IOP NEWSLETTER 121

March 2020

CONTENTS

IOP Logo: The evolution of plant architecture (© by A. R. Hemsley)

Letter from the president

Greetings Members,

I hope you are staying safe and healthy amid concerns about the spreading Covid 19 virus. It is nice that we can keep in contact electronically these days despite current restrictions on travel aimed at minimizing the spread of disease. I remain optimistic about our big conference IOPC/IPC planned for this September in Prague and I am hopeful to see you there. Palaeobotany has a long history in Prague, going back to Kaspar Maria Count Sternberg (1751-1838), whose "Flora der Vorwelt" (1820) marks the official starting point for valid palaeobotanical nomenclature recognized by the International Code of Nomenclature. It is fitting that, after 200 years, we return to the place that was so inspirational in the early history of our discipline.

The **deadline for abstract submission** for the Prague IOPC is this month, only a few weeks away—**March 31, 2020**. We are currently facing the serious situation with the Covid19 corona virus in most parts of the world. The IPC/IOPC organizing committee informed us that the above abstract deadline remains firm, but based on the unstable situation for travelling in the next month, the **deadline for early registration** for the conference has been already postponed to **April 20, 2020.** More information is below in this newsletter and can be accessed directly at https://www.prague2020.cz. This is the main conference of our organization, held every four years. The IOP General Assembly, with elections of new Executive Committee and consideration of our 2024 conference venue are scheduled to be held during the Prague IOPC.

In this newsletter, we also feature summaries of recent meetings and memories of our colleagues Ted Delevoryas and Tom Phillips. Again, I thank our webmaster, Kathryn Edwina Hill, for her expertise and diligence maintaining and improving our website. Please have a look; we are at palaeobotany.org.

With best regards, Steve
Steve Manchester (Gainesville, FL, USA), IOP President

Letter from the IPC/IOPC-2020 Organising Committee

Dear IOPC Participants,

We are monitoring the situation concerning the Covid 19 coronavirus and various restrictions in our country. Due to this issue, the **early registration deadline is postponed to April 20th 2020**. Please, stay in touch and monitor our website. Your

abstracts are very welcome and after some time we hope it will be clearer how things develop.

However, we all hope that "time is on our sides" – if the epidemic will have the same course as in China, where the number of infected people dramatically decreased, our conference will not be cancelled and we all will meet in Prague in September.

Best Wishes and Good Luck to all of us!
The Organizing Committee

MIKE BOULTER STUDENT TRAVEL AWARDS TO ATTEND IOPC 2020

This year we are happy to offer several travel awards for student travel to IOPC in Prague, September 2020. Applicants must be current members of the IOP and may be undergraduate or graduate students. Those who completed their PhD within the past 24 months remain eligible. These awards, named in honour of former long-serving IOP Secretary, Michael C. Boulter, are planned to be in the amounts of 1000 Euro (European students), and 2000 USD (students from abroad).

The awards are competitive and must include the following parts assembled in one PDF:

1. Title and abstract of talk to be presented (no posters).
2. Copy of the abstract to be presented.
3. Short Curriculum Vita of no more than two pages.
4. A budget that includes a listing of costs for attending the conference and sources of funding that have been secured for all costs except the Boulter Student Travel award.
5. Letter of support from your advisor (may be submitted separately by the advisor--if submitted separately include the name of your advisor with the original application).

Awards will be decided by an international committee. Applications are to be sent to the Secretary/Treasurer of IOP via e-mail attachment by **April 15, 2020**: Lutz.Kunzmann@senckenberg.de

Elections of IOP Executive Committee 2020 – Final call for nominations

The term of office of the current Executive Committee ends during the next International Organisation of Palaeobotany Conference in Prague 2020. As usual, the election of officers should take place at the General Assembly held during the conference. The Executive Committee consists of President, three Vice-Presidents, Secretary/Treasurer, three Members at Large, and Conference/Congress Member. The

Conference/Congress Member is chosen by the EC; he/she is usually in charge with the organization of the next IOP Conference. All other officers will be elected by the members. While the President and the three Vice-Presidents shall not serve more than one consecutive term of office, the three members at Large and the Secretary/Treasurer can be re-elected for another term.

According to our statute, the Executive Committee shall seek nominations for the eight places by advertising in the newsletter. The call for nominations must be made by the Secretary/Treasurer in the IOP newsletter no later than six months before the conference at which the election shall take place (latest February 2020).

Hereby, we call for nominations for the following positions of the EC:

- President
- Three Vice-Presidents
- Secretary/Treasurer
- Three members at large

Nominations may be made in writing (e-mail attachment to the secretary/treasurer: Lutz.Kunzmann@senckenberg.de), by any member of IOP. Self-nominations are also possible according to our statute. All candidates must be current members of IOP. If you wish to nominate someone, please make sure in advance that the person is willing to be nominated for a specific officer position. Please note that the current Members at Large and the Secretary/Treasurer are eligible for reelection and therefore can be nominated.

The current Executive Committee will determine the status of the all nominees, ascertain that they are prepared to stand for election, and will publish a list, in the form of a ballot in the newsletter in June 2020.

Therefore, your nomination letters are requested at the latest by March 31, 2020 (by e-mail to the secretary: Lutz.Kunzmann@senckenberg.de).

Meeting report: 28th International Plant Taphonomy Workshop

The fossil record of plants depicts an astonishing diversity of preservational forms and depositional settings, ranging from two-dimensional adpressions of leaves in limnic sediments to volcanically buried forests showing the three-dimensional preservation of anatomical detail. This taphonomic variety documents plenty of fossilization pathways, whose understanding, however, is crucial to reconstruct plant growth and the influence of changing vegetational patterns through the Earth's history. On this account, the International Plant Taphonomy Workshop has been launched in

1991, aiming at providing space to discuss plant fossilization in an informal and interdisciplinary atmosphere.

