IOP NEWSLETTER 20

INTERNATIONAL ORGANIZATION OF PALAEOBOTANY

INTERNATIONAL UNION OF BIOLOGICAL SCIENCES
-SECTION FOR PALAEOBOTANY
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MARCH 1983

PLEASE MAIL NEWS AND CORRESPONDENCE TO YOUR REGIONAL REPRESENTATIVE OR TO THE SECRETARY FOR THE NEXT NEWSLETTER 21, BEFORE THE END OF JULY 1983. The views expressed in the newsletter are those of its correspondents and do not necessarily reflect the policy of IOP.

IOP NEWS

ANNUAL REPORT & FINANCIAL STATEMENT FOR 1982
Copies of these two documents are being submitted to IUBS and are available to individual members from the secretary. As forcast in IOP Newsletter 17 the Executive Committee has decided to increase membership dues to US$8.00 or £4 starting this year. This will partly help offset our present operational losses caused by the lack of funding to IOP from IUBS.

PAYMENT OF DUES FOR 1983
If you owe money for this year's IOP membership, a payment request form is attached with this mailing of the newsletter. Please pay promptly to the regional representative or to the secretary, as indicated on the form.

IOP CIRCULARS
These are documents produced through IOP and are available free to paid up members on request to the secretary. The following Circulars are available now:

1. Computer print-out of January 1983 IOP membership list. This is a useful and up to date list of palaeobotanists' addresses.
3. Abstracts of the First International Palaeobotanical Conference, Reading, 1980.
6. C.R. Hill, 1981. The Cladistics-Museums Controversy, a personal review and outline of a theory of evolutionary cladistics.
7. M.C. Boulter, 1981 (compiler). Palaeobotanical Extracts from 'The Sportophyte'. This 28 page booklet contains facsimile extracts from the first palaeobotanical newsletter, edited by Marie Stopes from 1910 - 1913. There is a brief introduction by the compiler.

Suggestions of new editions of the Circular series will be warmly received. Items of general palaeobotanical interest which are not suitable for formal publication and which are too long for the newsletter will be considered for the Circular series.

5TH NORTH EAST AMERICAN PALAEOBOTANICAL CONFERENCE

This convened on Friday November 5th at the Harvard Forest, Petersham, Massachusetts, with 21 participants in attendance. That evening, Hermann Pfefferkorn, University of Pennsylvania, described his taphonomic research on the lower floodplain of the Orinoco delta, replete with examples of the unique field conditions in the area. This portion of the delta is subject to tidal flooding, and is analogous to some Carboniferous coal swamps. Among the many observations that Hermann offered were (1) the fact that fossils were rarely formed in the leaf-litter of the forest proper; (2) that many plant organs of the forest floor were exported by the tidal flux from the forest to the river, and (3) that the most common places to find incipient fossils were the channel margin and channel bed. This presentation led to an extended discussion and focused attention on taphonomic considerations in subsequent contributions.

The next day's contributed papers were led off by Andrew Knoll, Harvard University, who recounted the utility of phytoplankton in defining the Precambrian-Cambrian boundary, using specimens from Svalbard for his example. While his consideration of the utility of microscopic phytoplankton for late Precambrian biostratigraphy was well taken, his most interesting point was perhaps an evolutionary one. Just prior to the boundary, phytoplankton suffered a major extinction so that the boundary flora is very species-poor. This latter flora only began to diversify some 20 million years into the Cambrian, in contrast to the general concept of the boundary as the time of major diversification.

Karl Niklas, Cornell University, discussed a new and un-named plant from Llandoverian sediments of Virginia. The specimens occur as organic spots, 0.5mm to 1.0cm in diameter. Investigation with the SEM reveals that they have two zones, an outer sheath and an inner zone of elongate cells, the latter consisting of an outer ring of smooth tubes surrounding an inner strand of larger, differentially-thickened tubes. Chemical analyses emphasize the plant nature of the fossil, and delta C^{13} values are consistent with those for land plants. This led to a useful and heated discussion of the definition of a vascular plant, because on the basis of the structure of the central strand of this plant, it would appear that it possessed conducting tissue, but of a form which was not equivalent to that in modern vascular plants.

David Barrington, University of Vermont, discussed fossil tree fern stems and the classification of cyatheacean ferns. Normally, the primary characters for the classification of extant cyatheacean ferns are foliar, yet stems are the most common fossils and have not been treated in modern systematics. Following a review of the characters of modern and fossil stems, David concluded that (1) the adaxial petiole trace in several taxa is a feature of convergence, and (2) that while stems generally support neontological classification, Cibotium falls closer to the Cyatheaceae, rather than to the Dicksoniaceae, with which it is normally associated.

David Taylor, University of Connecticut, reviewed a specimen of Taeniocrada liniata, providing excellent anatomical detail and clear evidence of vascular tissue. In his discussion he emphasised the nature of Taeniocrada as a polyphyletic group, and noted that T. dubia was frequently associated with Barinophyton and has been suggested as a sterile plant of the latter genus.

