

IOP NEWSLETTER 14

INTERNATIONAL ORGANIZATION OF PALAEOBOTANY

INTERNATIONAL UNION OF BIOLOGICAL SCIENCES
-SECTION FOR PALAEOBOTANY
President: Prof. T. DELEVORYAS, USA
Vice Presidents: Prof. E. BOUREAU, FRANCE
Dr. S. ARCHANGELSKY, ARGENTINA
Dr. S.V. MEYEN, USSR

Secretary: Dr. M. C. BOULTER
N. E. London Polytechnic,
Rcmford Road,
London, E15 4LZ, England.

FEBRUARY 1981

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PLEASE MAIL NEWS AND CORRESPONDENCE TO YOUR REGIONAL REPRESENTATIVE OR TO THE SECRETARY FOR THE NEXT NEWSLETTER 15. The views expressed in the newsletter are those of its correspondents and do not necessarily reflect the policy of IOP.

IOP NEWS

ELECTION OF OFFICERS

As announced in the last two newsletters, posts for one president, one secretary, three members-at-large and one congress member become vacant this year. This means that Boureau, Archangelsky and Meyen stay on as vice-presidents (unless elected to other posts) and that Delevoryas, Boulter, Dilcher, Weber, Zhilin and Douglas vacate their posts but can be nominated for re-election. The constitution is ambiguous about the matter, but the executive committee interprets it to mean that all those vacating their posts were eligible for re-election. It would help if the next executive committee were to rewrite the constitution. A ballot paper is attached at the end of this newsletter. All paid up members of IOP are eligible to vote. Chaloner was nominated by Andrews and Delevoryas, Meyen by Boulter, Boulter by Andrews, Hughes by Andrews, Snigirevskaya by Andrews, Phillips by Andrews and Taylor by Delevoryas.

ANNUAL REPORT & FINANCIAL STATEMENT FOR 1980

Copies of these two documents have been submitted to I.U.B.S. and are available to individual members from the secretary. For the first time since the constitution of IOP was changed in Leningrad in 1975 the financial balance sheet shows a small profit. This is due to the recent increase in subscription charges and to the donation of \$864 profit from the First International Palaeobotanical Conference held in Reading last year. The outlook for 1981 is optimistic in view of a \$1,000 subvention from I.U.B.S., though continuing support from some institutions with postal facilities is likely to decline, due to the international economic recession.

income: 261 membership dues of \$6.00	1,566
donation of profit from Reading meeting	864
	<u>\$ 2,430</u>

expenditure: bank charges and loan repayment	100
stationary etc	100
typing charges	350
newsletter production	520
postage (part)	850
Reading meeting charges	90
bibliography subsidy	300
	<u>\$ 2,310</u>

profit over 1980: \$120

IOP GENERAL ASSEMBLY 1981

This is to formally announce that there will be a meeting of the IOP General Assembly during the 13th International Botanical Congress at Sydney Australia this August. IOP president Ted Delevoryas will chair the meeting and the executive committee congress member Jack Douglas has kindly agreed to serve as secretary to the meeting.

PAYMENT OF DUES 1981

Annual dues of US\$6.00 for each member in countries with easy currency exchange facilities with London are to be paid before the end of March 1981. If you have not paid already (according to IOP office records) you should receive an invoice with this newsletter. Most members find it simpler to pay for a number of years membership at one time. If you pay directly to London please send a cheque in £ sterling (£3 a year for each member) drawn on a London bank - this makes substantial savings on bank charges.

SECRETARIAL ACKNOWLEDGEMENT

The secretary receives many communications from IOP members which are not acknowledged. This saves time and money but is clearly impolite and inefficient. Will angry correspondents please accept this note as an apology?

I.U.B.S. SUBVENTION

The International Union of Biological Sciences has given IOP a grant of \$1,000 to help cover expenses for this year's activities. This ensures that money is available for newsletters 14 - 16 and suggests that some further assistance may be available for bibliographic enterprises. The IOP executive committee is very grateful to the IUBS executive for this generous and helpful encouragement.

REPORTS OF RECENT MEETINGS

INTERNATIONAL SYMPOSIUM ON THE PLANT CUTICLE, LONDON, SEPTEMBER 1980

This conference held under the auspices of the Linnean Society of London at Burlington House was attended by some 70 scientists representing 12 countries. It succeeded in bringing together research workers interested in widely differing aspects of cuticle studies. The first day was devoted mainly to the structure and chemistry of the cuticle, surface waxes and other components. The second day combined topics concerning the passage of materials through the cuticle and ranged from the structure and function of the specialised cuticles of the stigma and secretory cells to penetration of herbicides and pesticides in crop plants. The third day covered taxonomic aspects

of cuticle structure and micromorphology, including reviews of the cuticle in early fossil vascular and non-vascular plants. The meetings were extended to an informal half day at Kew for further discussions of the taxonomic applications of cuticle organisation. The proceedings of the conference are to be published by the Linnean Society.
K.L. ALVIN, LONDON.

THIRD NORTHEAST USA PALEOBOTANICAL CONFERENCE, HARVARD, OCTOBER 1980
More than 35 local palaeobotanists attended this meeting, and other participants came from as far away as Texas, North Carolina, Illinois and Michigan. There were 15 papers and 2 demonstrations.

The tone of the meeting was set on Friday night (which was Halloween or All Hallow's Eve) when the evening's speaker, Tom Phillips of the University of Illinois, was introduced by a two metre Lepidodendron tree. This was appropriate as Tom provided an excellent review of the ecology of Carboniferous coal swamps, beautifully illustrated with slides and diagrams. Besides being informative Tom conveyed a personal history of how he became interested in his present research, and left us all with an appreciation of the fun and excitement of the science. Bruce Tiffney (Yale University) led off Saturday morning with a short paper summarizing the (meagre) fossil record of the gasteromycetes. This reviewed a reinvestigation of Geaster florissantensis Cockerell which was shown not to be a fungus. Paul Strother (Harvard University) then reviewed the Silurian microfossil evidence for land plants, including spores, banded tubes and sheets of cells. While the affinities between these elements remains unclear it is possible to trace patterns of association between them. Alice Tyrone (Harvard University) summarised her work on the morphology of pteridophyte spores with the s.e.m. This work will lead to an illustrated generic key of pteridophyte spores. Patricia Gensel (University of North Carolina) described a beautifully preserved Zosterophyllophyte from the Devonian of New Brunswick. It has the general aspect of Gosslingia and exhibits circinnate vernation. Charles Beck (University of Michigan) presented a detailed s.e.m. study of the anatomy and mode of preservation of Callixylon wood. Of particular interest was the presence of a circular pit aperture in C. arnoldii, a feature which contrasts to the slit like aperture of other Callixylon species, and which is normally correlated with the presence of a torus. Karl Niklas (Cornell University) offered a developmental model of the modes of branching and growth in early land plants. Taking simple assumptions regarding the behaviour of the apical meristem, he was able to demonstrate how a wide range of vegetative and reproductive morphologies could be achieved by simple developmental alterations. In the same developmental framework Dom Paolillo (Cornell University), in perhaps the most interesting paper of the meeting, discussed the classic lineage of Lepidodendron - Sigillaria - Pleuromeia - Nathorstiana - Isoetes, including Paurodendron. He concluded that there is developmental similarity in the rhizophore/rootlet complex between Paurodendron, Lepidodendron and Sigillaria, but that this group is distinct from Pleuromeia, which is in turn distinct from Nathorstiana - Isoetes. The published paper is eagerly awaited.