This year's workshop was held between November 1st and 3rd at the Institute for Geology and Paleontology of the Westfälische Wilhelms-Universität Münster, north-western Germany – a traditional and renowned center for paleobotanical research. Thanks to the organizers Prof. Dr Hans Kerp, Dr Benjamin Bomfleur and the dedicated students of the paleobotany working group, 34 paleobotanists, paleontologists and geologists from eight countries on four continents offered insights into latest taphonomical studies, topics and issues presented in 15 talks on the second day. The contributions covered a broad scope of subjects related to plant fossilization, e.g., plant taxonomy and anatomy, paleoecology, sedimentology, statistics, geochemistry and mineralogical analytics.

Meeting spotlights: A. group photo; B. Round-table discussions; C: Looking for plant fossils in the Piesberg quarry near Osnabrück during the field trip.

Major themes centered on the famous Lower Cretaceous Crato Fossil Lagerstätte in north-east Brazil, Mesozoic evidence for animal-plant interactions and paleoenvironmental implications of diverse floral records. The talks were grouped in two

blocks each being introduced by a keynote. As a demonstration of the potential and limits of palynological analyses, Dr. Phil Jardine (Westfälische Wilhelms-Universität Münster) provided an overview of the geochemistry of sporopollenin and its durability in the geological record. Steffen Trümper (Museum für Naturkunde Chemnitz) shed light on how life turns into rocks by discussing latest outcomes in petrified wood research. The theoretical considerations were completed by an excursion into the Upper Carboniferous of the Osnabrück region, NW Germany, guided by Hans Kerp (Münster) and Angelika Leipner (Osnabrück). Targets comprised a visit to the Museum am Schölerberg, that documents 300 million years of natural history in the region, and the Piesberg quarry. The latter is a classical site of Bolsovian/Asturian floras and faunas recorded in an up to 500 m thick paralic, coal-bearing succession formed in the Variscan Foreland Basin.

Next to the internationality and the diversity of topics presented, the scientific exchange benefited from a considerable proportion of young researchers proving that taphonomy is a vibrant science. In addition, much time was scheduled for discussions as compared to traditional conferences, being highly appreciated by the audience. Finally, a pleasant and prolific dialog atmosphere during the meeting was ensured by a welcome dinner next to the University botanical garden, food and drinks served during the workshop and a conference dinner in the vaulted town hall cellar in Münster's historical city center.

Altogether, the International Plant Taphonomy Workshop, once again, was a place of fruitful conversations for which the organization panel from Münster is highly acknowledged. The participants are looking forward to the upcoming 2020 workshop at the Urweltmuseum Geoskop housed in the medieval Lichtenberg castle of south-western Germany.

Steffen Trümper, Museum für Naturkunde Chemnitz, Chemnitz, Germany
Helen Böttcher, Senckenberg Naturhistorische Sammlungen Dresden, Dresden, Germany

Report on the Meeting of the Palaeobotany Specialist Group, Linnean Society, London: Wednesday 23 October 2019.

In celebration of Cedric Shute (1937-2019), former curator of plant fossils at London's Natural History Museum, some forty palaeobotanists from nine countries met at Burlington House in Piccadilly. Dr Peta Hayes (NHM,London) co-ordinated and chaired this event. It focused on current techniques and the value of collections in the context of Cedric's contributions to our subject.

Emily Roberts (Portsmouth, UK & Vienna, Austria) described a new gnetalean from the Lower Cretaceous of Brazil. These stems bear roots, leaves and pollen organs that compare closely with extant *Gnetum.* They show adaptations to an arid environment, similar to that around today's Lake Chad.

Borja Cascales-Minana (Lille, France) reviewed early diversity dynamics of the "great Evolutionary Floras" of mega fossil plants in mid-Palaeozoic times. He uses Q-mode factor analysis of 511 fossil plant genera to recognize three major evolutionary phases:Eotracheophytic, Eophytic and Palaeophytic between the Silurian and early Carboniferous. Subsequent questions included how to compare cladistic and non-cladistic taxa, plus the importance of comparing floras based on their absolute ages.

Margret Steinthorsdottir (Stockholm, Sweden) has examined how sub-fossils of *Betula nana* from Germany and Sweden reveal patterns of accelerated climatic warming earlier in the Quaternary. Her results show rapid warming in winter and early spring; if repeated today, this might result in late frost damage and mismatched bud-burst/insect egg-hatching. More fires in northern forests seem likely too.

Jason Hilton (Birmingham, UK) described new finds from the basal Permian Wuda tuff of Inner Mongolia. He emphasized the importance of systematic collecting in the field, detailed research before publication and long-term stewardship of specimens in recognized collections. Jason presented details of a well-preserved noeggerathialean, *Paratingia wudensis,* regarding it as a lignophyte; along with *Protopitys,* he places this order closer to the basal seed plants than any other progymnosperm.

Mario Coiro (Zurich, Switzerland) spoke about applying Confocal Laser Scanning Microscopy to plant fossils in historical collections. He presented evidence from Lower Cretaceous fossils from Portugal and Argentina of an early relative of the cycad *Bowenia* and for the angiosperm status of *Mesodescolea.* Contrary to Harris, he regards the peak of cycad abundance to have been in the Cretaceous, not the Jurassic.

Tiffany Adrain (Iowa City, USA) worked alongside Cedric Shute for most of the 1990s before transferring her curatorial skills to America. Whilst museums hold important data in their registers and catalogues, Tiffany emphasized the value of ancillary materials (*e.g*. personal correspondence, photographs, field notebooks) in providing further important information. She presented a range of nineteenth-century letters, labels and photographs that relate to per mineralized Lower Cretaceous cycadeoids preserved in Iowa, London and elsewhere.