Patricia Gensel, University of North Carolina, then gave a welcome review of the present composition of the Zosterophyllophytes, emphasising the nature of the distinguishing characters. These include sporangial position on the stem, whether or not sporangia are born on stalks, the presence or absence of surface protrusions, epidermal characters and others. Perhaps the most striking feature (though not of taxonomic value within the group) was the circinnate vernation of many species, beautifully illustrated with slides. Pat Gensel then gave a second paper on the palaeobotanical contributions of Sir J.W. Dawson. While he is often remembered by modern practitioners only for having mixed up three organisms to create Psilophyton princeps, an examination of his work reveals a broad and valuable contribution to palaeobotany, including the description and elucidation of many taxa.

After lunch, Karl Niklas returned to address the question of "why plants grow up". Using computer-based analyses, he demonstrated the basic efficiency of a vertical cylinder in intercepting sunlight and increasing the success of photosynthesis. By combining this observation with a mechanical analysis of branching angle, Karl was able

to predict the transition from (1) a horizontal to (2) a vertical-terete to (3) a vertical-branched habit in early land plants, all from a theoretical study.
James Hickey, University of Connecticut, presented an anatomical study of very young plants of Stylites, thereby gaining a new developmental insight into the relation of Stylites to Isoetes. It would appear that, in the juvenile stages, the two are anatomically quite similar, and their distinctive differences arise later in ontogeny. On this basis, and with a re-evaluation of the other distinguishing characters of the two genera, Jim concluded that (1) Stylites should be recognised as a portion of Isoetes, and not be separated, and (2) that Isoetes is ancestral to Stylites, not vice-versa.
Michael Millay, University of Maryland, then presented two papers on the Marattiaceae. In the first he provided evidence for a new species of Acaulangium from the Stephanian of France, reviewed with excellent photographic support. He then proceeded to discuss an on-going cladistic analysis of the Marattiaceae as a family. While the continuing nature of this project precluded any results, the presentation was interesting in emphasising the use of cladistic methodology in palaeobotany.
Hermann Pfefferkorn then returned for a taphonomic discussion of storms versus continual deposition, addressing the question of which created more fossils. Evidence from his Orinoco work and from other sources suggests that, in a storm, the canopy of the forest contributes the largest amount of debris, while plants that grow inside the forest or near the ground are poorly represented. In an environment of continual deposition, however, those plant parts that enter early stages of fossilisation are those that (1) are tough and(2) are shed continuously by the plant. Clearly neither deposit provides a full sample of the source community, and Hermann emphasised the desirability of seeking out both depositional environments (if present) in one deposit.
Leo Hickey, Yale University, discussing research done with Scott Wing, U.S. Geological Survey California, addressed a complex of Juglandaceous fossil leaves, fruiting axes, fruits and pollen from the early Tertiary of western North America. While the fruiting axes, fruits and pollen were similar to those of the modern Platycarya, the leaves possessed characters which were in some cases no longer represented in the family, and in other cases were found jointly or singly in other extant genera of the family. Sedimentary context and morphological features provided strong evidence that these juglandaceous remains could be segregated into two groups representative of two biological entities, one of which included all organs save wood. From these data, Leo concluded (1) that this constituted excellent evidence for mosaic evolution, and (2) that the evidence for these organs being associated was so strong that he favoured the assignment of a single specific name to the suite of organs, rather than naming each separately. This latter question of the interface of evolution and nomenclature was subsequently addressed by Bruce Tiffney, Yale University, who described a flower and fruit which he has worked on in conjunction with Else Marie Friis, Aarhus, Denmark, from Santonian-Campanian sediments of Massachusetts. While a thorough analysis of this fossil is still in progress, it shows several characteristics suggestive of the Fagaceae. This apparent affinity may be disproven by further work, but its possibility was used to stimulate a general discussion which closed the afternoon session. Participants then viewed some specimens of Early Devonian plants from Canada, exhibited by Patricia Gensel.
The concluding evening talk was given by Bruce Tiffney, who recounted his trip to 10,300' Mount Emei, Sichuan Province, China, undertaken in August 1982. The focus of the presentation was the botany of this mountain, which harbours many living plants which are well-known as fossils to students of the European and American Tertiary floras. However, while the dominant theme of the talk was botanical, Bruce took the opportunity to slip in many pictures of the Chinese countryside.
While participation was slightly down this year, enthusiasm was not, and we look forward to the sixth meeting next Fall. In view of the valuable discussions which ensued from some of the more controversial topics, we hope to initiate a tradition of discussion sessions, in addition to contributed papers.

B.H. TIFFNEY, YALE, USA.