After lunch Karl Niklas returned with a fascinating discussion of the physics of wind pollination in Devonian seeds, a study which involved scale models and a wind tunnel, and which provides the "selective pressure" involved in the acropetal fusion of telomes about the ovule. Jim Walker (Amherst) provided a survey of early angiosperm pollen and the pollen of some primitive modern angiosperms. As a result of a truly exhaustive study Jim concluded that the limited range of characters in

the Cretaceous pollen may be a false lead, and that really, many different taxa were present. Scott Wing (Yale) discussed work in Eocene sediments of the Bighorn Basin of Wyoming, where he has been establishing a correlation between sedimentary environments and paleocommunities of plants. Much of the vegetational and floristic change encountered in the basin during the Eocene is seen to be ecological rather than evolutionary. Bill Crepet (University of Connecticut) described a new seven-merous campanulate Eocene flower from Texas which compares most favourably with the Gentianaceae. The pollen borne in the flower is even more fascinating (Pistillipollenites), for it is reported from as far back as the Cenomanian. Cecelia Lenk (Harvard) discussed the interpretation of pollen samples from buried soils created by wind-throws in the Harvard Forest. Since the windthrows can be dated by recorded history, she was able to present a palynological reconstruction of the local forest vegetation during the last 500 years. Steve Manchester (Indiana University) reviewed the Pterocaryoid fruit remains from the Rocky Mountain region. He concluded that this group was more diverse in the Paleogene than at present, and on the way by, introduced the audience to at least three new species from the fossil record. The demonstrations included several beautiful Devonian plants from Gaspé presented by Pat Gensel, and a very nice discussion (with written instructions) of a new technique for making slides of pyritized/limonitized material, presented by Bill Stein and Dave Wright (University of Michigan). Saturday evening saw Bruce Cornet (Exxon Oil) discuss his investigation of a fascinating Sanmiguelia-like plant from the Triassic of Texas. While it is not clear to what group the plant belongs, it is clear that it is a fascinating organism. The stimulation of the meeting lasted well beyond the papers, as small groups congregated in the corners on both evenings, arguing science while renewing and establishing friendships - all good evidence that there will be a fourth annual N.E.P.C. next fall.

B. TIFFNEY, YALE, CONNECTICUT, USA.

FOURTH ARGENTINIAN SYMPOSIUM ON PALAEOBOTANY & PALYNOLOGY 1980

This meeting was held in Cordoba city under the auspices of the National Academy of Sciences, the National Research Council, the Argentinian Palaeontological Association and the Latinamerican Association of Palaeobotany and Palynology. Seventeen papers were presented on a wide range of palaeobotanical topics. Additionally, Dr O. Rosler gave an address on "Current palaeobotanical and palynological investigations in Brasil" and finally a meeting of the working group on "Palaeophytologia Kurtziana" was held. After these lectures there was a two day field excursion to some Carboniferous and Permian localities.

S. ARCHANGELSKY, BUENOS AIRES.

25 ANNIVERSARY OF THE ARGENTINIAN PALAEOONTOLOGICAL ASSOCIATION

On November 21st 1980 the 25th anniversary of the APA was celebrated. During the morning a round table discussion on palaeontological development and needs in the country took place. During the afternoon there were lectures by four specialists: Dr J.C. Gamarro gave a survey on palynology; S. Archangelsky talked on 100 years of palaeobotany in Argentina. Members of the first Commission were honoured with diplomas, two of them palaeobotanists: Pedro Stipanovic and Carlos Menendez (posthumously). The APA publishes the quarterly journal Ameghiniana, the only regular palaeontological publication in Latin America during the last decades. Palaeobotanical and palynological papers form an important part of the journal and some numbers have been devoted exclusively to these fields.

S. ARCHANGELSKY, BUENOS AIRES.

IV COLOQUIO SOBRE PALEOBOTANICA Y PALINOLOGIA, MEXICO, JULY 1980
This meeting included lectures on Precambrian and Palaeozoic floras, Mesozoic palynology and palaeobotany and on Tertiary palynology. A 65 page booklet is now available which contains abstracts of each of the lectures. It has been published by the Instituto Mexicano del Petroleo. Dr R. Weber has kindly provided IOP with a copy of this: write to the secretary of IOP if you would like to borrow it.

IGCP 42: UPPER PALAEOZOIC OF SOUTH AMERICA, SAN JUAN, JUNE 1980
Five palaeobotanical papers were presented at this meeting, on new lycopods from San Luis, the Permian of Paraguay, Fedekurtzia, the Permian of Chubut and the Permian of Nueva Lubecka. There were also four palynology papers presented. After the lectures a field trip visited Carboniferous sections at La Rinconada and Hoyada.
S. ARCHANGELSKY, BUENOS AIRES.

TOPICS FOR DEBATE

THE STARTING POINT OF PALAEOBOTANICAL NOMENCLATURE

The February 1981 edition of Taxon includes a paper on this topic. Its aim is to change the starting point of palaeobotanical nomenclature from Sternberg 1820 to Schlotheim 1820. The author is Dr D. Storch, DDR, 69 Jena, Fritz Krieger Strasse 6. He writes to IOP newsletter to say "That many peoples of different countries have agreed to my proposal, please keep in mind the words of ANDREWS, in his new book, about this question."

