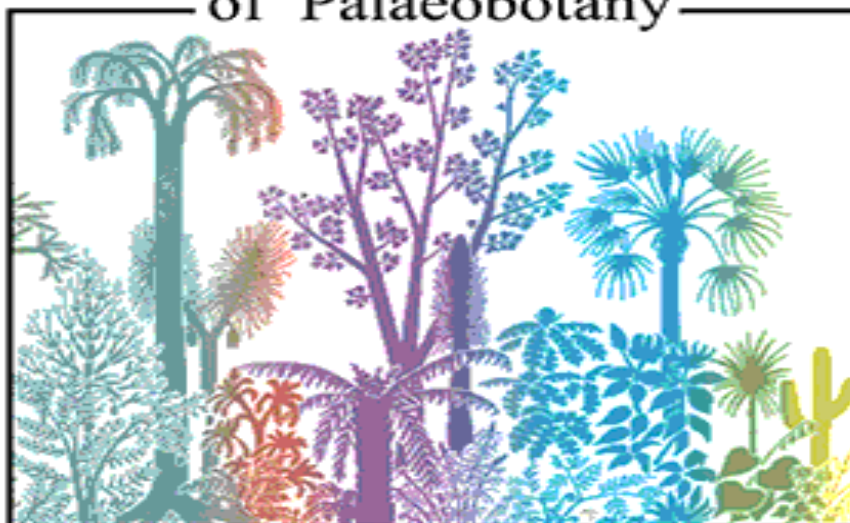


# International Organisation of Palaeobotany



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

## IOP NEWSLETTER 118

February 2019

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## Letter from the president

Dear Members,

I am happy to announce that our website has a new look and feel thanks to the dedication of our webmaster, Kathryn Hill in Adelaide. Compiled in Wordpress format, the website is designed to be readily viewable on smart phones and tablets as well as desktop and laptop computers. Try it out at [Palaeobotany.org](http://Palaeobotany.org) [= paleobotany but with European spelling]. Our original website, founded by Alan Spencer on the initiative of, and with a small amount of financial support from our then President Margaret Collinson, provided the important framework for developing the current website which, I am happy to say, continues to be hosted on servers of the Palaeontological Association. In parallel with our website, announcements and links including job postings, meeting announcements and other communications have been kept up to date on social media by Nareerat Boonchai, Rebecca Koll and others. Thank you!

We are seeking volunteers to help us expand the Paleobotanical Biographies section of the website. This is especially an opportunity to highlight the character and achievements of influential colleagues who are no longer with us. Currently featured are Edmund Tyrell Artis (1789-1847), William Chaloner (1928-2016), Isabel Cookson (1893-1973), Emily Dix, (1904-1972), Jack Douglas, (1929-2007), Leo Hickey (1940-2013), Birbal Sahni (1891-1949), Marie Stopes, (1880-1958), Tom Taylor (1938-2016) and Jack Wolfe (1936-2005), but important figures from many countries are missing--<https://palaeobotany.org/index.php/palaeobotanist-biographies/>

In this newsletter we initiate a new section highlighting the history and scope of paleobotanical collections housed at particular institutions. I thank Rudy Serbet for providing an overview of the Paleobotanical collections at University of Kansas. We invite similar summaries from other collections, large and small, from museums and universities around the world.

Although we all recognize the merit of publishing our works in high ranking journals, we also want the dedicated journals of our discipline to flourish. You can help us elevate the impact factor of paleobotanical journals by submitting some of your high quality articles to these journals, listed with pertinent information on our website at <https://palaeobotany.org/index.php/featured-palaeobotanical-links/palaeobotany-journals/> In addition to the well-known commercial journals, Review of Palaeobotany and Palynology and Palaeontographica Abt. B (established 1856!), I call your attention to the fact that Acta Palaeobotanica and Fossil Imprint are currently open source without charge to authors or libraries, and are available in printed as well as electronic format.

During recent months we have suffered the loss of dear colleagues, Geoff Creber, Cedric Shute, Hazel Wilkinson, and Sid Ash. I want to thank Margaret Collinson, Peta Hayes and those who have helped them to coordinate the unhappy task of preparing obituaries in celebration of their lives which enhanced our field and our community.