Leyla Seyfullah (Vienna, Austria) presented amber-bearing fossils from the Lower Cretaceous Crato Formation of Brazil. FTIR analysis of this amber compares it closely to other non-pinaceous conifer ambers, with Araucariaceae and Hirmerellaceae as the nearest comparable families. Some amber-bearing pollen organs from this formation

have yielded *Eucommiidites* pollen, being the first megafossil Erdtmanithecales from the Cretaceous of South America.

Alexander Hetherington (Oxford, UK) repeated the value of older publications and historical collections in palaeobotany, particularly in tracing the evolution of roots in Palaeozoic land plants. From Siluro-Devonian rhyniophytoids with rhizoids only, through the dichotomous roots of fossil and extant lycopsids, to the diverse lateral rooting systems of euphyllophytes, progress in roots' ability to access water and minerals through time is well represented in the fossil record. Alexander invited palaeobotanists to visit the website of Oxford University Herbarium to view the recently digitized images of microscope slides kept there since 1929.

Isabel van Waveren (Naturalis, Holland) spoke about the seed cone of an early Permian coniferophyte from Sumatra named *Tobleria bicuspis.* Using historical material from the Jongmans Collection, plus further specimens from recent fieldwork in Indonesia, she interprets this as an early voltzialean conifer. Its preservation in volcanic mudflows, along with varying percentages of other gymnosperms, is interpreted as a rare example of a glacial palaeoflora.

Hugh Pearson (Sizewell, UK) mentioned some curatorial proposals developed by Cedric Shute regarding precise typification of fossil plant names and his coining of "adpression" to include both compression and impression specimens. Cedric helped transfer part of the Benson Slide Collection from Royal Holloway College, Egham, to the Natural History Museum in 1967. Our past president, Prof. Margaret Collinson, also of Royal Holloway, assisted the transfer of the remaining Benson slides to South Kensington, including many type and figured specimens that Cedric had noted as missing.

Christopher Cleal (Cardiff, UK) praised Cedric for his detailed recollection of individual specimens kept at South Kensington and for his skill in preparing cuticles from delicate material. Chris' then spoke about the ongoing difficulties of incorporating the names of organs of fossil plants alongside the names of whole living plants within one code of nomenclature. He provided some instances of nomenclatural difficulties from the Euramerian Carboniferous and a lively debate ensued.

Peta Hayes is to be thanked and congratulated for bringing together a varied and interesting set of speakers. In addition to questions after each talk, the opportunities for further discussion and exchange of information at tea/coffee breaks and in the nearby public houses proved as valuable for palaeobotanical progress as ever.

Hugh Pearson. (EDF, Sizewell,UK)

Report on the Palynology Specialist Group Meeting, Linnean Society, London, Thursday 24 October 2019.

Dr Barry Lomax (Nottingham, UK) organized and chaired this gathering of 25 palynologists from Austria, China, Germany, UK and USA at Burlington House in London's Piccadilly.

Martha Gibson (Sheffield, UK) has extracted pollen of Late Permian gymnosperms from Zechstein rock salt in NE England. Argillaceous halites here yield variable quantities and qualities of palynomorphs and cuticle fragments, with bisaccate pollen the most common. Martha has also experimented on extant *Pinus* pollen to show how hyper salinity and high temperatures cause darkening of its sporopollenin.

Matthew Kent (Nottingham, UK) showed how machine learning can assist in the chemotaxonomy of spores and pollen using data from focal plane array FTIR. Matt' explained that differences between FTIR instrumentation can result in variation of identification from below 30% to over 80%. However, he and his colleagues aim to contribute to a harmonized database of pollen chemistries of worldwide application for palynologists and biostratigraphers.

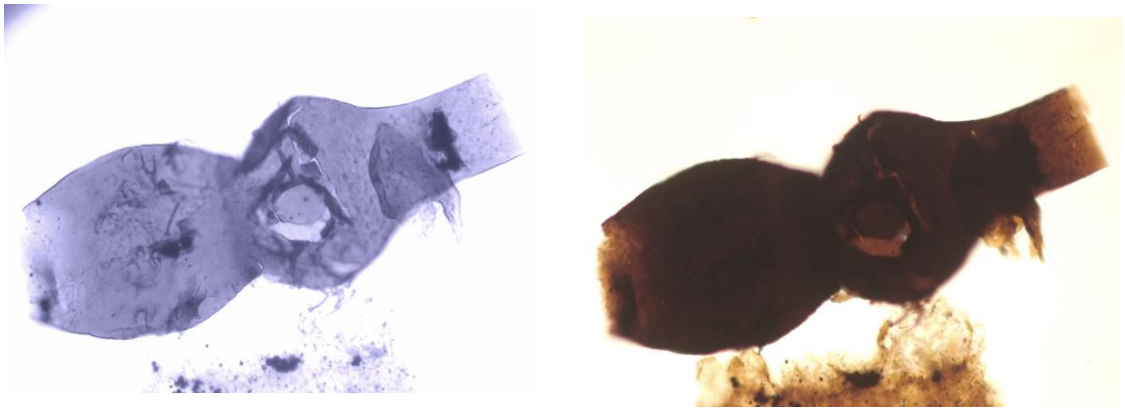
Feng Liu (Nanjing, China) described vegetation dynamics across the Permian/Triassic Boundary (PTB) in southern Tibet. Using Principal Components Analysis (PCA) of palynomorphs data from both onshore and offshore sections, he recognizes deforestation around the PTB, followed by pioneer lycopsid communities. Subsequent questions concerned the distinction of taphonomic and ecological changes and whether there may have been a break in continuous sedimentation in this part of Gondwana around the PTB.

Anemia ferruginea *Anemia angolensis*

Images of spores of extant ferns provided by Carrie Walker.