Also: "Since 1954 (Eighth International Botanical Congress Paris) nomenclature of fossil plants begins with the first fascicle of Sternberg's "Versuch einer geognostisch-botanischen Darstellung der Flora der Vorwelt" (1820). Schlotheim's "Petrefactenkunde" (1820) is regarded as invalidly published. The arguments for and the consequences of this decision (proposal by J.M. Schopf 1949) are discussed. Resulting from this discussion the author (Storch) proposes to change the starting point of the palaeobotanical nomenclature to begin with Schlotheim's "Petrefactenkunde" (1st January 1820). The consequences and the advantages of this proposal are discussed. Additional proposals are: conservation of Cordaitea Unger 1850 and change of the type species of Calamites Brongniart 1828 nom. cons. from C. radiatus Brongniart to C. suckowii Brongniart."

'cf.' - SYMBOL OF AN OUTMODED DATA-HANDLING SYSTEM

The symbol 'cf.' is no goblin of taxonomy, but is an integral part of the current methods; E. Kovacs-Endrody (IOP Newsletter 12, p.8) is correct, however, to imply that this symbol serves only the convenience of the writer and almost never that of the reader. There is a course of logical convention for the use of cf. and aff., but it is questionable whether any useful purpose is served by attempting to clarify any more such an imprecise method in palaeobiology.

The object of the use of these symbols is to express doubt that the material being referred to can accurately be attributed to the specified taxon. For living material a simple warning of this kind about the attribution may be acceptable and even on occasions useful. For fossil material, however, with a normal use of such data as compilation into lists for stratigraphic and palaeoecologic interpretation, these symbols merely act to cancel the entry for any conscientious user; even the text of the relevant article seldom reveals the basis of the qualification. A reader who is not conversant with all the details is in no position to adjudicate on the validity of one entry about which the writer declined to decide.

Perhaps it is worth considering briefly what the average reader or user has a right to expect from such records, and therefore what the author or writer should provide. In the case of data on fossils, there is much to be said for keeping all attributed material in some way separate from the type (or topotype) material which alone can retain the integrity of definition and identification supposedly enshrined in a fossil species name. The obvious method would be to use 'cf.' for all attributed material, and thus avoid expanding the reference or type; this is suggested because attribution without any qualification amounts to expansion of the taxon (both record and concept), uncontrolled except by the unknowable quality of each relevant worker's contribution.

Such a widespread use of 'cf.' could become as meaningless as has the present usage, unless some attempt were made to qualify and grade the 'cf.' statement (see Hughes 1976, pp. 24-29 and earlier); but that again would depend on the use of a stable reference-taxon definition. A brief newsletter item is not the place to argue all these matters in full, but if palaeobotanists (and all palaeontologists) genuinely wish to improve the general standard of data-handling and thus of the results obtained by others from their work, Kovacs-Endrody should be taken seriously and the logic of the comment should be fully explored. I hope that many palaeobotanists and palynologists will attend the Nomenclature Sessions of the 13 International Botanical Congress at which a proposal (Hughes 1979) to broaden the nomenclature possibilities in this field will be presented. Subsequently, I hope it will be feasible to run a separate symposium devoted to this important palaeontologic data-handling problem.

References: Hughes, N.F. 1976 Palaeobiology of Angiosperm Origins. Cambridge University Press, 242pp.

Hughes, N.F. 1979 Proposal for a new palaeobotanical appendix for the I.C.B.N. Taxon 27, 497-504.

N.F. HUGHES, CAMBRIDGE.

EXTRA-EQUATORIAL PERSISTENCE

When preparing an up-to-date synthesis on the Upper Palaeozoic Angara floras for 'Biological Memoirs' I noticed an interesting phenomenon which may characterise other boreal as well as notal floras. The following is just a preliminary communication.

Over the last few years we have learnt a lot on the affinities of the main Angara plants in terms of suprageneric taxa adopted for the Euramerian and Cathaysian plants. This allows a closer comparison of the Upper Palaeozoic floras. On the other hand, better knowledge of characters of the Angara plants provides a basis for another comparative analysis, namely from a general evolutionary point of view. Characters of plants belonging to different phytochorias were divided into three groups.

Group A comprises endemic Angara features having no counterparts in Equatorial plants (eg. saccus with reticuloid features in Cladaitina pollen of the Rufforiaceae; dorsal furrows in many Angara gymnosperms). The group is very small.

Group B comprises comparable characters of plants of different phytochorias. These characters are called ubiquistic. Ranges of these characters were plotted on the chronostratigraphic scale separately for Angara and Equatorial floras. Plants of the Subangara area (the peripheral parts of Angaraland - see IOP newsletter 9 page 3) were analysed separately. In about half the cases, characters of the group appear first in the equatorial floras, then they appear in the Angara flora where they persist long after their disappearance in the Equatorial ones. Only about 4% of the characters have similar ranges in both Angara and Equatorial floras. Some 25% of the characters

appear in Angaran plants later and disappear earlier than in Equatorial ones. Remaining characters appear in Angara plants later, but disappear together with Equatorial ones.

Group C includes characters endemic for the Equatorial belt (eg. monolete fern spores, synangia in ferns and pteridosperms, Stigmaria-like rooting systems and halonian scars in lepidophytes, reticulate venation in pinnate pteridospermous fronds, etc). This group is very large, much larger than group A. This agrees well with much greater taxonomic diversity of Equatorial floras (in 5-10 times if one compares published lists of coeval assemblages).

Combining all three groups of characters, particularly considering the long persistence of characters forming the majority of the Group B, one can clearly see a strikingly archaic habit of Angara flora of the inner parts of Angaraland (Angara areae s.s.). Indeed, in the Middle - Upper Carboniferous, Angara lepidophytes are still much closer to Upper Devonian - Tournaisian Equatorial lepidophytes than to coeval ones. Angara articulates preserve some characteristic features of the Asterocalamitaceae (the juxtaposition of bundles in the node, sporangiophores arranged into fertile zones instead of strobili) up to the Upper Permian. Paripinnate neuropterids persist until the Upper Permian, and pteridosperms with cardiopteroid pinnules until the Lower Permian, etc.

The following general conclusions can be made:

- 1, Angara plants had developed only a few endemic characters, not taxa.
- 2, Overall diversity of Equatorial floras in both morphological and taxonomical aspect is much higher than that of the Angara flora.
- 3, In Angaran plants many characters correspond to those of older Equatorial plants. This phenomenon is called "Extra-Equatorial Persistence".