With best regards, Steve

Steve Manchester (Gainesville, FL, USA), IOP President

## **Geoffrey Tremain Creber 14.4.1923 – 13.9.2018**

### **Obituary and Career**

Margaret E Collinson, Jenny Nicholls (née Creber) & Hugh Pearson

Geoffrey Creber, PhD, passed away peacefully on Thursday 13th September 2018 at the age of 95, with family present. He had for the past 5 years been in the St David's Residential Home in Priory Road, Ascot, Berkshire, UK. Geoff was born in Harrow, Middlesex and lived in southern England all his life moving between Middlesex, Buckinghamshire, Hampshire and Berkshire. In 1952 he married Hilda (a teacher of Mathematics) from whom he was widowed in 1994. He is survived by his three children, Jenny Nicholls, Frank Creber and Clare Withey, four grandchildren and a great grandson.

Amongst palaeobotanists Geoff was widely known and respected for his work on fossil wood anatomy, tree growth and fossil forests with particular focus on wood growth rings and palaeoclimatic implications. Geoff's palaeobotanical publications span fifty years from 1956 to 2006 including early work on conifer cones. A list of publications, including all those referred to here, is appended to this obituary. Memories from palaeobotanists who knew Geoff well follow this obituary.

#### **Education, Service in WW2, early studies in Botany (with Geology subsidiary)**

From 1933-1939 Geoff attended John Lyon School achieving the GSE General School Certificate in 1937. Geoff left school at the outbreak of WW2 working first in a bill-broking firm and then at Barclays Bank whilst waiting to join the RAF. From 1941-1945 he was in the RAF including in West Africa 1942-1943. After the war ended Geoff was stationed at the RAF Maintenance Depot at Kidbrooke in SE London working on navigational systems with the intention, after 'demobbing', of going on to work in a civilian job in radar systems.

Instead Geoff decided to register at what was then Chelsea Polytechnic (later Chelsea College) to study a course in Botany. At registration day in September 1945 Geoff intended that Physiology would be one of his chosen subsidiary subjects but was told that was 'full' and that he should try Geology because that still had vacancies. In 2004 Geoff wrote "I continue to be amazed that such an important decision in my education should have come about in such a casual way". After 'demob' Geoff was awarded a Further Education and Training (F.E.T.) Award from the government and became a full-time student at Chelsea in September 1946 until 1947. Enduring memories from the years at Chelsea included Geology field trips led by Dr. William Fleet, trips described by Geoff in 2004 as 'splendid'. Apart from Dr. Fleet in Geology, Geoff was also taught by Herbert Duerden in Botany and his contemporary students included the palaeontologist Derek Ager and, most significantly, his subsequent PhD supervisor and co-researcher, former IOP President Professor William (Bill) G. Chaloner. Geoff moved to University College London in 1947 and obtained his BSc (Special) in Botany from there in 1950. Geoff always wanted to go into research after his degree but was not able to do so at that time.

### **Employment after BSc**

From 1950 until his retirement in 1981 Geoff worked in schools teaching general science subjects Biology, Chemistry and Physics. Initially he was at Central Foundation Boys School, Cowper Street, London and from 1957 onwards at University College School, Hampstead, London where he became Head of Department by 1969.

In 1969 Geoff was awarded a Schoolmaster Fellow-Commonership to spend the Summer Term at Emmanuel College, Cambridge and was able to carry out research at the Sedgwick Museum, an opportunity that he felt really opened up the research path for him. It also was the beginning of a long association with that college which, together with that with Royal Holloway, Geoff treasured until the last.

### **University of London associations and part time PhD study**

During his PhD studies Geoff worked with the palaeobotanist William (Bill) G. Chaloner (deceased 2016) with whom he had been a contemporary at Chelsea in 1946/47 (both were then studying Botany with subsidiary Geology). Geoff went to UCL for his BSc. Bill went to Reading for his BSc and stayed for his PhD (with Tom Harris). Bill was appointed to a lectureship at UCL in 1956 but that was six years after Geoff had obtained his BSc there. We do not know if Bill and Geoff had remained in contact since 1947 or if the contact was lost and then renewed.