Carrie Walker (Milton Keynes, UK) has examined spores from 22 families of extant leptosporangiate ferns to find how their morphological diversity compares to their taxonomy. PCA of shape, aperture and exine ornamentation has so far yielded no distinct phylogenetic groupings amongst these ferns, but Carrie is now progressing to examine spores of Carboniferous ferns to find if taxonomic diversity was also decoupled from morphological disparity in the Paleozoic. Photomicrographs of some of some extant spores are shown above.

Paul Strother (Boston, USA) makes use of near IR to extend the pioneering work of Walton and Leclercq to Palaeozoic cryptospores and chitinozoans. IR microscopy here reveals otherwise obscure sutures prosome details of chitinozoans without the need for destructive oxidation. Paul detailed some simple adjustments to visible-light microscopes and cameras to facilitate taking near IR images. Paul also spoke fondly of his time working with Cedric Shute and of their time together in The Anglesea Arms (see figures below).



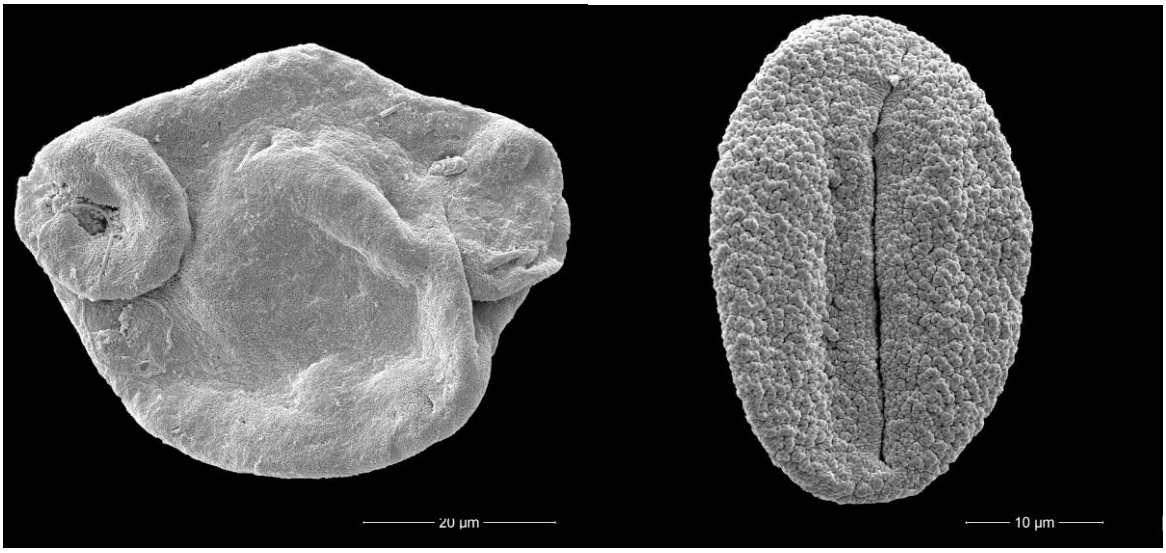
Photographic images of IR (left) and light micrographs (right) of palynomorphs are below.

John Marshall (Southampton, UK) described the spores of Mid- and Late Devonian coals from Spitzbergen and Bear Island to establish which plant groups contributed to palaeoequatorial wetlands of that age. Whilst spores of *Archaeopteris* were abundant at this time, palynology of the vitrinite-rich deposits shows the lycopsids *Protolepidodendropsis* and *Cyclostigma* were dominant in forming these humic coals. There seems to have been a Tournaisian hiatus before coal formation resumed in the palaeotropics in Visean times.

Alexander Ball (Sheffield, UK) spoke about the adaptive radiation of land plants around the Siluro-Devonian boundary, with special reference to spores from the Anglo-Welsh basin. He is examining fusainized sporangia to shed further light on the disparity between the diverse *sporae dispersae* and less varied mesofossil record here. Alexander

also aims to clarify the biostratigraphy of this basin, including the *Apiculiretusispora* sp. E and *tripapillatus-spicula* biozones.

Christa Hofmann (Vienna, Austria) emphasized the value of SEM in palynology with some examples of its application to the middle Miocene flora of Entrischenbrunn, Germany. Here, Marly sediments (perhaps from an oxbow lake) yield a diverse leaf flora supplemented by dispersed pollen. SEM has helped greatly to separate various taxa of Ulmaceae, Oleacae and Sapotaceae; African connections outweigh Asiatic affinities in this flora.



Onagraceae *Ludwigia* *Rehderodendron*

SEM images of some of Christa's exquisite pollen.

Philip Jardine (Muenster, Germany) discussed the chemical durability of sporopollenin in the fossil record. FTIR examination of certain extant pollen shows 98% chemotaxonomic classification success for grasses. By ensuring comparable sample processing routines, he is confident that chemical data from extant and Quaternary pollen will be directly integrated.

The tea/coffee breaks and concluding wine reception allowed further discussion of the diverse and interesting topics covered in this meeting. Barry Lomax is to be thanked and congratulated on the efficient running of this enjoyable meeting. We look forward to an equally successful Palynology Specialist Group Meeting at Burlington House in autumn 2020.

Hugh Pearson (EDF, Sizewell, UK).

Report on NECLIME Annual Meeting, September 25–26, St. Petersburg, Russia

The 19th NECLIME Annual Meeting was held in Saint Petersburg, Russia, on September 25–26, at the Komarov Botanical Institute of the Russian Academy of Science, a venue well-proven for NECLIME meetings. The meeting was organized by Natalia Nosova, Dmitry Gromyko, Lina Golovneva, and Svetlana Popova. With a total of 50 participants, 21 oral, and six poster presentations the meeting covered a wide range of topics.