3RD MEETING OF THE WILLI HENNIG SOCIETY

The third meeting of this group took place at the University of Maryland from 20-22 November 1982, and palaeobotany featured prominantly in the programme for the first time The later part of the first day was given over to a symposium on "Phylogenetics and Palaeontology" in which three palaeobotanical papers were presented: P. Crane and C. Hill, Cladistics, Palaeobotany and Evolution; A. Lesnikowska and M. Millay, Cladistic Analysis of Fossil and Extant Genera of the Fern Order Marattiales; and S. Wing & L. Hickey, Phylogenetic Analysis of Fossil and Living Juglandaceae.
Crane and Hill critically evaluated three major areas in which palaeobotany has often been regarded as contributing to knowledge of phylogeny; the determination of primitive character states, clarification of homology, and recognition of ancestor-descendant relationships. They concluded with examples from fossil and Recent Matoniaceae and Betulaceae with the aim of demonstrating a realistic and useful role for palaeobotany within the cladistic research programme.
Lesnikowska & Millay provided a detailed analysis of 13 genera in the Marattiales using 35 characters principally of the synangia, sporangia and spores. They pointed out many of the difficulties involved in attempting to integrate palaeobotanical and neontological data, but used the cladogram to develop several interesting hypotheses on the phylogeny of the group.
Wing & Hickey contributed a cladistic analysis of the Juglandaceae utilising 31 characters of both reproductive and vegetative features to resolve the relationship of the seven extant genera. They presented three alternative cladograms, and incorporated new fossil data from their own research on early Tertiary Platycarya-like material, as well as that from the work of S.R. Manchester on other fossil Juglandaceae.
All three papers demonstrated the simple point that palaeobotany and cladistics are not antithetic, and that cladistics can provide quite simply a thorough and very valuable way of analysing palaeobotanical data. Among other things it introduces some methodological rigour into such vague concepts as phylogenetic relationships and homology; and thus goes some way to providing a framework in which we can realistically apply palaeobotanical data to evolutionary problems.

P.R. CRANE, CHICAGO, USA.

BILL LACEY RETIREMENT FEST

A group of British palaeobotanists gathered on the grey and frosty afternoon of December 12th 1982 in Tapton Hall of Sheffield University for a meeting to mark the retirement of Professor Bill Lacey of the University College of North Wales, Bangor. The meeting was organised by Dr Barry Thomas as convenor of the Linnean Society Palaeobotany Section. It was timed to precede immediately the annual meeting of the Palaeontological Association, and some thirty palaeobotanists and friends attended.
The afternoon meeting involved five palaeobotanical papers: Dianne Edwards on the continuing convolutions in the story of the late Silurian/Devonian cuticles assigned to Nematothallus. This was followed by Gillian Rex reconstructing the fossilisation of a Carboniferous lycopod leaf, Cyperites (Sigillariophyllum of some authors). Joan Watson gave an account of in situ Equisetum from the Wealden, including some new material showing structural detail. After tea, Bob Spicer talked on polar Cretaceous angiosperms and associated palaeoclimatic problems, and Margaret Collinson on Kenyan Miocene angiosperm fruit and seed floras, illustrated with a splendid sequence of suitably warming colour slides of her recent collecting trip.
In the evening, Bill was presented with a specially bound volume of a Festschrift of palaeobotanical papers, constituting a part of the Botanical Journal of the Linnean Society (1983) due out this Spring. It was edited by Dr M.W. Dick and organised by Dianne Edwards who achieved the miracle of not merely whipping up the contributors to keep a tight timetable but of getting the printed and bound volume into Bill Lacey's hands on schedule. Bill Chaloner presented the volume on behalf of all the contributors, and gave a brief review of Bill Lacey's many contributions to palaeobotany.
Bill Lacey then gave us a delightful hour of "palaeobotanical reminiscences", illustrated with slides ranging from sepia to Kodachrome. His recollections included conversations with John Walton (in Glasgow), with Gothan (in a toilet in Heerlen) and a report of Tom Harris skinny-dipping for Equisetum in a Welsh mountain lake. It was

a characteristically droll round up of half a century of palaeobotanical personalities of the kind that are safest - and at their best - in anecdotal verbal presentation. The occasion was greatly enjoyed by all concerned, including, we trust, Bill himself.

The Lacey Festschrift volume (Bot. J. Linn. Soc., 1983, 86, 1 - 225) contains the following papers:

PALAEONTOLOGICAL ASSOCIATION ANNUAL CONFERENCE

This took place at the University of Sheffield in December 1982, and is fully reported in the Association's Circular 111 by Gordon Chancellor, Oxford University Museum. The paragraph quoted below is of particular interest to palaeobotanists:

" Fossil plants were well represented at the conference. John Marshall told us of exceptionally well preserved miospores from the Old Red Sandstone of West Shetland. The M. Devonian material is unoxidised and appears in its original colours, and John has been able to identify a reworked U.Silurian/L.Devonian assemblage proving the existence of older rocks in the area. Jane Francis extended her prize-winning account of last year's meeting on the basal Purbeck fossil Forests of Dorset, and this year's President's Prize was awarded to T. Jefferson for his superb paper on how to recognise various pathologies, such as fire damage, in fossil trees from Antarctica. Jefferson's slides showed diagnostic types of 'trauma', where cambium had been destroyed or where a cavity was filled by an overgrowth of distorted xylem cells. One tree showed 37 separate fire scars, and others had clearly been damaged by floods or animals. One wonders whether lightening also leaves characteristic tissue damage and Jefferson made the intriguing suggestion that flood scars might give a means to date periodic influxes of sediment. I feel sure the prize was awarded to Jefferson not just for his talk but also for his exhibit (co-designed with Amy Karowe also from Ohio State) on in situ burial of trees by Mount St. Helens eruptions. This was an outstanding contribution among many fine exhibits on display...."