A joint publication with Geoff (Chaloner and Creber 1973) was stated in the preface to Geoff's PhD thesis (Creber 1984) to be one of four parts that "were published separately" and were included in the thesis as Appendix III. In Chaloner and Creber (1973) the address of the authors is given as Department of Botany and Microbiology, University College London. However, in Creber (1972) Geoff gives his address as University College School, Hampstead whilst Creber (1975 and 1977) gives his address as Birkbeck College and (1977) acknowledges Bill for originally suggesting that he should study tree rings (All three papers are also in Appendix III to Geoff's PhD thesis). Therefore, allowing for delays between submission and publications of papers in those days, we deduce that Geoff probably began his formal part time PhD research while Bill was at UCL and Geoff was working as a School Teacher. Geoff's children (born between 1957 and 1961) remember that many family holidays were taken in areas where fossils could be found. Bill moved to Birkbeck College in 1972 and to Bedford College in 1979 (later part of Royal Holloway and Bedford New College from 1985) and Geoff continued his research at those colleges. At Bedford College, alongside Gill Rex, Geoff acted as Demonstrator (= teaching assistant) for Bill's B23 course in Palaeobotany, plus for some other undergraduate courses in Botany. Geoff was awarded his PhD from Bedford College, University of London in 1984. Much of Geoff's PhD research was undertaken on a part time basis but in the thesis acknowledgements Geoff says "Thanks are also due to the Leverhulme Trust for a grant which made possible full-time work on the research during its late stages".

### **Continuing research and later life**

Geoff went on to publish most of the research from his thesis, including many papers jointly with Bill Chaloner and four papers with Dame Jane Francis who had been at Bedford College as a post-doctoral researcher. Geoff's papers are widely referred to in textbooks of fossil botany (e.g. Taylor & Taylor 1993, *The Biology and Evolution of Fossil Plants* Prentice Hall). Beerling (2007, *The Emerald*

*Planet*. OUP) quotes from Chaloner & Creber (1990) that trees are “compulsive diarists” in how their growth rings give us information on past climates.

In the book in which Creber and Chaloner (1990) was published Geoff described himself as Honorary Research Officer in Botany, Royal Holloway and Bedford New College, Egham, Surrey (now Royal Holloway University of London). After Bill retired and became Professor Emeritus in the Department of Geology at Royal Holloway Geoff held an honorary position in that Department from 1995. Geoff continued to publish extensively until 2006 both papers deriving from his PhD and from new research. A new collaboration began with Sid Ash that took Geoff to study the petrified forest in Arizona and led to joint publications from 1990 onwards (see Sid Ash remembers).

Up until as recently as 2013 Geoff had professional contact, often by e-mail, with colleagues in Russia and other countries (e.g. see Evelyn Kustatscher remembers) who he had met whilst attending various conferences and their associated field trips held over the previous years. One of the conferences that we know Geoff remembered most fondly was the 7th International Organisation of Palaeobotany Conference held in Bariloche, Patagonia, Argentina in 2004 when he was in his 80s (see also Carole Gee remembers).

In October 2002 Geoff and Bill approached Margaret Collinson (Earth Sciences, RHUL) with a silicified specimen of *Woodworthia* wood from the Permian of Brazil which had been cut in the transverse plane. Geoff desired to see the growth rings more clearly. Thus, in March 2013, Margaret (with Sharon Gibbons, palaeobiology lab manager) embarked on their first (and only ever!) etching of a large specimen in hydrofluoric acid. A polypropylene holder was constructed in the department. Using this the specimen was lowered so that a small part of it was in HF, allowed to etch, then lifted out and rinsed by raising and lowering very carefully into multiple changes of water. The air dried etched transverse surface was photographed (Figure 1 left) and a peel was made (Figure 1 right). Thus, it came about that Margaret has the honour to have been the co-author on Geoff’s final publication in 2006. Here we include colour images of the etched surface and the peel to compliment the black and white image in the publication and to demonstrate Geoff’s career-long devotion to the study of fossil wood and all that can be learned from it.



Figure 1 *Woodworthia arizonica*, Permian, Brazil. Colour images of specimen in black and white in Creber & Collinson 2006 fig. 5 (IAWA journal 27 (3) 237-241) showing longitudinal sections of vascular strands traversing many growth rings; (left) HF etched transverse surface; (right) cellulose acetate peel from the same. Scale bar 1 cm. Photos taken in 2003.