I believe that these observations can be extrapolated to other extra-equatorial floras. If so, one can conclude that the equatorial belt (together with ecotone areas such as the subangara area showing many advanced plants) is the main generator of both principally new forms and new higher taxa. It seems that the selective pressure of extra-equatorial environments works as a conservative agent (it is a brake rather than a motor of the evolution).

The equatorial persistence may have important corollaries for palaeoclimatic reconstructions. Let us imagine that we live in the Permian and are trying to reconstruct the world Carboniferous climates. In the Permian forests of Siberia we observe some plants looking similar to the Euramerian Carboniferous plants which are absent in the Permian equatorial belt. In other words, we would claim that the Euramerian flora containing some 'typically boreal' elements cannot be regarded as truly tropical and should be qualified as sub-tropical. I suspect that the same happens when the Eocene floras of Europe are attributed to the subtropics due to the presence of some typically boreal plants.

There are other current stratigraphic, palaeoclimatic, florogenetic, etc. problems which should be analysed with the possibility of such extra-equatorial persistence in mind.

S.V. MEYEN, MOSCOW, USSR

TERMINOLOGY OF GYMNASPERM FRUCTIFICATIONS

When describing fructifications of Angara Upper Palaeozoic gymnosperms I came across fundamental terminological difficulties. Some of the fructifications are represented by axes with sessile seeds closely spaced and spirally arranged. Others consist of axes subtended by a rosette of scales and bearing spirally attached sessile sporangia. Technical terms for these and other fructifications are absent in the literature. Usually for gymnospermous fructifications we import terms from either pteridophytes (eg microsporophyll) or angiosperms

(Blütenstand in Florin's works on conifers and cordaites). I could follow Schopf when he introduced the term 'fertiliger' for glossopteridalean fructifications, and I could also invent a couple of new terms. But such ad hoc remedy will not solve the whole problem. I believe that pteridosperms (s.l.), gymnosperms and angiosperms are clearly different evolutionary grades in their reproductive strategies.

It seems reasonable to have independent systems of terms for all three groups. The highlights of one such system are presented below and the details given elsewhere.

Basic new terms are monosperm, polysperm, circasperm and microsporoclad. A monosperm is a seed together with its stalk. Any aggregation of monosperms (or of sessile seeds) is called a polysperm. Associating sterile specialised organs (scales, appendages, etc) form a circasperm. Aggregations of microsporangia, when the term microsporophyll is absolutely unsuitable, are called microsporoclads. Further classification of monosperms is unnecessary. They may be orthotropous or anatropous, naked or with circasperm, but no special terms are suggested for these varieties.

Polysperms are classified into simple and compound (cf. simple and compound inflorescences). Four groups of simple polysperms are recognised: 1. polysperms externally similar to inflorescences where flowers are replaced by monosperms or sessile seeds; correspondingly members of this group may be called paniculate, racemose, head-like, etc. polysperms; the group also includes peltate polysperms (peltoids of Gamankov & Meyen) and pinnate polysperms (as in Ilfeldia); 2. polysperms with planated seed-bearing lamina are divided into phyllosperms (lamina is the same as in foliar leaves, eg. in neuropterids) and cladospperms (modified lamina as in Cycas); 3. seed enclosing organs (chlamidosperms) are classified into cupules (orthotropous organs; when containing one seed only they may be called monogyna) and capsules (otherwise organised, eg. Leptostrobus); 4. epiphyllous polysperms, or fertiligers sensu Schopf; they may be frondose or bracteose, ie subtended by non-modified or modified leaf respectively. Transitions between these types are often observed and some fructifications may be variously treated within the system. Such complications are inevitable.

Compound polysperms are aggregations of simple ones. Due to their variety it seems better to avoid many new terms. Instead, one can use plant names for certain types (as in stomatal and embryo sac terminology). For instance, female cones of conifers may be described as coniferoid polysperms, and those of many cycads as zamoid polysperms. Aggregations of compound polysperms may also occur.

Microsporoclads are classified into simple and compound. Simple ones comprise branched, pinnate, peltate, etc units bearing microsporangia. Regular aggregations of simple microsporoclads are called compound ones. Correspondingly, aggregations of sporangia of pteridophytes, if the term sporophyll cannot be attributed, can be called sporoclads (eg in trimerophytes and aneurophytalean progymnosperms).

I will be grateful to receive comments on this terminological system from palaeobotanists.

S.V. MEYEN, MOSCOW, USSR

CONSERVATION OF PALAEOBOTANICAL SITES IN BRITAIN

In IOP Newsletter 9 it was briefly announced that the Nature Conservancy Council (NCC) is carrying out an investigation into British palaeobotanical sites, with a view to their conservation. Since then, I have discussed the project with a number of palaeobotanists in this country, some of whom have expressed concern about its possible repercussions. This concern is largely based on a misunderstanding of what we are doing, and so I decided that it is

time to give a clearer explanation of this work. The aim of the NCC in its palaeobotanical work is to help advance serious research into fossil plants in Britain. This is done mainly by trying to protect those sites that are important for research; by opening and cleaning old and defunct sites and by rescuing specimens in bulk from threatened localities. However, if this is to be done to its maximum effect, we need to have close cooperation with workers in the field. If anybody has any suggestions of sites which should be scheduled or managed, or any site cleaning or collecting projects which could constructively be done, please contact C.J. Cleal, Geological Conservation Review Unit, Pearl House, Bartholomew Street, Newbury, Berkshire RG14 5LS.

Chris Cleal has produced a four page account of the palaeobotanical activity and policy of the NCC. IOP members may obtain copies of this document from him at Newbury or from the IOP secretary.

INDEX OF FIGURED PLANT MEGAFOSSILS

The third volume of this index was published in January 1981; the index gives a survey of plant megafossils from Devonian through Jurassic sediments as figured in literature from 1971 onwards. The third volume deals with 'Permian 1971-1975'. The data has been compiled by M. Boersma and L.M. Boersma-Broekmeyer.

In this volume illustrations are quoted of 1,101 species belonging to 279 genera. The taxa are alphabetically arranged. For each figure the relevant publication, the age of the source strata and the country (province) or origin are indicated. In separate chapters the taxa are arranged according to the major plant groups, the chronostratigraphical units and the countries of origin. Furthermore a list of 306 new taxa has been added as well as a reference list of the 164 publications from which the figures have been quoted.