FORTHCOMING MEETINGS

NORTH AMERICAN MID-CONTINENT PALAEOBOTANICAL COLLOQUIUM, May 13th 1983

The first such colloquium will be held on Friday May 13th at the Field Museum of Natural History in Chicago, and is intended to bring together palaeobotanists in the area for informal and relaxed exchanges of ideas, updates on current research and discussions on topics of broad palaeobotanical interest. The active participation of students is particularly encouraged. The meeting will immediately precede the Sixth Annual Field Museum Systematics Symposium (May 14th) which this year deals with the

general topic of "Extinctions". Further details of the palaeobotanical colloquium can be obtained from G.W. Rothwell, Department of Botany, Ohio University, Athens, Ohio 45701 or P.R. Crane, Department of Geology, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, Illinois 60605-2496, USA

EUROPEAN PALAEOBOTANICAL CONFERENCE, Monpellier, France, July 1983.
This will take place at the Université des Sciences et Techniques de Montpellier, from 11 - 16th July. The second circular has been sent out in February 1983 to all those who replied to the first circular. Further copies can be obtained from J.Galtier Lab. Paleobotanique, Université des Sciences et Techniques, 34060 Montpellier, France.
The initial programme has been changed due to problems caused by the Bank Holiday; July 14th will be a free day. Lecture sessions will be on 12 - 13th July and the excursions have been moved to the 15 - 16th July.
By early February about 60 people had registered for the conference, many from outside Europe: 19 from France, 15 from England, 3 from the USA, 4 from Denmark, and individuals from Germany, The Netherlands, Belgium, Austria, Spain, Italy, India, Tunisia, Nigeria and the USSR.
The field excursions will allow collection of Mesozoic and Tertiary Charophytes, Stephanian compressions and impressions, Permian plants, Pliocene lignite with megafossils and pollen, and Early Quaternary lacustrine deposits. On the free day there will be inland excursions, and of course there is a beach.....

3RD INTERNATIONAL SYMPOSIUM ON FOSSIL ALGAE, Colorado, August 1983.
This will be held at the Colorado School of Mines, Golden, Colorado from Monday August 15 - Wednesday August 17th. Its aim is to discuss recent developments contributing to a better understanding of fossil algae. There will be the following themes: taxonomy and classification; palaeoecology, palaeoenvironments and biostratigraphy; stromatolites; Precambrian microorganisms; planktonic calcarious algae; endolithic algae; living calcarious algae; and fossil algae in petroleum and mineral exploration. There will also be poster sessions and demonstrations.
There are plans to publish the proceedings by the Colorado School of Mines Press.
There will be three field excursions: "Marine calcarious algae of South Florida", "Paleozoic (Ordovician-Permian) and Precambrian Algal Carbonates of New Mexico and West Texas" and "Carboniferous (Middle Pennsylvanian) Algal Mounds and associated facies, Central Colorado".
Write to: Dr J.L. Wray, Chairman of the Organising Committee, Special Programs and Continuing Education, Colorado School of Mines, Golden, Colorado 80401, USA.

6TH INTERNATIONAL PALYNOLOGICAL CONFERENCE, Calgary, Canada, August 1984.
The second circular has recently be issued and is available from Mrs Lois Kokoski, 6IPC Conference Office, Faculty of Continuing Education, University of Calgary, Education Tower room 102, Calgary, Alberta, Canada T2N 1N4.
The third circular will be sent out in September 1983, ONLY TO THOSE WHO HAVE RETURNED THE YELLOW FORM 2A, or by direct request to the Conference Office.
Abstracts must be typed on a special from sent out with the second circular. Those received at the Conference Office after December 31st 1983 will not be accepted for the Abstracts Volume.

8TH REGIONAL COMMITTEE ON MEDITERRANEAN NEOGENE STRATIGRAPHY CONGRESS, Hungary 1985.
This congress will be held in Budapest from September 15-22nd 1985. The First Circular is available from: The Organising Committee of 8RCMNS, Hungarian Geological Survey, Nepstadion ut 14, H-1442 Budapest, P.O.B.(Pf.) 106, Hungary.

Thuringia: GYMNOSPERM SYNANGIUM OR COPROLITE?

In 1953 W. Remy described a peculiar Lower Permian fossil, Thuringia callipteroides, and noted that it yields Illinites-like pollen,and cuticle indistinguishable from that of Callipteris conferta frondsHe suggested the synangiate nature of Thuringia. Roselt

(1962) described quite different male fructifications of callipterids and erected the genus Callipterianthus. Recently, Barthel and Kozur (1980) demonstrated a close association of Callipteris naumannii and synangia similar to Pterispermostrobus gimmianus. The association of Pterispermostrobus with Callipteris was also described by Doubinger (1980). Thus, three types of male fructifications were thought to have been produced by Lower Permian Callipteris implying the collective nature of the genus.
When visiting the Museum fur Naturkunde in Berlin I was permitted to go through large collections from Crock, the type locality of both Thuringia and P. gimmianus. Many slabs exhibit mass accumulations of C. conferta interspersed with P. gimmianus and very rare Thuringia. When I studied the latter I noted that its surface, with irregular swellings, looks quite different from that of common pteridosperm synangia. I concluded that Thuringia is not a synangium, but a coprolite. This hypothesis explains several moot points at once. Firstly, P. gimmianus may belong to C. conferta as suggested by their association. Secondly, the cuticular fragments found in Thuringia are very similar to the cuticle of C. conferta: among the fragments are evident equivalents of the lower and upper leaf surfaces (the surfaces are strikingly different in cellular structure). I do not believe that the cuticular structure of synangia can show such parallels with foliage leaves. Professor M. Barthel kindly informed me about his studies of Thuringia. He was embarassed that the pollen were absent in all the specimens macerated by him, and that cuticular fragments were sometimes arranged into six layers within the compression. At last the similarity between the pollen found in both Thuringia (by Remy) and P. gimmianus is identical. Incidentally I agree with Barthel that the pollen should be affiliated with Vesicaspora rather than Illinites.
Several cases are known when coprolites yield plant cuticle and eventually pollen. Thuringia provides another case. Judging from dimensions (up to 1.7mm) of cuticular fragments extracted from Thuringia the coprolites may belong to small vertebrates such as reptiles, not insects.
As to the female fructifications of Callipteris conferta, I am sure that they were Autunia-like. W. Remy described them under the name Norinia ? cucullata and mistook for Whittleseya-like synangia.
I discussed all this with Professor Barthel and Professor Daber who kindly helped with my work in Berlin and who support these conclusions.