One part of sessions on the first day of the meeting focussed on larger scale vegetational patterns, their evolution through time and interactions with palaeoclimate conditions, and the reconstruction of past atmospheric CO2, the other on early Pleistocene to Holocene vegetation and climate dynamics including aspects of human evolution and culture, respectively. Sessions on the second day were dedicated to the floristics of East Asia and the Paratethys, moreover, case studies on Paleogene floristic exchange in Eurasia, high latitude wood anatomy, and Paleogene equatorial climates were presented. In the last presentation, the carpological database of the Komarov Botanical Institute was introduced. The abstract volume will be made available for download on our homepage.

The meeting included two excursions which were also joined by participants of the Memorial Readings of A. N. Kryshtofovich which took place at the Komarov Institute right before the NECLIME meeting.

The first excursion took us to a nature reserve around Sestroretskiy Razliv Lake where a guided tour provided insight into vegetational successions of raised bog communities in the glacial morphology of Karelia while in the afternoon we had the chance to visit Kronstadt, the historical maritime defence outpost of St. Petersburg and famous Russian fleet base. A second 4-day field trip was organized to the Polar-Alpine Botanical Garden of the Academy of Science located in the Murmansk region near Kirovsk. The nearly 24-hours train trip to the North through mixed boreal forests in autumn colour was an outstanding experience to all participants. In a guided tour to the Botanical Garden and surrounding Khibiny Mountains, an area of great natural beauty, the impressive plant collection of the garden and altitudinal vegetation changes near the regional tree line were presented by the local colleagues which is gratefully acknowledged.

Thanks to the dedication and grand hospitality of our Russian friends, this second Saint Petersburg meeting of NECLIME and both field trips were a great success. Special thanks go to Svetlana Popova, for her brilliant organization and for taking care for us all.

Torsten Utescher (Frankfurt/Main and Bonn, Germany)
Angela Bruch (Heidelberg and Frankfurt/Main)
Volker Mosbrugger (Frankfurt/Main)

Ted Delevoryas (1929–2017)

On June 29, 2017, we lost an eminent member of our paleobotanical community with the death of Dr. Theodore (Ted) Delevoryas. Ted was born on July 22, 1929 in Chicopee Falls, Massachusetts, U.S.A., and received his undergraduate degree at the University of Massachusetts (1950) and his Master's Degree (1951) and Ph.D. (1954) at the University of Illinois, Urbana–Champaign. After graduate school, he taught as an Assistant Professor at Michigan State University for one year (1955–1956) before moving to Yale University in New Haven, Connecticut, where he was an instructor from 1956–1958 and Assistant Professor from 1958–1960. After a two-year stint (1960–1962) as an Associate Professor at the University of Illinois, he returned to Yale as an Associate Professor and later became a full Professor, with a joint appointment as an Associate Curator of Paleobotany at Yale's Peabody Museum. In 1972, he accepted a position as Professor of Botany at The University of Texas at Austin.

Ted's research specialty was Mesozoic fossil plants, primarily ferns, conifers, and

cycads, on which he published over 100 scholarly articles (see list below). The ability to recognize and identify ancient plant fossils required an intimate knowledge of their anatomy and morphology, which Ted demonstrated in his beautiful drawings that were incorporated in his influential books on the Morphology and Evolution of Fossil Plants (1962), and Plant Diversification (1966), as well as in the book he co-authored with Professors Harold Bold and Constantine Alexopolous, the Morphology of Plants and Fungi (1980). During his career, Ted mentored four Masters students, eight Ph.D. students, and four postdocs. Many have become productive mentors and paleobotanical researchers themselves, and two of them were elected members of the National Academies of Sciences. His academic family honored him in 2010 with a festschrift entitled Plants in Mesozoic Time: Morphological Innovations, Phylogeny, Ecosystems.

The esteem in which he was held by his colleagues resulted in an award of a John Guggenheim Fellowship in 1964 and election as a Fellow of the U.S. National Research Council (1954–1955), the Linnaean Society of London (1975), the Paleobotanical Society of Lucknow, India, and the American Association for the Advancement of Science

(1990). In 1978, he was named Distinguished Fellow of the Botanical Society of America. Along with other botanists, Ted was awarded the Centennial Award of the Botanical Society of America in 2006 for his outstanding service to the plant sciences and to the Society.

Ted took his position of university professor seriously at The University of Texas at Austin, and he was happy to take on the responsibility of furthering the success of colleagues, faculty, and students. Ted exemplified this sense of duty when he served as Department of Botany's Chairman (1974–1980) during which he hired numerous well-known botanists who contributed to the department's rise and continued the work begun by Gordon Whaley and Billie Lee Turner to make it the premier botany department in the country. Ted also took on the responsibility of Chairman of the Division of Biological Sciences at U.T. Austin from 1974–1980 and for a short period was Acting Director of The University of Texas' Marine Science Institute at Port Aransas. He was similarly influential in the plant sciences community as a whole, serving as President of the Botanical Society of America in 1974, President of the International Organisation of Palaeobotany (1978–1981), member of the Editorial Board for the American Institute for Biological Sciences' journal Bioscience (1977), and as Editor-in-Chief of the American Journal of Botany (1985–1989).

Rigorous in teaching, particularly his courses on paleobotany and survey of the plant kingdom, Ted inspired his students and earned their love and respect. The students showed their appreciation of Ted by serving his favorite dessert, strawberry shortcake with ripe strawberries and whipped cream, at the last paleobotany lab session of the semester, despite it being late December. A highlight of the paleobotany class was the annual field trip to the Marshall clay pit in east Texas, where the students experienced first-hand the joy of field paleontology and the thrill of discovering Eocene angiosperm leaves. Ted retired as a full time faculty member from U.T. Austin in 1995 and became Professor Emeritus in 1998.

