . . the fine structure on the surface (of a pollen grain) cannot be observed under the light microscope." In the purest sense, this of course is true, but I somehow feel that the late Professor **Gunnar Erdtman,** the father of systematic palynology, would have provided numerous examples of pollen examined by various light microscope means that would rival much SEM, and certainly those in this book. Just a casual perusal of Erdtman's publications would easily underscore this point.

Technical deficiencies are also evident. It is difficult to understand why **Springer-Verlag,** a world leader in scientific publications, did not do a better job in editing the very meager text. There are numerous typographical errors as well as inappropriate use of English. There are also numerous pages which are only partically filled, a seemingly needless waste.

The cost of this book, $72.50, essentially guarantees that it will not be a staple on palynologists' bookshelves. Further, with the huge financial cutbacks that university libraries are having to make in their book orders, I doubt if it will be seen much on their bookshelves either.

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PALYNOLOGIA MADAGASSICA ET MASCARENICA. In: *Tropische und Subtropische Pflanzenwelt,* volumes 61 (1988), 67 (1989), and 72 (1989).

These three volumes represent the conclusion of **Herbert Straka's** pollen flora of Madagascar and the Mascarene Islands, a truly monumental work that took 25 years to complete. With justified pride, **Straka** can state that his opus (that describes about 1500 genera in 189 families) renders Madagascar the palynologically best known tropical flora in the world.

Description of the taxa in these three volumes follows the same format of the previous volumes, reviewed by me in *Palynos* 9(2), 1986. For each family discussed, taxonomic and pollenmorphologic literature is listed, followed by a brief biogeographic and habitat description, pollination mechanisms, pollenmorphological characters according to **Erdtman's** classification, and many figures with high quality of light and scanning photomicrographs. A synoptic table summarizes the pollenmorphologic characters for all taxa treated in each specific volume, using a numerical code that can only be deciphered consulting the glossary of the terminology, published earlier in French (in the journal *Pollen et Spores,* v.6:239-288) and in English (in *Tropische und Subtropische Pflanzenwelt,* v. 55:137-158). A setback for the potential pollenstratigrapher is the lack of pollenmorphologic tables or keys that contain the whole flora. However, as shown by **D.A. Burney** in his analysis of Holocene vegetation changes in Madagascar (*Quaternary Research, 1987, v. 23),* this problem can apparently be overcome. Perhaps **Straka** and his co-authors will ultimately design a pollenmorphologic key for at least the major pollen taxa encountered in modern and fossil pollen assemblages, once they begin to work on these aspects themselves. Fortunately, the authors

Continued on page 8.

Continued from page 7.

included an index in the last volume (72) that contains the publication citations of all families and genera (excluding species, however) described since the project started in 1964. Although many families were described twice, in earlier issues of *Pollen et Spores*, as well as in the new series of *Tropische und Subtropische Pflanzenwelt*, there is no real duplication, because the earlier descriptions are commonly more detailed and contain primarily light photomicrographs, instead of primarily scanning photomicrographs as in the later versions. Thus, it is worthwhile to consult both versions for the study of a specific family. As it stands, there is a wealth of data accumulated, an invaluable source for plant and pollen taxonomists and pollenstratigraphers for years to come, and **Straka** has to be congratulated for his perseverance in bringing this project to completion.

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FUTURE MEETINGS

1990

July 1-7
4th EVOLUTIONARY CONGRESS OF SYSTEMATIC & EVOLUTIONARY BIOLOGY (ICESB IV), Maryland, U.S.A. (J. Corliss, Dept. Zoology, Univ. of Maryland, College Park, MD 20742)

August 15-17
ARCTIC GEOLOGY AND PETROLEUM POTENTIAL (Meeting), Troms, Norway. (Norwegian Petroleum Society, Box 1897-Vika, 0124 Oslo 1, Norway)

August 15-21
NONMARINE CRETACEOUS CORRELATIONS, INTERNATIONAL SYMPOSIUM. International Geological Correlation Program, Project 245. (Dr. Dan Grigorescu, Faculty of Biology, Geography, Geology, University of Bucharest, Romania)

August 23-September 1
NONMARINE CRETACEOUS CORRELATIONS. Continuation of IGCP Project 245, Alma-Ata, USSR. (Prof. V.A. Krassilov, Institute of Biology and Pedology, Vladivostok 690022, USSR)

August 27-31
SIXTH INTERNATIONAL SYMPOSIUM ON POLLINATION, Tilburg, The Netherlands. (Secretariat, Ambrosiusweg 1, 5081 NV Hilvarenbeek, Netherlands)

August 26-September 1
SEDIMENTOLOGY (13th International Congress), Nottingham, U.K. (I.N. McCave, Dept. of Earth Sciences, University of Cambridge, Downing Street, Cambridge CB2 3EQ, U.K.)

August 27-31
4th INTERNATIONAL CONFERENCE OF AEROBIOLOGY, Stockholm. (Administrative Secretary 4th IAC, Konferensservice AB, Box 4037, S-17104 Solna, Sweden)

September 24-28
VIIIth SYMPOSIUM ON PALYNOLOGY OF APLE (Asociacion de Palinologos de Lengua Espanola), Tenerife, Canary Islands, Spain. (Secretaria del 8 Simposio de Palinologia, Departamento de Biologia Vegetal (Botanica), Universidad de La Laguna, 38271 La Laguna, Tenerife, Islas Canarias, Espana)

October 10-13
AMERICAN ASSOCIATION OF STRATIGRAPHIC PALYNOLOGISTS, 23rd Annual Meeting, Banff, Alberta, Canada. (David J. McIntyre, Institute of Sedimentary and Petrleum Geology, 3303 33rd Street, N.W., Calgary, Alberta, Canada, T2N 4E9, Telephone (403) 292-7089.)

1991

August 2-9
QUATERNARY RESEARCH (13th INQUA International Congress), Beijing, P.R. China. (Secretariat, 13th INQUA Congress, Chinese Academy of Sciences, 52 Sanlihe, Beijing 100864, People's Republic of China)

September 6-11
PALEOECOLOGY (2nd International Congress), Nanjing, P.R. China. (Ma Yu-Ying, Nanjing Institute of Geology and Palaeontology, Academia Sinica, Chi-Ming-Ssu, Nanjing 210008, P.R. China)

September 22-27
CARBONIFEROUS-PERMIAN STRATIGRAPHY AND GEOLOGY (12th International Congress), Buenos Aires, Argentina. Language: English. (Dr. S. Archangelsky, Museo Argentino de Ciencias Naturales, Av. A. Gallardo 470, Buenos Aires 1405, Argentina)

1992

June 28-July 1
PALEONTOLOGY (5th North American Convention), Chicago, U.S.A. (Dr. Peter R. Crane, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605-2496, U.S.A.)

August 24-September 3
INTERNATIONAL GEOLOGICAL CONGRESS (29th), Kyoto, Japan. (Dr. Tadasahi Sato, Chairman, Japanese National Committee on Geology, Inst. of Geoscience, The University of Tsukuba, Ibaraki, 305 Japan)

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