**Geoffrey Tremain Creber 14.4.1923 – 13.9.2018**

## **Memories from friends**

### **Sid Ash remembers work with Geoff Creber**

[Note from Margaret Collinson – sadly Sid passed away before he was able to check the final minor edits to this document]

#### *Geoff Creber in the desert Southwest of the United States*

During the latter part of Geoff's scientific career he investigated some of the Upper Triassic fossil woods preserved in the lower part of the Chinle Formation in Petrified Forest National Park (PFNP), Arizona, USA. They were studied in collaboration with me when I was at Weber State University and University of New Mexico. I had studied the Upper Triassic plant compressions (leaves and reproductive structures) in the park since about 1960. The collaboration resulted in the publication of five articles and the abstracts of two talks (see Creber publications list appended to the obituary earlier in this newsletter).

The first joint project was a study of some unusual tree trunks and roots which are (i) greatly flattened (often 10-20 cm in thickness) (ii) nearly structureless and (iii) typically embedded in a thin layer of hard pinkish siliceous rock. In contrast, typical logs exhibit little compression, have normal cell structure and are embedded in soft sedimentary rock. Similar modified wood occurs in the Upper Triassic Chinle Formation in Utah and in the Dockum group in west Texas. We concluded that the damage was most probably caused by a widespread fungal infection similar to those that attack and kill modern trees (Creber and Ash (1990). New radiometric dating indicates that this phenomenon occurred between about 213.1 and 218.0 million years ago during the Norian Stage of the Late Triassic (Ramezani, et al., 2014, Amer J. Sci., 314, 981-1008).

The next project we tackled was the structures in the dominant petrified wood found in PFNP, *Agathoxylon* (formally referred to *Araucarioxylon*) *arizonicum* that some authors had thought were annual rings. We sampled twenty-five decorticated prone logs and in-situ stumps that had pycnoxylic wood. Although many of the specimens had ring-like structures they were discontinuous and none encircled the complete circumference. We then examined the wood samples and slides that had previously been described by other authors including Knowlton, 1889 (holotype of *A. arizonicum*), Daugherty, 1941 (holotype of *Dadoxylon chaneyi*) and *Woodworthia arizonica* Jeffrey, 1910. All of these samples contained only growth interruptions and lacked true growth rings. We concluded that the pycnoxylic wood in the Chinle Formation does not contain true annual rings hence indicating a climate that lacked strongly developed seasons (Ash and Creber, 1990, 1992).

Ash and Creber (2000) published a new description of the morphology of the *A. arizonicum* tree based on careful examination of many of the logs and stumps attributed to the genus that are preserved in PFNP. The tree was monopodial, ranged up to nearly 60 m in height and 3m in diameter, and tapered evenly from a slightly expanded base to the top. The tree was held upright by a ring of broad lateral roots and a stout vertical tap root. The lateral branches (not preserved

themselves) were not systematically arranged on the trunk and appear to have been viable until the tree died. Bark was found on one specimen and was the thin and scaly type.

We concluded our decade long professional association with Creber and Ash (2004) on two other genera of petrified wood often found in the Chinle Formation in the Petrified Forest and vicinity, *Schilderia adamanica* Daugherty, 1934 and *Woodworthia arizonica* Jeffrey, 1910. We presented detailed descriptions of the decorticated logs attributed to each species and reconstructed each tree, once again based on our own careful observations of many specimens of each species in the field and private collections. Both trees were similar, as each was monopodial and less than 1m diameter, although *S. adamanica* was 36 m tall and *W. arizonica* was 32 m tall. Also, we noted that *W. arizonica* had been reported from the Permian of Brazil, a discovery documented two years later (Creber and Collinson, 2006 see obituary earlier in this newsletter).

### **Jane Francis remembers Geoff Creber**

#### *The Bedford College Days*

Although Geoff's main research was on fossil wood, he was curious about many aspects of science and loved learning new things. Coffee time conversations in Bedford College ended up ranging across many topics, palaeobotanical and otherwise, from wood xylem composition and evolution of the angiosperms to the Magna Carta and life on Mars. No question remained unanswered so if our discussions ended with an open question Geoff would be off straight away to investigate and return with new information, gleaned from numerous books in the days before computer searches.