Ted settled down to retirement life in Encinitas, California, where he made sure he always had a view of the ocean. He continued to challenge his mind and sought learning throughout his life. He taught himself Spanish, French, and German, believing that textbooks would provide insufficient insight into the development and culture of each language. Ted could often be found working a New York Times crossword puzzle, playing Scrabble, reading a book, or enjoying classical music. He particularly liked the quartet compositions of Mozart, Bach, and Beethoven, and at age 72, took up the cello which he was able to enjoy playing throughout his retirement. He also loved sailing, collecting Mexican art, and had an amazing collection of live cycads.

Ted was known for his gentle nature and wit, and he had a way of making people laugh and putting a smile on their faces. He was a man of good humor and modesty, as

well as a botanist par excellence, an avid field scientist, and a dedicated and scholarly paleobotanist. Ted passed away peacefully in his sleep in Austin, Texas, at age 87. As he would have put it, he lived a long, great life. Ted is survived by his siblings Lillian (now deceased) and Mark Delevoryas, his sons, Matt and Chris Delevoryas, his stepchildren Marlena, Michael, and Melanie, his grandchildren, several nieces and nephews, and his ex-spouses Nancy Delevoryas and Cecilia Dean.

Compiled by Beryl Simpson and Cecilia Dean, with contributions from Norma Fowler, Robert Jansen, Melanie Rierson, and Carole Gee

For more about Ted, including a list of his publications, see:
https://palaeobotany.org/index.php/palaeobotanist-biographies/ted-delevoryas/

Tom Phillips (1931-2018)

Tommy Lee Phillips, Professor of Plant Biology at the University of Illinois, Champaign-Urbana campus, passed away after a long series of illnesses on July 14, 2018, at the age of 86. Conscious and working almost up to the end, he was, without ever striving to become so, or really recognizing it, one of the paleobotanical giants of his generation, "bestriding the narrow world like a Colossus", to slightly misquote Shakespeare. The effect of his commitment to empirical work and to gathering copious amounts of data, the ideas and vision that emerged from that dedication, and his almost unparalleled capacity for organization, will be felt in the fields of paleobotany, paleoclimate studies, and coal geology for decades to come.

Above left: Tom Phillips. Above right: Overview of the warehouse collection of coal-ball peels assembled by Tom Phillips and students.

Dr. Phillips, as he was ever known to most of his students, turned his attention

almost exclusively to research on Pennsylvanian-age plants, anatomically preserved in coal-balls, starting in the early 1970s. Before that time, in the 1950s, he had studied coal-ball plants for his graduate work, particularly ferns, under the guidance of Professor Henry Andrews, at Washington University in St. Louis. Upon coming to Illinois in the early 1960s, however, he found other paleobotanists, Drs. Wilson Stewart and Ted Delevoryas, already working on coal balls, and so, for a brief time, turned his attentions elsewhere, including to plants of Late Devonian age. Those studies brought him to the Arctic for two summers (Photo), and to the cover of the Bulletin of the Missouri Botanical Garden (Volume LI, Number 1, January, 1963)! Eventually though, as self-described below, he was drawn back to the unparalleled quality of preservation to be found in these remarkable coal-ball specimens, especially to his beloved ferns. Fern studies continued nearly until his death, particularly in collaboration with his long-term colleague Prof. Jean Galtier (Montpellier, France). He also was a student of the lycopsids, and published many important papers on that group of plants as well.

The major breakthrough of his career was the recognition of the role of paleoclimate in mediating changes in the composition of Pennsylvanian peat-swamp communities and the stratigraphic distribution of coal resources. As described by a senior colleague, Dr. Blaine Cecil (USGS retired), Dr. Phillips' 1983 presentation at the Geological Society of America meeting in Indianapolis, where he re-introduced the idea of climate as a control on coal abundance and occurrence patterns, was revolutionary, permitting resolution of many of the seemingly conflicting aspects of sedimentologic, tectonic, and eustatic explanatory models. Going beyond paleobotany, these paleoclimate interpretations also provided a scientific framework for the reinterpretation of the origin of coal including environments of peat formation, and paleoclimate controls on coal quality.

Beginning with attempts to track the evolution of certain fern groups through time, he noticed that as the species changed temporally, so did the general composition of the swamp vegetation. This initial insight led him to realize the need for better data on this phenomenon, and so, with colleagues in the Physics Department at the University of Illinois, he began the process of developing a quantitative method for assessing coal-ball vegetation. The system first appeared in a Geological Society of America paper in 1977 [Phillips, T.L., Kunz, A.B. and Mickish, D.J., 1977. Paleobotany of permineralized peat (coal balls) from the Herrin (No. 6) Coal Member of the Illinois Basin. In: Interdisciplinary studies of peat and coal origins. Geological Society of America Microform Publication 7: 18-49], and has been used since, sometimes variously modified, in numerous papers by Dr. Phillips and his students, and by others wishing to quantify coal-ball plant abundance patterns. The result has been study of numerous coal beds from throughout the Euramerican paleogeographic realm, and the

development of a major database of peat-swamp vegetational patterns over time. He also was the first to begin studies of coal ball "profiles" (aka: "vertical sections"), which required collecting coal balls directly from the face of a coal bed, while preserving the microstratigraphic and spatial geometries. Combined with the application of his quantitative-analysis methods, the result was a series of papers that greatly changed our understanding of the organization of Pennsylvanian peat-forming ecosystems.