S.V. MEYEN, Moscow.

TWO WEEKS IN THE MUSEUM FÜR NATURKUNDE (BERLIN, DDR)

I was invited by Professor M. Barthel, the Director of the Museum, to spend two weeks in Berlin. He, as well as Professor R. Daber, Professor H. Suss, and other members of staff at the Museum kindly helped me during my visit.
The first impression of any palaeobotanist visiting the museum would be, I believe, the giant collections that are kept there. Many of the specimens are now classical. The collections range from the Precambrian to the Quaternary and there are monographic collections of Schlotheim, Goeppert, Schenk, H. Potonie, Gothan, Florin etc.
I had to focus my efforts to those specimens only which were the most important for my current work in gymnosperm systematics and phylogeny.
Among coniferalean fructifications the most instructive were Walchiostrobus with Florin's labels. I came to the conclusion that in Walchiostrobus (affiliated by Florin with Ernestiodendron) the fertile part of the axillary complex consists of basally fused and planated seed stalks with subapical seed scars. These fertile planated units also occur isolated and then their similarity with Pseudovoltzia seed scales as reconstructed by Walton and Schweitzer (not Florin) is really striking. I think that Pseudovoltzia can be directly derived from Walchiostrobus-Ernestiodendron (instead of Lebachia). Such derivation finds support from the cuticular data (in epidermal structure Pseudovoltzia is much closer to Ernestiodendron than to Lebachia). In the collections from Zechstein I observed quite a few Peltaspermum-like discs associating with Lepidopteris martinsii. And I briefly saw Triassic gymnosperms as well - it seems that Voltzia is indistinguishable from Pseudovoltzia, and that Albertia is closely related to Ullmannia.

S.V. MEYEN, Moscow.

TROUBLE WITH RHACHEIS

I am thankful to Jansonius (IOP Newsletter 18) for telling us what is the plural of 'rhachis' and for adding the lost 'h'. Paxton's Botanical Dictionary and Henderson's Dictionary of Biological Terms do not write the Greek rho as 'rh' in this word as used in the English language. There is a difference between a transliteration and current usage. A transliteration of the greek word must of course begin 'rh' but for current English usage the 'r' suffices. The correct plural therefore is 'rhacheis' (pronounced: rak-ice), but there remains a serious problem as I intend to demonstrate. I have substituted 'rhacheis' for the words originally used by the authors: 'rachides' in the references 1,2 and 3 below and 'rachises' in 4.

1) Collinson, M.E. & Ribbins, M.M. 1977 page 110. "However, in the absence of data concerning the end walls in the fossil rhacheis we prefer to refer to these cells...."

2) Taylor, T.N. 1981 page 278. "Initially the vegetative parts of the plant were thought to be fern-like, and consequently, early literature dealing with Archeopteris referred to rhacheis bearing pinnae with ultimate pinnules. "

3) Taylor, T.N. 1981 page 218. "Fronds are borne on the stem in two vertical rows by alternately arranged pairs of rhacheis arising from a common base."

4) Walton, J. 1940 page 92. "The same four-ranked arrangement is found on these secondary rhacheis and may be repreated on the third-order rhacheis. The later rhacheis however, have their laterals.....The ultimate rhacheis terminate in sporangia and possess a single strand of tracheids."

Walton was writing about Stauropteris. I should point out that he also used 'rachides' (Walton, 1963, page 452) and one begins to see from quotation 4 why he did not use 'rhacheis'. A much broader education was dispensed at the beginning of the century than is now and I'm sure Walton knew Greek. The problem, I think, is obvious in that this word is not evidently a plural in the English language and is not really uasable in scientific texts. Without a good knowledge of Greek the word could be singular in quotations 1 and 2 and can only be interpreted as a plural in 3 and 4 by the grammatical content. As a further illustration, using a word that can be understood as a collective plural with a singular spelling: "The trouble with the fossil lichen is that it does not grow on trees" - only a good grasp of English, botany and the context will tell you if the word 'lichen' is singular or plural.

I do not think there is any sense in remaining puristically Greek in view of the difficulty in comprehension of a word that does not 'sound' plural. I now wonder if it is not this very problem that has given rise to the concoctions 'rachides' and 'rachises' in the past, the former being given by Henderson and both versions by Webster's Collegiate Dictionary. Although I prefer the latter version, scientific rigour forces me to consider it as incorrect. I care enough about language to reject my own preferences if wrong, and am concerned that fern leaves should not be confused with radishes, especially as the leaf of Raphanus raphanastrum is pinnate.