Geoff loved meeting new people, especially at conferences. His modest but friendly style and the smile that was always on his face made him very approachable so he made many new science contacts at every meeting. He particularly liked field trips and was very happy with hammer in hand hunting for fossils, all the while chatting away to fellow fossil hunters. He also loved learning new languages, both to speak and to write, and the trickier the better, so he made many new friends in far reaches of the world as he learnt about their fossils in their own language.

I will remember Geoff for his unending cheerfulness, his passion for learning, and the twinkle in his eye at the thought of a new adventure!

### **Carole Gee Remembers Geoff Creber**

#### *Condors, guanacos, and giant Jurassic logs: Travelling with Geoff Creber through Patagonia*

It was in the wilds of Patagonia where I first met Geoff Creber. About 15 years ago to the month, we thrown together on an epic, week-long, post-IOPC VII field trip through southern Argentina which was organized by Ruben Cuneo. Serendipitously, Geoff and I found ourselves seated next to one another for most of the journey in the overland bus.



I am not usually that clueless, but I have to admit that I didn't know then what I found out later about Geoff's towering reputation in palaeobotany. I did not know his seminal papers in palaeo-xylogy, I had not chatted with him at the IOPC VII in Bariloche, and in fact, I did not know anything about the person beside me when we first met on the bus. In this case, the man and his human qualities preceded his reputation. Within hours of travelling, Geoff and I got to know each other and forged a deep friendship during those seven days.

Despite the long hours on the rough and bumpy dirt roads, we never lacked for a common topic of interest, because Geoff was an interesting and interested person. He was gentle, knowledgeable, and modest. Our discussions were mostly about plants and nature, but I remember touching on such wide-ranging topics as gardening and pop music as well. One thing that I still have in my memory is that Geoff and his wife were avid gardeners; Geoff mentioned a day lily with a special yellow colour mutation that appeared in their garden one day and how he bred it into a new cultivar. In response to my prodding, Geoff told me that once he had gotten it to breed true, he presented it on to a local garden shop to continue its propagation and distribution among keen gardeners. This was the kind of intellectually curious and generous man Geoff was, one with a green thumb and love for plants (Fig. 1).



Fig. 1. Geoff Creber in the field, enjoying here a moment of rest on a fossil log in the latest Paleocene/earliest Oligocene Salamanca Formation in southern Argentina.

Along with Ruben and the other field trip participants, we travelled more than 2000 km, from the cool humid forests near Bariloche, across the dry steppes with golden-colored bunch grass, to the cold temperate woods and subpolar glaciers of Tierra del Fuego. Together we saw herds of guanacos and soaring condors, ate rhea schnitzel for lunch, and were blown away by the never-ceasing wind of southern Patagonia. Through it all, Geoff was buoyant, happy, a good travel companion, and an entertaining conversationalist.





Fig. 2. Geoff Creber achieving his travel goal: To stand among and admire the giant fossil logs of the Cerro Cerrado Petrified Forest in person.

It was only at one point that Geoff grew somber. This was on Day 3, just before we arrived at the Cerro Cuadrado Petrified Forest. As one of the world's foremost specialists on Mesozoic wood, Geoff was on a pilgrimage to this globally famous Middle Jurassic locality with giant logs and *Araucaria mirabilis* cones. While the rest of us were merrily snapping photos and chatting animatedly, Geoff solemnly contemplated the majesty of these 160 million year trees (Fig. 2).



Fig. 3. Field trip participants on the last day of our epic 7-day journey through Patagonia. As usual, Geoff (3<sup>rd</sup> standing from the left) is smiling and impeccably dressed. Photo courtesy of Hans Kerp.

When I look at my photos now, I'm surprised to see Geoff with a walking stick. Although he was in his 80's on this trip, Geoff was so vital in mind and spirit that I never considered offering him help or heeding his age on this journey—much to my embarrassment now. His keen intellect became more apparent to me afterwards when we co-wrote a field trip report for the IOPC Newsletter, because only Geoff could recount our stops correctly and work out the intricate rules of grammar for the complex sentences that I insisted on writing.

In 2004, there weren't any cell phones, satellite coverage, or wireless for me to look up Geoff's publications or scientific accolades while in the field, but from his constant and quiet joyfulness, it was very apparent to me that Geoff had led a fulfilling life as a scientist, scholar, and human being. May we all be as content with our lives and grow old as grateful and graceful as Geoff Creber.