At virtually the same time, Dr. Phillips began working with staff of the Illinois State Geological Survey (ISGS). Among these were geologists, members of the computer and data processing section, and palynologist Dr. Russel Peppers, who also co-advised some of Dr. Phillips' paleobotany students, all done with the strong support of key administrators (particularly Survey Chief, Dr. Jack Simon). This collaboration with the ISGS continued up to his last days, ending with his final student and collaborator, Scott Elrick, now the head of the Coal, Bedrock, and Industrial Minerals Section. The technical support, access to mines, and geological and stratigraphic assistance offered by the Survey's staff were essential to his work. Among the most important research to come from this collaboration, in addition to the peat-swamp ecology studies, was an early paper recognizing and detailing a major vegetational change at the Middle-Late Pennsylvanian boundary, a threshold-like event resulting in turnover of nearly two-thirds of the plants, likely resulting from a strong pulse of warming and drying (Phillips, T.L., Peppers, R.A., Avcin, M.J. and Laughnan, P.F., 1974. Fossil plants and coal: patterns of change in Pennsylvanian coal swamps of the Illinois Basin. Science, 184: 1367-1369). Dr. Phillips felt very strongly about the importance of the links between geology and paleobotany, and nearly all of his students, most of whom were enrolled in the plant sciences program, were required to take courses in sedimentology, stratigraphy, and related geological disciplines.

His work was not unrecognized by colleagues, although he never sought such recognition, and actually strongly advised against even thinking about it. After all, as he made clear, why be concerned with such things, which are out of your control. Among the awards he received during his lifetime are "Honor Graduate" – top of his graduating class – in the U.S. Army Counter Intelligence Corps (CIC) School during the Korean War, and a Guggenheim fellowship, which permitted him to spend a sabbatical year first in France and then the Soviet Union (1975-1976). There were some unanticipated interaction effects between his CIC experience and his visit to the USSR, but all turned out well in the end. His later receipt of the Geological Society of America Gilbert Cady Award for excellence in Coal Geology (1992), and his election to the National Academy of Sciences (1999) were pleasant surprises to him, but never influenced him to deviate from the objectives he had set for himself as a research scientist.]

Education, including undergraduate teaching and graduate advising were central

to Dr. Phillips' personal mission as a university professor. He attended not only to his own students, but also to those from several other institutions, providing assistance with both field and laboratory work, as well as with thesis writing. These were never burdensome tasks, and he enjoyed sharing his thoughts with students in both formal and informal settings.

His University of Illinois graduate student advisees include the following:
Benton M. Stidd, Ph.D. (Western Illinois University, retired)
Karl J. Niklas, Ph.D. (Cornell University, retired)
Joan Courvoisier, M.S. (University of Florida, retired)
Lisa M. Pratt, M.S. (Ph.D. elsewhere) (Indiana University, NASA)
Linda Oestry, M.S. (Missouri Botanical Garden)
James F. Mahaffy, Ph.D. (Dordt College, retired)
William A. DiMichele, Ph.D (Smithsonian Institution)
Richard B. Winston, Ph.D. (U.S. Geological Survey)
Alicia D. Lesnikowska, Ph.D. (Georgia Southwestern State University, retired)
Suzanne Costanza, Ph.D. (Harvard University)
Debra A. Willard, Ph.D. (U.S. Geological Survey)
Scott D. Elrick, M.S. (Illinois State Geological Survey)

Those of us who worked closely with Dr. Phillips will miss his wisdom, mentorship, encouragement, and dry sense of humor. He was proud of all of his students, a strong supporter of the University of Illinois, and a believer in the power of education to change lives. From humble beginnings in the mountains of East Tennessee, he rose to the pinnacle of his profession thanks to native intelligence, physical strength, and great powers of endurance, but also to hard work and self-discipline. Among the strongest messages I heard, not often, but never varying, were to love the work, consider yourself lucky to have such a profession; never take yourself too seriously or become too proud, because most of the discoveries we make or insights we have appear to be quite obvious in hindsight; do not engage in tête-à-tête debates with colleagues, just keep working and let the scientific process decide; and never strive for awards or recognition – you cannot control such things, and your real professional happiness is to be found in the love of your work, not "out there".

In his private life, Dr. Phillips was married to Patricia Paden for 51 years. He had four children. His home was in Champaign, Illinois, a short drive from the University. A gardener in his free time, he once told me that he planted but God took care of the rest. From the plantings around his house, one would conclude (wrongly) that he loved Canadian yew, but also ferns and other exotic species, including the occasional angiosperm, especially if it were a tree. Born and raised in Kingsport, Tennessee, rugged

country, Dr. Phillips came to love the Midwest landscape, its flatness and its big, seemingly endless sky – he attributed to his brother, Haynes, the observation that in the farmlands of Illinois, "the sky meets the ground." Perhaps the best description possible. A fond memory of the lab was the big drawer of paperclips, 6 inches deep of them, an essential element for the organization of coal-ball peels, used to clip them to 4X5 inch cards. A child of the Depression, Dr. Phillips was a man who believed in having enough, and never trusted in others to fulfill those needs – one stood on their own two feet; thus, there were backups to the backups for all supplies, from pens and markers, to cardboard boxes, to steel shelving, to tape decks on which to play his favorite "books on tape" (spy novels – perhaps reflecting his service during the Korean War) – all this at home as well as in the lab. I don't believe he ever had a cell phone, although under some tutelage he came to be a user of a large iMac computer, and even learned to navigate email, much of which he printed out to read – the computer was foremost a tool to look at high-resolution images of coal-ball peels, a step up from the microscope. He answered the phone in his soft drawl, at home and at work, "Hello, Tom Phillips", and was a Southern Gentleman in all the complexity that encompasses.

Dr. Phillips' career is summed up below in his own words, taken from a "Biographical Sketch" found among his papers by his wife, Pat, to whom I am indebted for her help with this brief memorial. From context, my guess is that the sketch was written in the late-1970s. Dr. Phillips was known for his long sentences, so the text has been altered slightly only by the addition of commas and hyphens, here and there. His words are as follows:

"I became interested in plant evolution as an undergraduate while majoring in botany and minoring in geology; at the time I was already committed to the idea of becoming a teacher in botany. The state of Tennessee still prohibited the teaching of evolution in state schools. I was particularly interested in anatomically preserved plants and the opportunities they afforded to more precisely trace evolution of a plant genus or family through an entire geologic period or longer. The pursuit of paleobotany ideally combined botany and geology. My undergraduate training was interrupted by the Korean War and I was in the U.S. Army (Counter Intelligence Corps) 1953-1955. In the summer of 1959 I was a physical science technician in the U.S.G.S. Coal Geology Laboratory and my apprenticeship in paleobotany was as a research assistant 1957-1961 [with Dr. James Schopf].