The book consists of 133 pages, is cloth bound and costs Dfl. 45.00. Copies of volume 1 (Carboniferous 1971 - 1975, 1979, 183pp. Dfl. 40) and volume 2 (Triassic 1971 - 1975, 1980, 70pp. Dfl. 30) are also available. Send Dutch guilders in the form of an international money order to: Laboratory of Palaeobotany and Palynology, University of Utrecht, Mr A.J. Gosling, Heidelberglaan 2, Utrecht 2506, Netherlands.

CARBONIFEROUS FLORAS: SCHLOTHEIMIANA

The International Working Group on Carboniferous and Permian Compression Floras is considering the suggestion of including its communications to the 117 participants within the pages of IOP newsletters. If the different format is suitable this would eliminate one of the many parallel channels of scientific communication.

The group has recently published a 'Bibliography of Pennsylvanian Compression-Impression Floras of North America 1822-1977'. All participants in the group have been sent a copy: it is Contribution number 1 under the name of Schlotheimiana. Copies can be obtained on prepayment of US\$3.00 from Dr H.W. Pfefferkorn, Department of Geology, University of Pennsylvania, 240 S. 33rd Street, Philadelphia, PA 19104, USA. Please pay in American dollars and include a suitable amount for postage.

CLADISTICS AT THE BRITISH MUSEUM

Last November, London's The Sunday Times newspaper (itself threatened with extinction) included an article summarising some aspects of the current debate on the political and philosophical importance of the Natural History museum's exhibition policy. Though fossil plants

are not yet involved, there are relevant implications for IOP members. Here is an extract from the article, written by the newspaper's science correspondent Bryan Silcock, and headlined **DINOSAURS AND APE-MEN REAR A MARXIST HEAD:**

"What is very large, millions of years old, and a vehicle for Stalinist propoganda? Answer: the dinosaurs in the South Kensington Natural History museum. Few people who inspect the recently revamped dinosaur display and an even newer exhibit, Man's Place in Evolution, will realise they are being exposed to what many scientists regard as an evolutionary heresy. Furthermore, this heresy may have subversive political implications. Dr Beverly Halstead in a letter to Nature says that if the trend at the museum becomes established as the received wisdom, a fundamentally stalinist view of the history of life will have been incorporated into a key element of the British education system and marxism will be able to call confidently on the scientific laws of history in its support. Behind these remarkable charges lies a long-smouldering dispute. It began in the seventies when the museum adopted a new exhibitions policy. Stuffed birds and fossils were out. Instead of static displays the public would be shown biological processes and interactions at work and be introduced to fundamental ideas such as natural selection. Many academics and senior members of the museum staff disliked the whole idea.

At the heart of the present dispute lies a new approach to taxonomy - the classification of living things - called cladistics. Taxonomy is usually regarded as the most pedestrian branch of biology, but cladistics is arousing passions that the world of biology had not experienced since Darwin's theory of evolution 120 years ago. Cladistics is a systematic method of classifying living things on the basis of shared features. It all sounds innocent enough, but cladists do not have much time for fossils as a primary source of information. This both infuriates the traditionalists and leads the cladists to revolutionary conclusions about relationships between living things. Many traditional ideas about these relationships are based on the tracing back of evolutionary lines with the help of fossils to try to discover where the branches of the evolutionary tree merge. This kind of analysis suggests, for example, that birds are descended from dinosaurs. Cladists, on the other hand, start with existing species and try to avoid preconceived ideas where they came from. And on this basis they are restructuring the animal kingdom along revolutionary lines. Cladists claim, for example, that reptiles as a natural group do not exist. The species at present classed as reptiles must be broken up and dispersed elsewhere. And birds, they say, are close relatives of mammals.

Cladism alone is bad enough for the traditionalists, but the handbook for the Man's Place in Evolution exhibition goes even further, appearing to deny traditional evolution completely. 'It is axiomatic, therefore' it says at one point, 'that no species in the fossil record can be considered as ancestral to any other, nor can one species evolve directly into another.' It is this idea that evolution does not occur gradually that lies behind Halstead's fears of subtle political indoctrination: it will, he says, encourage the revolutionary view of how human societies change, expounded by Stalin as follows: 'Qualitative changes occur not gradually but rapidly and abruptly, taking the form of a leap from one state to another'. Not the least extraordinary aspect of the whole affair is that cladism does not necessarily lead to the idea of evolution by jumps; indeed, say its supporters, it does not lead to any particular theory of evolution at all."

BIBLIOGRAPHIES

N.AMERICAN PENNSYLVANIAN COMPRESSION FLORAS 1821 - 1977

As announced on page 9 above this is the first contribution under the title of Schlotheimiana published by the International Working Group on Carboniferous and Permian Compression Floras. It is compiled by H.W. Pfefferkorn and W.H. Gillespie. The 44 pages contain an Index of Authors, a list of general palaeobotanical papers and lists of references for individual States of the USA. See page 9 for details of purchase.

INTERNATIONAL BIBLIOGRAPHY OF PALEOBOTANY FOR 1980

Two members of IOP, Bill Gillespie and Hermann Pfefferkorn are going ahead with the preparation of this bibliography for 1980. All IOP members should have received a letter requesting citations. The compilers will start to assemble the bibliography by the end of February; they will be printed as submitted by the authors, that means without any retyping. Next year the letter asking for citations will be mailed in December so that the bibliography can be published very soon into the following year.

It is hoped that this bibliography will become part of IOP's annual activities in a year or two. The project is already receiving a small financial subsidy from IOP funds on the understanding that one copy of the bibliography will be distributed free to all members.

BIBLIOGRAPHY OF AMERICAN PALEOBOTANY

There are spare copies of this annual bibliography available, dating back to 1958. They cost US\$4.00 each and can be obtained from W.L. Crepet, U-43, University of Connecticut, Storrs, CT 06268, USA. Do not enclose payment with your request as you will be invoiced with the issues ordered. The same source also sells lapel badges ('buttons' in the American language) with the slogan "I DIG FOSSILS" printed in red. These cost \$1 each.

OBITUARY

ROBERT CROOKALL 1890 - 1981

Dr Crookall died at his home town of Bath, England, on 2nd January 1981 after a heart attack.

He was born in Lancaster on 31st July 1890 and studied botany, chemistry and psychology at Bristol University. He stayed there to obtain his PhD from his studies on the Carboniferous flora of the Bristol and Somerset coalfields. He spent a year as a lecturer in botany at Aberdeen University before he was invited in 1924 to join the Geological Survey in South Kensington, London. He remained there until his retirement in 1952. He was initially employed by the Geological Survey as their first and only palaeobotanist, to finish the work of Robert Kidston who died in 1924. Kidston's collection of Coal Measure plant fossils and his manuscripts had been deposited with the survey and they needed to finish publishing his manuscript. In the event, no further parts appeared until three years after Crookall himself retired.