The most reasonable solution, I think, and one suggested by Jansonius, is the use of the latinised version 'raches' (pronounced: raykees). This is perfectly acceptable tactics in scientific usage and the word is quite recognizeable (sic -Ed.) as a plural in English. I am forthwith deleting the word 'rachises' from my latest manuscript and replacing it by 'raches' hoping that the repherees will not scratch it out.

J.C. HOLMES, Montpellier, France.

NEWS OF INDIVIDUALS

PROF. DR. R. GIVULESCU retired from his position at the University of Cluj, Romania, on August 30th 1982. His present address, where all correspondence should be directed is: Donath Str., 17/M2/66, Cluj-Napoca, Romania.

DR. LASZLO JOSZEF has been appointed the Curator of the Palaeobotanical collection of the Hungarian Geological Institute, Nepstadion u. 14, 1143 Budapest, Hungary.

ERWIN L. ZODROW has been appointed curator of Carboniferous fossil plant collections at the University College of Cape Breton, Sydney, Nova Scotia, Canada, where he holds an appointment of associate professor in geology. The university collection, established by the present curator in 1975, contains over 3,200 specimens of coal measure plants from the Sydney coalfield, Nova Scotia, including a good pecepterid collection from the youngest part of the coalfield.

SYED M. RASUL resigned as Head of the Applied Geology Unit at Trinity College Dublin in September 1982 to take up a post at Paleoservices Ltd., Sandown Road, Paramount Industrial Estate, Watford WD2 4XA, UK.

PETER CRANE is now at the Geology Department, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, Illinois 60605.

ANDREW SCOTT works at the 50 year old Geology Department at Chelsea College London. He has recently made four radio broadcasts for the BBC's external services. His talks have been about "The early history of life on land", "coal", "the development of early terrestrial ecosystems" and "Life in the coal swamps".

SUSAN PATERSON has just started a three year research project at Chelsea College London on the "Ecology of Lower Carboniferous floras from Scotland and France". The work is financed by the UK Natural Environment Research Council.

BOOK REVIEWS

PROBLEMS OF PHYLOGENETIC RECONSTRUCTION K.A. Joysey & A.E. Friday (Eds.), 1982. The Systematics Association Special Volume 12, Academic Press, London. ISBN 0 12 391250 4 £31.40 $58.50.

Systematic biology is currently in the midst of great controversy over the practical and philosophical bases for developing classifications and studying relationships among organisms. This is, in large part, an outgrowth of the increasing application of cladistic methods in systematic research. This volume presents the partial results of a symposium held in Cambridge, England, in 1980 on aspects of phylogeny and classification. With one exception (Meeuse), all of the 13 authors are British, six from the British Museum (Natural History), a recent focal point of debate on cladistics. The volume is pervaded by strong philosophical overtones and presents sharp ideological contrasts. This book is not the place for the noviceto be initiated into the world of cladistics, but those with an understanding of the basic terminology and cladistic methodology will find, in one volume, a wealth of interesting and thought provoking articles. Two of the articles deal specifically with botanical problems (Meeuse, and Hill & Crane), both centred on Angiosperms. Most of the other papers are concerned with general aspects of phylogeny and classification, although emphasis is on examples from animals.

I would suggest that palaeobotanists not familiar with details of cladistic methodology first read the paper by Hill & Crane, which has a detailed introduction to many of the problems central to phylogenetic systematics; I will return to this article in more detail later. This should be followed by the next (and last) paper, by Alan Charig, which compares many of the fundamental philosophical tenets and methodologies of various schools of systematics. Charig is an advocate of developing common ground between palaeontological evidence and cladistic methods. There is too much discussion of the obvious weaknesses of Hennigian classification, however, his long and incisive discussion of 'tranformed cladistics' prepares the reader for the papers by Patterson and Forey. If one is forced to pick and choose among articles to read in this book the Charig article should be high on the list. Of the remaining papers I would like to mention four briefly. The paper by C.R.C. Paul on the Adequacy of the Fossil Record is an interesting relief from the constant criticisms of fossil record incompleteness. He points out that the fossil record is a potentially powerful test of phylogenies that have been generated in the absence of reference to stratigraphy. R.A. Fortey and R.P.S. Jefferies contrast the 'stratophenetic' with the cladistic method of phylogeny reconstruction and argue theoretically that each has strengths in particular kinds of situations, depending on the completeness of the fossil record. Unfortunately, how to recognize a good from a poor stratigraphic record may still reside in the realm of

metaphysics, dependent on one's views of how evolution proceeds. As with many of the papers, they devote considerable discussion to problems of homology, something rarely encountered in the palaeobotanical literature. Papers by Colin Patterson and P.L. Forey present the views of 'tranformed cladists'. Patterson's paper is a lengthy and interesting paper, the concepts pertaining to homology should be read by all palaeobotanists, cladistically inclined or not. His gradual buildup to the rejection of an evolutionary inference in systematics takes the reader a bit by surprise. Forey presents a more critical view of those who incorporate evolutionary interpretations into systematics.