Rest in peace, dear friend.

### **Evelyn Kustatscher remembers Geoff Creber**

#### *Geoff in Italy: field work, food and wine*

I met Geoff at the Taphonomy meeting in Altlengbach near Vienna in 2001 and immediately noticed his sunny and enthusiastic personality. He gave a talk during that meeting on two types of fossil trees from the Petrified Forest National Park in America. After the meeting, we kept in contact and he sent me some of his papers.

In 2005, Geoff came to the Dolomites for the Permian-Triassic palaeobotany meeting that I organized. I remember how happy he was about the possibility to see the Dolomites, and taste the Italian food and wine. I organized an icebreaker with a tasting of wines of the area and remember that later during the same year he told me enthusiastically how he went home and suggested those wines to his favourite wine bar. The fieldtrip at the end of the meeting took us to the Bletterbach and I was astonished that he wanted to go down into the canyon with us, considering that he was more than 80 years old even then.

We kept contact in the following years via mail and in 2013, when I went to a conference in London, he invited me for a visit. I went to see him at the Residential Home in Ascot (Peta Hayes helped me to get the directions) and he was lovely, sitting there with his (elderly) dog, sipping a glass of Italian wine (that I brought with me), remembering his trip to the Dolomites and his visits to the Petrified forest. When I was leaving, he gave me a very special gift, one of his books that he told me that he had enjoyed very much reading. It was "The fossil hunters in search of ancient plants" by Henry N. Andrews. I was deeply touched by the fact that he wanted the book to be kept by someone who understood his passion for fossil plants and I still cherish his special gift. After my visit, the mail contact persisted. He was very happy when I invited him to the Padova meeting but declined because his health did not permit him to attend and, at some point, his daughter had to take over the writing of his mails. When I think about Geoff I will always remember his wonderful smiles, his enthusiasm about life and fossil plants, and his love for Italian wine.

## Hugh Pearson remembers Geoff Creber

*Geoffrey Tremain Creber FLS: quantifier of fossil wood.*

*O tempora, o mores!*

*(O what times, o what manners!)*

*In Catilinam speech 1, ch.1.*

MC Cicero (106-43 BC).

With the death of Geoff Creber (1923-2018) we have lost one of the principal researchers in this field, from the same generation as were Kenneth Alvin, William Lacey and Alan Wesley. Geoff did much to change the study of fossilized wood from a branch of qualitative natural history into a quantitative science.

I first met Geoff in 1981 when he was employed as a Research Officer in the Botany Department of Bedford College, University of London. He was undertaking part time PhD research with Bill Chaloner as supervisor whilst also supporting Bill's research and teaching (see obituary earlier in this newsletter). Geoff applied his experience from years of school teaching well in his capacity as a demonstrator for undergraduate courses; his quiet and gentlemanly manner was combined with a dry and sometimes mischievous sense of humour - hence the Cicero quotation above.

Geoff was elected Fellow of the Linnean Society of London 5 Nov. 1959; he had been proposed by fellow palaeobotanist Ken Alvin, plus Peter Bell and Dr. DJB White. He presented some of his work on fossil wood in poster format at meetings at Burlington House, London, and would often wear his Linnean Society tie at national and international conferences.

At the EEPC conference in Dublin in August 2018, former IOP President Gar Rothwell reminded me of an amusing recollection of Geoff's humour. Gar had been working on a stigmarian apex from the collections at the British Museum (Natural History), London, and Cedric Shute of the Museum's Fossil Plant Section had prepared a silicone rubber mold of it for Gar to take to N.America. Condoms were less freely mentioned in polite society during the early 1980s, but Gar, Cedric and I burst out laughing when, having seen the flexible rubber item, Geoff said "I never knew there were contraceptive sheaths in the Carboniferous!"

The name G.T. Creber will continue to be referenced for years to come in papers on palaeo-climatology; Geoff certainly did much to help bring palaeobotany into the game of well-quantified palaeontological sciences. However, my abiding memory of Geoff will be from a photograph (Figure 1; next page) taken of him and fellow palaeobotanists standing beside the partially reconstructed Jurassic conifer *Protocupressinoxylon purbeckense* on the Isle of Portland, Dorset, England on a summer's day in 1984. Dame Jane Francis and Geoff had helped to organize that field excursion. Geoff managed to combine practical fieldwork and English sartorial propriety to perfection.