Crookall carried on his researches into Carboniferous plant distribution and published several papers on this topic while he was completing the Kidston manuscripts. He also published his useful little book of Coal Measure Plants in 1929. Before retiring he began to return to his life-long interest in Psychical Research and Parapsychology. Since retiring we wrote a great many books on this subject and again received world wide recognition of his work. Robert Crookall was full of humour and was always helpful to those

who needed it. He was a deeply religious man whose later publications and writings revealed his philosophy of attempting to show religious truths through scholarship and the scientific approach.
B.A. THOMAS, LONDON.

NEWS OF INDIVIDUALS

ANA M. RAGONESE of the Circeo Palaeobotanical Laboratory of Buenos Aires in Argentina spent a month visiting some palaeobotanical laboratories in the United States, in November 1980. This was in relation to her palaeoxylological studies on Lower Tertiary petrifications.

W.G. CHALONER of the Department of Botany, Bedford College, London will be Visiting Professor to the University of Massachusetts from 19th February to 21st March 1981. His address will be c/o The Department of Botany, University of Massachusetts, Amherst 01003, Massachusetts, USA. He will return to London for April 6th.

NEWS OF OTHER ORGANISATIONS

ARBEITSKREIS FÜR PALAEOBOTANIK UND PALYNOLOGIE (APP)

The next meeting will be held in Strasbourg from 26 - 28th March 1981. There will be one day of lectures and a two day field trip to Triassic and Tertiary localities in the Alsace. The secretary of the meeting is Dr Monique Schuler, Institut de Géologie, 1 rue Blessing, F-67084, Strasbourg Cedex, France.

PALEOBOTANICAL SECTION, BOTANICAL SOCIETY OF AMERICA

Bill Crepet is the new secretary of this group and will retain that post for the next three years. His January 1981 newsletter looks forward to the imminent publication of three new books by American palaeobotanists - Tom Taylor's complete and lavishly illustrated "Paleobotany: An Introduction to Fossil Plant Biology" to be published in February 1981, "Evolution, Ecology and Paleobotany" edited by Karl Niklas (volume 1 is due to be published in June 1981 and volume 2 in March 1981 - wow!) and "Biostratigraphy of Fossil Plants: Successional and Paleoecological Analysis" edited by David Dilcher and Tom Taylor should be published already.

Paleobotany will be represented at the meeting of AIBS to be held at Indiana University, Bloomington from August 16 - 22nd 1981. The meeting will offer palaeobotanists "an exceptional field trip" to be led by Gary Dolph and Bill DiMichele and will be to the Pennsylvanian megafossil localities west of Bloomington.

INTERNATIONAL PALAEOONTOLOGICAL ASSOCIATION (IPA)

The Secretary-General, Professor Otto H. Walliser, Geologisch-Palaontologisches Institut, Goldschmidt Strasse 3, D-3400 Göttingen, West Germany, has recently prepared a Report for 1980 and a Letter of Intent for the period 1980/1984. He writes to IOP: "IPA undertakes further steps to become an international organisation which intercedes for palaeontology, that means also for your interest. The last period (1976 - 1980) was a time of stabilisation, of making complete the list of incorporated national palaeontological societies and of enlargement of the lists of International Research Groups."

BOOK REVIEWS

REVISION OF THE INDIAN SPECIES OF GLOSSOPTERIS. Shaila Chandra & K.R. Surange, 1979. Monograph no. 2, Birbal Sahni Institute of Palaeobotany, Lucknow, India. 291pp., including 54 pages of text-figs. and 47 plates. Cloth boards, Royal Quarto. Rs 300 in India, US\$60.00. The generic name Glossopteris was first used by Brongniart in 1828 for impressions of detached tongue-shaped leaves with distinct midrib and reticulate lateral venation found in the Permian of Australia and India. In the century and a half which has elapsed more than one hundred species have been recorded from the various parts of Gondwanaland. The largest number, nearly seventy (including new species in the present monograph) have been described from India. The taxonomy of these relatively simple leaves has long been a problem, partly because of the paucity of diagnostic characters available in impressions (the form in which Glossoteris occurs most commonly) and partly because of the inadequate descriptions and illustrations given by many previous authors. The use of epidermal characters, obtained from cuticle preparations or, more recently, by sem study of latex transfers, holds considerable promise of an improved taxonomy. Likewise, the study of attached fructifications provides valuable additional distinguishing features. The fact remains, however, that most Glossopteris leaves do not show epidermal or reproductive features; more to the point this applies to nearly all the type material of the earliest described taxa. Under these circumstances, the authors have used only the external morphological features of size, shape and venation pattern, but, within these limitations, have provided much more detailed descriptions and illustrations than any previous workers in this field.

The monograph includes all the Indian species of Glossopteris described from 1828 to 1979, based on a study of the types and other illustrated material of original authors. The 68 taxa are figured in 23 plates of photographs of fossils, 24 plates of restoration drawings and 54 full pages of text-figures, collectively providing illustrations of the leaf specimens at natural size and of the venation patterns at natural size and at magnifications of x2 and x4 for all species. Details of epidermal characters and reproductive organs have been excluded intentionally from the distinguishing characters of extant species and from the diagnoses of new taxa (in a few cases brief reference to cuticular structure "as supporting evidence" is included under comparisons or observations). This course of action is understandable, since the authors wished to adopt uniform treatment of all the material studied. All the same, the fact that epidermal characters are known in half of the taxa described and in some are the only distinguishing features (in several instances the authors themselves say "the species is not distinguishable on external morphological characters") raises some doubt about the wisdom of their exclusion.

The validity of the approach to Glossopteris taxonomy in the monograph depends on the reliability of the external characters used. Some readers may feel that, because of possible variations induced by different environmental conditions or found in different parts of the same plant or resulting from different degrees of maturity, the leaf characters of size, shape and even venation pattern may not be reliable. Since they establish 12 new species in the monograph the authors clearly do not take this view. Indeed, they say that: "the shape and venation pattern are constant characters peculiar to each taxon"; they may be right, but it is a little difficult to reconcile this statement with the fact that a number of taxa have been established on only one or two specimens. Likewise, the claim made in the Foreword by Professor T.S. Mahabale that the comparison of different species

has been made "rather easy" should not be taken too literally, since the monograph contains no keys or grouping of similar taxa in sections as aids to identification. The authors indicate that this must be done by "visual matching", a task which is not so much difficult as time-consuming.