Perhaps the paper of most interest to palaeobotanists is that of Hill and Crane: "Evolutionary Cladistics and the Origin of the Angiosperms". The first 45 pages are a general discussion of problems including the basic principles of cladistics, phenetics, homology assessment etc., using many plant examples. An enormous spectrum of material is covered in these pages, amounting to informative abstracts of all major areas of phylogeny reconstruction. The final 33 pages of text are devoted to the evolutionary relationships of the angiosperms, and an attempt at defining sister-group relationships within extant seed plants. The authors are to be applauded for attempting this extremely difficult task, which obviously involved great effort. However, there are drawbacks in this preliminary study that one might expect when only extant plants are considered, and which may result in considerable future modification of methods and results. Fifty characters were recognized, all of which were used in the cladistic analysis. It is unclear to me how the states of these characters were polarized. Plesiomorphic states appear to have been identified by using "standard" interpretation and ad hoc deductions of the directions of character state change (eg tracheids to vessels in angiosperms), rather than by outgroup comparison. However, I am really unsure of this since it is not stated clearly. Interpretations of homology undoubtedly will be scrutinized closely by many interested investigators, since this is an area of active debate. Some controversial interpretations that I am able to recognize include the equivalence of fern leaf gaps with "leaf gaps" in seed plants, mannoxylic wood in Ginkgo, consideration of Gnetalean cone bracteoles as ovular integuments, and a few more. I find the cladogram itself interesting - the sister group of the angiosperms is really unresolved, but the lower vascular plants form an unresolved trichotomy as the sister group of the seed plants. The fossil record seems to indicate that the lycopods form the sister group of all other extant plants. Interpretation is made difficult in places by complex and opaque writing that renders the second half of the paper much more difficult to understand than the introduction. In spite of any reservations, this still appears to be a very important paper as a first attempt at rigorous analysis of tracheophyte relationships. The authors clearly mean it to be a working model and, as such, it is a necessary step toward understanding the phylogenetic relationships of extant seed plants.

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PHYLOGENETICS: THE THEORY AND PRACTICE OF PHYLOGENETIC SYSTEMATICS E.O. Wiley, 1981. John Wiley & Sons, $37.50.

Wiley's book is intended to serve as an 'introduction to phylogenetics' and to 'survey general practices in taxonomy'. It addresses a huge subject area including much that is covered in many systematic textbooks. Species, supra-specific taxa, specimens and curation, characters, and publication, all find a place. But the main body of the work and probably what most readers will be seeking, is contained in the chapters on phylogenetic trees, reconstruction of phylogenies, phylogenetic classification and its alternatives, and biogeography. Wiley deserves much credit for distilling a moderate text-book presentation of modern cladistics, out of what must be one of the most inflammatory and polemic-ridden bodies of literature in the history of systematics. 'Phylogenetics' is more comprehensive than Eldredge & Cracraft's 'Phylogenetic Patterns and the Evolutionary Process', and makes more of an attempt to incorporate plant systematics, but for me this was balanced by less of general palaeontological or evolutionary interest. Basically, Wiley presents balanced views which those who have developed a deep mistrust of cladistics may find palatable. Many potentially confusing areas are clearly explained and his useful discussion of the Wagner algorithm and numerical techniques is well organized and easy to follow. Wiley provides a personal perspective on all of the more controversial issues still under discussion within

cladistics, but although valuable these will have the less desirable effect of obfuscating the more important major points for many readers. The text is long and frequently tedious, but nowhere is there a concise coherent account of the basic principles of cladistics which are, after all, simple and straightforward.
Perhaps the major factor which contributes to the 'reasonable' tone of 'Phylogenetics' is its distinct evolutionary emphasis, coming as it does in the wake of much confusion over the relation between cladistics and evolutionary theory. To Wiley, cladograms are phylogenetic trees, or deviate only minimally from them, and species are 'evolutionary species' with their own 'evolutionary tendencies and historical fate'. However, the question arises, is such an evolutionary orientation helpful or even necessary? Cladograms are merely hierarchic sets of mutually nested characters defining groups within groups. Different grouping arrangements are evaluated by parsimony. Such schemes as far as I can see, can be constructed entirely without reference to evolution, and this surely is one of their advantages, enabling retrospective comparison with ideas of evolutionary process. Interpreted in evolutionary terms the characters defining groups can be viewed as nested sets of evolutionary novelties which may be examined for congruence with stratigraphy, ontogeny and other extrinsic patterns. Seen in this perspective cladograms also predict the novel combinations as characters which we might expect to encounter as our knowledge of plant diversity is increased by further palaeobotanical work. Wiley sees 'nothing wrong' in these views which separate classificatory procedure from notions of evolutionary mechanisms. But in failing to adopt them he effectively rejects the relativistic quality of cladograms and encumbers himself (eg pages 99-109) with dull and tortuous reasoning attempting to directly relate cladograms to the actual phylogenetic tree. The attempted justification seems to go beyond what is required, and paradoxically the resultant position comes close to that adopted by those at the other end of the cladistic spectrum who regard everything but the barest synapomorphy scheme as Neo-Darwinian mysticism. Surely an alternative perspective is possible where cladograms are accepted for what they are; evolutionarily neutral, relativistic character schemes. In an evolutionary framework they are simplified models, which may serve as tests for ideas of how evolutionary processes might operate, and as starting points for more specific phylogenetic hypotheses. Such a position scarcely seems contentious, and merely common sense, but it is under-exploited. Wiley's book will provide much of general interest to palaeobotanists wishing to use an extremely useful technique in their practical work. Whether they will wish to adopt its entire philosophy is much more doubtful.