Graduate training at Washington University [with Professor Henry Andrews] offered an opportunity to begin studies of plant genera extending across the Pennsylvanian Period; the plants were anatomically preserved in the petrified peat deposits in coal seams of the Midwest. My doctoral thesis on the genus *Botryopteris* was a first attempt at more precisely tracing the evolution of a fern, and the sampling

was inadequate to really get at the crux of variation in numerous coals of different stratigraphic age and to establish meaningful stratigraphic ranges. The opportunities at the University of Illinois, ringed by coal fields and with extensive collections of petrified peat, expanded the data for the study of *Botryopteris*, which was continued for a decade more. The earlier evolutionary history of the genus is known only from European deposits and upon the death of Holden in England, I went there on sabbatical and studied the available European specimens.

During the years of searching for additional occurrences of *Botryopteris* in petrified peat deposits, I was impressed with the changes in the coal swamp floras in which *Botryopteris* occurred, the coincidence of stratigraphic occurrence of this fern with distinctive floras, and eventually the major patterns of change through time of the floras, and to some extent their geographic changes within the U.S.A. This led to collaborative efforts with a palynologist [Dr. Russell Peppers] and, in turn, to studies of the coal swamp floras of England, France and the Soviet Union. For the first time it is now possible to carry out joint comparative studies of the coal swamp floras of North America and Europe with full time researchers in each of those countries. These efforts were initiated in 1975-1976 and involved the quantitative determination of the botanical constituents of coal and the stratigraphic ranges of the elements. The ultimate thrust of these data, beyond the application to coal properties, will be to establish the degree of identity of Upper Carboniferous swamp floras on what are now widely separated continental plates.

With the above as a main current in my research background, I have studied fossil plants from the Devonian and Pennsylvanian age deposits from the Midwest, West Virginia, and the Arctic, with two summers spent on Ellesmere Island [with Professor Andrews] and parts of others in West Virginia or nearby coal fields. These studies included genera from many of the major vascular plant groups, with special emphasis on fern or somewhat fern-like plants. My primary interest is the paleobotany of coal-swamp vegetation, and quite a large research and reference collection of coal-ball material has developed at the Urbana campus since 1949. The main research project includes the determination of the coal-swamp floras, their associations, environmental implications, and the botanical constituents of coal, primarily in the midcontinent coals of Pennsylvanian age.

My teaching activities have included elementary biology and botany, upper division courses in comparative morphology of bryophytes and vascular plants, and paleobotany. Graduate studies in my laboratory include coal-ball plant studies, primarily ontogenetic and evolutionary, fossil algae including those of boghead coals, coal-ball palynology and coal palynology (supervised jointly by the Illinois State Geological Survey). I enjoy working with students and paleobotanical colleagues, and particularly

welcome opportunities to share complementary talents on research projects that are beyond an individual's grasp.

1972-	Professor of Botany, University of Illinois, Urbana	
1972-1973	Associate Head, Botany Department	
1965-1972	Associate Professor	
1961-1965	Assistant Professor	
M.A., Ph.D.,	Washington University, St. Louis Missouri	1959, 1961
B.S., B.A.,	University of Tennessee, Knoxville	1953, 1957

Professional Organizations: Botanical Society of America (Paleobotanical Section, Chairman 1975-1976); Geological Society of America (Coal Section); International Societies of Morphology, Taxonomy, Palynology, Palaeontology, AAAS, AIBS; Torrey Botanical Club; Sigma Xi; Illinois Academy of Sciences"

Had Dr. Phillips signed this, it would have been with his signature self-designation, "TLP", which is how, with those three letters, most of his students, and many of his colleagues, referred to him when he was out of earshot.

Little did he know, though, when he wrote these comments, where his pursuits would lead professionally, or that his work would have such far-ranging influence. In the long run, it may be his gift and passion for data collection, happily met with organizational skills and a curator's attention to detail, all predicate to his scientific achievements, that will be his legacy. A truly staggering amount of material, meticulously collected, and documented, awaits investigation by future generations. This collection, symbolically a continuation of Dr. Phillips' lifelong passion for teaching, provides a starting point for others, yet to come, from which to make their own discoveries and change the way we see the world.

William DiMichele

Upcoming meetings

15th International Palynological Congress / 11th International Organisation of Palaeobotany Conference (IPC/IOPC-2020) Prague, Czech Republic, 12th to 19th September 2020

Please visit the website for registration and abstract submission: http://prague2020.cz/
We look forward to welcome you in Prague to the conference.
Best wishes,
The Organizing committee

15th Climatic and Biotic Events of the Paleogene (CBEP-2020) Bremen, Germany, 31th August to 3rd September 2020

Please visit the website for further information:
https://www.marum.de/Forschung/Climatic-and-Biotic-Events-of-the-Paleogene-2020.html
2nd circular available / abstract submission started / early bird registration until April 30 2020

Disclaimer:

Newsletter edited by Lutz Kunzmann & Steven Manchester.

The views expressed in the newsletter are those of its correspondents, and do not necessarily reflect the policy of IOP.

Please send us your contributions for the next edition of our newsletter (122) until end of May 2020.
Contributions should be sent to Lutz.Kunzmann(at)senckenberg.de.

Homepage: *www.palaeobotany.org*

https://www.facebook.com/International-Organisation-of-Palaeobotany-543548202500847/

https://twitter.com/hashtag/paleobotany?lang=en

https://www.instagram.com/explore/tags/paleobotany/?hl=en