The authors emphasise that Glossopteris is an artificial form-genus, including "diverse species and genera, belonging to different families and even to orders....". Perhaps the time has come to attempt for impression material of Glossopteris a hierarchy of suprageneric form-taxa (morphographic taxa) such as has been done for palynology?

The monograph concludes with a short section on the value of Glossopteris in Indian stratigraphy. This is supplemented by a table and separate species lists showing the stratigraphic ranges of the 68 species in the Indian Gondwanas from the Talchir Stage through to the Panchet. As presented, the table shows that only 4 of the 68 species occur in more than one Stage. There are, however, some discrepancies between the ranges given in the text and in the table. If these are taken into account the conclusions, though still valid, are not quite as clear cut as appears at first sight. But whatever the reservations about the reliability of the diagnostic criteria used, the monograph does demonstrate clearly that identifiable forms of Glossopteris exist in sufficient number to find wide application in stratigraphy. Dr Chandra and Professor Surange have undertaken a prodigious amount of work in a difficult field. They are certainly to be congratulated on the impressive outcome of their long study.

The monograph is produced in Royal Quarto (10" x 13") format, strongly bound, printed in clear type on good quality paper and beautifully illustrated. Intercontinental correlations would undoubtedly be facilitated if a revision of the genus Glossopteris could be undertaken to this standard of presentation for other parts of Gondwanaland.

W.S. LACEY, BANGOR, WALES.

KEROGEN - INSOLUBLE ORGANIC MATTER FROM SEDIMENTARY ROCKS. Ed. B. Durand, 1980. Editions Technip, 27 Rue Ginoux, 75737 Paris, 519pp., 260 tables figures and plates, £55.00, US\$127.00. Marketed and distributed by Graham & Trotman Ltd, 14 Clifford Street, London W1. This very expensive book reviews the present state of knowledge of insoluble organic matter in sedimentary rocks from the French point of view. Many of the 15 chapters are written by geochemists though some biological detail is presented and illustrated by wonderfully reproduced colour. But the book has no specialised palaeobotanical contribution and much of the interpretation suffers by the authors not taking our science very seriously. Perhaps this is one of the things that is wrong with kerogen studies generally.

There are many splendid palaeobotanical howlers - spores and pollen have integuments, angiosperm pollen have trilete marks and leaf cuticle is rarely recognised. What else are they missing, I wonder?

But the volume offers an indispensable background of essential information to palaeobotanists contemplating new studies in this very fashionable field. Most of the references are from the last decade, showing that the authors, editor and publishers do not let the grass grow under their feet; but they may not recognise this!

M.C. BOULTER, LONDON.

SYMPOSIUM ON THE CARBONIFEROUS-PERMIAN IN SOUTH AMERICA

Actas 2nd Congreso Argentino de Paleontología y Biostratigrafía y
1st Congreso Latinamericano de Paleontología, 1978, vol. 4.

This 270 page volume contains original and invited papers, discussions on the Carboniferous-Permian boundary in South America and conclusions of a working group with proposals of biostratigraphic units in Brasil and Argentina. There are also correlations and tentative datings. The volume includes 13 papers of a palaeobotanical or palynological nature.

S. ARCHANGELSKY, BUENOS AIRES, ARGENTINA.

EVOLUTION - NATURGESCHICHTE HÖHERER PFLANZEN. Ed. R. Daber, 1980. Akademie-Verlag, Berlin, 439pp. 84.00DM.

At the outset it is fair to recollect that the trends and traditions of the Berlin School of Palaeobotany are well marked by the names and the succession of Henry Potonié, Walter Gothan and Rudolf Daber. H. Potonié made his line of palaeobotany the fossil plants branch of the wider known Berlin main school of plant systematics, plant morphology and plant geography. No research in the field of plant evolution - be it for historical reasons or else - could neglect H. Potonié's "Grundlinien der Pflanzen-Morphologie im Lichte der Palaeontologie" (Jena, 1912) where he gave an early representation of principles of plant morphology. By integrating fossil and living plants he introduced two theories of phylogenetic comprehension: his "Gabeltheorie" (theory of dichotomy) dating back to 1895 and his "Perikaulomtheorie" of 1902. It is from this work that (as Lignier's did) W. Zimmermann's "Telomtheorie" derives, maintaining a dogmatic view of the primary importance of the dichotomy of homologous plant organs.

The cover drawing of "Evolution - Naturgeschichte höherer Pflanzen" shows an impressive reconstruction (modification A) of a bifurcated frond of Callipteridium pteridium from the Upper Stephanian of the Saale Basin (see Ranate Wendel, p.127, fig.18). Daber, accordingly deals in a fundamental way with "Gabelwedelformen" (bifurcated fronds) from the Carboniferous and Permian (the traditional ages to work on in Berlin). Daber, of course, discusses the philosophical meaning and the actual (restricted) relevance of Potonié's "Grundlinien" and Zimmermann's "Telomtheorie", moving right on to Melville's gonophyll theory and the interpretation of bifurcated Glossopteris fructifications such as Lidgertonia, Denkania and Eretmonia, comparing them, (with reference to Surange & Chandra 1974, 1975) with such northern hemisphere fronds as Callipteridium. In this context it should be noted that Daber sees Zimmermann's orthophyletic concept as out-dated and keeps himself to unstable "mosaics of characters" and "interimistic" forms and structures of various relations, both morphological and taxonomical, between Lower Devonian psilophytes proper and types of present day definition. Daber does not unconditionally accept the view that phylogeny has to start at "final" stages of organ differentiation and trace them backwards, but uses the evidence to study the development in its history as reflected by what he sees as logical sequences. He gives a survey and typology of Carboniferous and Permian bifurcated fronds, demonstrating "parallel series of development and interaction". The Palaeozoic pteridosperm frond is conceived as a conatural organ of axis, leaf and fructification, a morphogenetical "programme" which by reduction (not simply, I should stress) led to the angiosperm foliage and floral organs. Daber has however made no mention of Siergert's work in his discussion on the nature of dichotomies which seems a curious omission. Of 13 contribution in the book, only one other is strictly devoted