P.R. CRANE, Chicago, USA

IDENTIFICATION OF MODERN AND TERTIARY WOODS A.C. Barefoot & F.W. Hankins, 1982. Oxford University Press. 189pp. ISBN 0 19 854378 6. £47.50. $98.00.
This is a volume of 189 A4 pages divided into 6 chapters and 4 appendices. The first, very brief, chapter deals with the reasons for identifying and studying wood, whilst the second, also fairly brief, gives a general account of wood structure. Although both the Cycadales and the monocotyledons are mentioned for taxonomic reasons, the reader is not made aware that despite the fact that wood is formed by members of both these taxa, it will not be described in the book. The next two chapters on the xylotomy of gymnosperms and dicotyledons make up about 3/5th's of the volume and are entirely based upon the published keys of the Princes Risborough Laboratory (P.R.L.) which is referred to by its obsolete name thoughout the book. At this point it becomes evident that the title of the work should really be: "Aids to Identification" since it is only by actually using the P.R.L. keys, with the book as a guide, that identification becomes possible.
As a personal matter I am not at all happy in the use in these chapters of shaded areas on both photographs and line drawings as a means of indicating relevant features. At its worst the technique is unclear and confusing, at its best it still falls short of what can be achieved with properly placed labels and guide lines. Inconsistency is demonstrated only a few pages apart where in one case resin canal epithelial cells are shaded for emphasis whilst in another it is the lumen of the canal which is shaded to indicate the epithelial cells.

The final chapter is devoted to variability in wood structure, in which there are some unfortunate errors. Taxodioxylon is described as the wood of fossil Taxodium and reaction wood is stated to be in all of the woody parts of a tree; it is in fact absent from roots. That is about all we get on Tertiary wood (see the title). Considering the enormous literature on the subject there are some surprising omissions from the references, eg Robard's work on reaction wood, Fritts' on growth rings, and Greguss' on Tertiary woods. Since the references terminate half way down the page with the remainder blank, many could have been added without lengthening the volume.

G.T. CREBER, London, UK.

TRIASSIC FLORAS OF EURASIA I.A. Dobruskina, 1982. Trudy Geologicheskogo Instituta Akademii Nauk SSSR. Volume 365. 182pp. 3 roubles 50 kopeks (In Russian).
This is Dobruskina's second book on Triassic Floras of Eurasia (the first is described in IOP Newsletter 15). This one is devoted to the characteristics of plant assemblages and their comparisons. Plant lists are given for all localities. The phytogeographic patterns are shown on maps compiled for the first half of the period, Ladinian-Karnian, and the Norian-Raetian epochs. Three major stages in the flora development are recognised. One chapter deals with the origin of the Mesophyte flora of Eurasia. The position of the Triassic floras of Eurasia among coeval ones of the other continents is analysed and the following plants are described: Pleuromeia rossica, P. sternbergii, Ferganodendron sauktangensis, Cladophlebis sp, Scytophyllum pennatum, Vittaephyllum bifurcatum, V. hirsutum, V. brickianum and V. ferganense.

S.V. MEYEN, Moscow.

INDEX OF GENERIC NAMES (2ND ADDENDUM: 1974-1978) A. Watt, 1982 (compiler). U.S. Geological Survey Bulletin 1517. Purchase from: Distribution Branch, US Geological Survey, 604 South Pickett Street, Alexandria, Virginia 22304, USA (no price is quoted).
The index lists some additional 800 generic names in the same format as the earlier works in this series (Bull. 1300 compiled by H. Andrews, 1970 and Bull. 1396 compiled by A. Blazer, 1975). For those who are not acquainted with these two palaeobotanical touchstones, it might be explained that for each genus they list author, date and full citation of publication, the age, location, type of fossil, botanical affinity and, sometimes, organ(s) represented, and type of preservation. There are few reference works in our field of which one can genuinely say it is "indispensible", but for the present series it is entirely appropriate.
We already owe Andrews and Blazer a great debt of gratitude, and must now add to them the name of Arthur Watt. Long may the USGS continue to support this valiant enterprise, and may they find equally competent, hard-working and dedicated bibliographers to continue the series.

W.G. CHALONER, London, UK.

STRATIGRAPHY AND PALAENTOLOGY OF THE DEVONIAN AND CARBONIFEROUS O.V. Yuferev (Ed.),1982. Trudy Instituta Geologii i Geofiziki SO AN SSSR, No. 483. Nauka, Moscow. 2 roubles, 60 kopeks. (In Russian)
This collection of papers includes, among others: M.A. Rzhonsnitskaya, Zlichovian stage in the Lower Devonian of Barrandian and its equivalents in the USSR.
V.N. Dubatolov & V.N. Krasnov, Tashtypsky horizon and its value for the stratigraphy of the Devonian red facies from the Altai-Sayan region.
V.N. Dubatolov & A.V. Smirnov, Stratigraphy of Devonian deposits from the Borotalinsky synclinorium (Dzhungarsky Alatau).
M.A. Senkevich, Stratigraphic value of Devonian lycopsids.
V.A. Ananiev et al. Biostratigraphy of the Middle Siberia Lower Carboniferous.
Z.N. Pojarkova & B.V. Pojyrkov, Stratigraphic units of the lower and higher ranks.

S.V. MEYEN, Moscow.