to an evolutionary subject. Probably with a meaningful intention it closes the volume as Daber's opens it: L. Rüffle on (in my translation) "Encapsis of characters and criteria of homology in older angiosperms and their Herkunft ("provenance, which is much less committing than "origin" or "ancestry" would be). You must know your angiosperms and a good many terms, before you start reading this paper, because just 14 figures assist you to get through about 15 pages of a text thronged with quotations of facts and ideas from 1851 to 1980 (in a postscript) and from Ettingshausen to Rüffle himself. He presents a number of interesting examples of over-topping and neotene reduction of shoot/leaf relations, particularly within the hypocotyledonous region of angiosperms. Rüffle supports Melville's and Daber's hypothesis of "mosaics of characters" linking northern pteridosperms with glossopterids and angiosperms (eg Proteaceae; vide Aquilapollenites and its distribution in Vakhrameev et al. 1978, not 1970!), Shifting and re-orientation of meristematal activities and countercurrent movements of pro- and regression (probably in reaction to environmental stimulation or inhibition, Rüffle points to "conservative" aquatic angiosperms) very often, of course, veil the homologies. There is however some good evidence that the hypocotyl (as the floral!) region of recent angiosperms is indeed a zone of excessive phylogenetic reduction, as is the herbal condition to the woody, and the single stem or shoot to the shrub.

Between Daber and Rüffle forming the "frame", we find a sound content submitted by authors of international reputation. M. Barthel & Haubold on Callipteris, Wendel on Callipteridium, Storch on Sphenophyllum, Barthel again on Pecopteris (from type localities!), Setlik on Neuropteris, Obrhel on Distichophyllum, L. Wolf on Saganophycus sinus n. gen. et sp., Haubold again on the biostratigraphy of the Permosiles in Thuringia, Joahnichen, Mai & Walther on Cercidiphyllum and H. Suss on a Lower Eocene Platanoxylon.

The contributions of Barthel, Haubold, Wendel and Storch on material from the Upper Palaeozoic, and of Jahnichen, Mai & Walther from the Tertiary together form the bulk of the book. Here are some honest monographic or submonographic works of the respective genera or period that are well and sufficiently, even profusely, illustrated. They are a delight for what may be called the ordinary, straightforward palaeobotanist of longstanding with a mixture of taxonomical, stratigraphical and geographical interest. Nevertheless, to a certain extent, the results may be used to find even more detail to back up either Daber's or Rüffle's essays.

The editor and his collaborators are to be complemented on their saving and curating, their continuation of active field work, and the uses they are making of the Berlin collections. But I should also add how appropriate it is that Daber has given a warm and grateful biographical note in memoriam of his predecessor Walter Gothan (1879-1954), who though unpretentious in theory, performed the practical duties that establishes present day palaeobotany in Berlin on its traditional resources.

K.U. LEISTIKOW, FRANKFURT, WEST GERMANY.

LEAVES AND STEMS FROM FOSSIL FORESTS. R.E. Janssen, 1979. Illinois State Museum, Springfield, Illinois. 190pp. \$5.00 includes postage. This is one of several State based booklets that are published in the USA for the use of non-specialists. The title is somewhat misleading as the fossils are more limited than one is led to believe. They are solely Carboniferous in age and nearly all come from the famous Mazon Creek region. The book is liberally illustrated with clear photographs of fossils and reconstructions. The descriptions are well written but a few more explanatory figures and some identification keys would have made it more useful. The nomenclature is old fashioned

and this reduces the book's value. It is a fourth printing (revised) edition which is really more in keeping with the date of the 1957 printing.

B.A. THOMAS, LONDON. (with thanks to the Palaeontological Association)

MESOZOIC CRYPTOGAMIC PLANTS OF THE USSR. Ed V.A. Vakhrameev, 1980. Nauka, Moscow. 122pp. 1 rouble 30 kopeks.

MESOZOIC GYMNASPERMS OF THE USSR. Ed. V.A. Vakhrameev, 1980. Nauka, Moscow, 231pp. 2 roubles 40 kopeks.

These two catalogues comprise all the species described by both domestic and foreign palaeobotanists from the Triassic, Jurassic and Lower Cretaceous of the USSR. The genera of major taxa within the pteridophytes and gymnosperm orders are arranged alphabetically and the same arrangement is used for species within genera. Type species of genera are also cited even when they are not recorded in the USSR or when they come from beds of non-Mesozoic age. About 3,500 species are cited. For each species known in the USSR bibliographical references, stratigraphical position and geographical distributions are provided. This is not a revision and all the data are given according to the original sources of information. The bibliography includes about 1,000 references. These catalogues cover a lot of papers, including many rare and poorly known sources. They will be very useful to anyone working with Mesozoic plants.

S.V. MEYEN, MOSCOW, USSR.

SYSTEMATICS AND EVOLUTION OF HIGHER PLANTS. Ed. S.G. Zhilin. Nauka, Leningrad. 1980. 136pp. 18 plates, 1 rouble 80 kopeks.

This collection of papers was issued by pupils and colleagues of Academician A.L. Takhtajan as a commemoration volume on the occasion of his 70th birthday. Some papers are purely palaeobotanical, some deal with living plants only and some are of general interest. The palaeobotanical papers are: T.N. Baikovskaya, On the affinities of some Palaeocene plants of Romankolsai in the Southern Urals; S.K. Zhilin, Notes on systematics of the fossil Myricaceae; I.A. Iljinskaya, On the systematics of the fossil Fagaceae of the USSR (established on the remains of leaves, flowers and fruit imprints); E.F. Kutuzkina, The genus Hibiscus in the Late Sarmathian of the Krasnodar area; V.A. Samylina, The significance of epidermal-cuticular studies of leaves for the knowledge of Mesozoic gymnosperms; I.N. Sveshnikova, A new extinct genus of the family Cupressaceae - Tambovskia; N.S. Snigirevskaya, Takhtajanodoxa - a new chain in the evolution of lycophyta.

Among papers dealing with living plants, M.A. Baranova's paper on epidermal structures of living Buxaceae and Simmondsiaceae is particularly interesting for palaeobotanists. The section 'Plant Evolution' includes: N.R. Meyer, Probable evolutionary trends in the sporoderm of gymnosperms and some angiosperms; A.A. Fedorov, The family Dipterocarpaceae and plant evolution; I.A. Shilkina & A.A. Yatsenko-Khmelevsky, Some aspects of wood evolution in conifers of the Mesozoic.

S.V. MEYEN, MOSCOW, USSR.