Figure 1: Geoff Creber (4<sup>th</sup> from left leaning on trunk) on field excursion to Isle of Portland in 1984. Also in this photo is one of the contributors to this memorium, who also passed away recently, Sid Ash, second from the left. Photo courtesy of Jane Francis.

### Geoffrey Tremain Creber Publications list

Compiled by Margaret Collinson with help from Sid Ash, Jane Francis, Jenny Nichols, Hugh Pearson and Han van Konijnenburg van Cittert

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[Note - Available \(only text no figures\) within this text document at https://archive.org/stream/in.ernet.dli.2015.120209/2015.120209.Implications-Of-Continental-Drift-To-The-Earth-Sciences-Vol-1\\_djvu.txt](https://archive.org/stream/in.ernet.dli.2015.120209/2015.120209.Implications-Of-Continental-Drift-To-The-Earth-Sciences-Vol-1_djvu.txt)  
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## In memoriam: Cedric Shute

Cedric Shute, our much-loved friend and most highly esteemed colleague, respected worldwide, died on 26<sup>th</sup> January 2019. Cedric had retired from the museum in 1997 but remained in regular contact with Museum staff and other UK palaeobotanists until his death, gladly sharing his experience and recollections to help with their ongoing work.



Cedric joined the Palaeobotany section of the then British Museum (Natural History) [now Natural History Museum] in 1959, after completing his National Service. He impressed the existing curator, Maurice Wonnacott, with his careful curation of the collections and attention to detail. The extremely high standard of curation of the Palaeobotany collections owes a lot to Cedric's meticulous work. Cedric trained several junior staff in the curation of palaeobotanical specimens and published to share his methods (e.g. Shute and Foster 1999). It is a source of great pride to the current curator that she was able to benefit from his expertise over the past 25 years.

Cedric was an excellent host to visitors from all over the world. His knowledge of the collections, his aptitude for assessing the importance of material and his friendly manner has meant that he enhanced the Palaeobotany collections extensively during his time as Curator of Palaeobotany. One example is the internationally significant Rhynie Chert collection from the Devonian of Scotland. The Rhynie Chert is inaccessible, buried under a field which is now a SSSI, but in 1964 a trench was opened for the International Botanical Congress. Cedric asked if he could collect some material for the Museum and then turned up with a van, bringing crates and crates of important research material back to London. There are many other important collections that the museum owes to Cedric's endeavours. Some spring immediately to mind because of their current role in international research and exhibitions, including the Benson Collection, the Apex Chert, and the palaeobotanical collections of Downing College, Cambridge.

Cedric is world-renowned for his mastery of palaeobotanical techniques, in particular, cuticle preparation. Cedric was known as a magician in this dark art and was sent the trickiest material to prepare when others had failed. He embraced new techniques, such as Confocal Laser Scanning Microscopy and advised other scientists on using methods similar to those he had developed in palaeobotany. He published on palaeobotanical methods and nomenclature. It was Cedric who invented the term “adpression”, to accommodate the need for a term encompassing both compression and impression fossils (Shute and Cleal 1987).

Cedric’s particular research interest was the Coal Measures. Working with Chris Cleal over many decades, Cedric published over 15 papers on Carboniferous plant fossils and their significance. He also collaborated and published on Silurian and Devonian plant remains with Dianne Edwards, Alan Hemsley and Paul Strother. In 1994, Cedric co-edited a volume of Biological Reviews with Elizabeth Sheffield, resulting from the Natural History Museum & Linnean Society of London Symposium held to bring together neobotanists and palaeobotanists on the theme of Alternation of Generations in plants.

Outside the Museum Cedric played a key role in fostering collegiality of the palaeobotanical community, both within the UK and by inviting visitors from overseas to join activities. This included his active participation in social events such as ‘the last Wednesday of the month’ and in Palaeobotany group field trips and scientific meetings under the auspices of the Linnean Society of London. Cedric’s contribution to palaeobotany has been recognized by new species being named after him, e.g. the Wealden bennettite leaf *Cycadolepis shuteana* Watson & Sincock (1992).

Although Cedric retired in 1997, he continued to come in to the Museum every day as a Scientific Associate until an accident limited his mobility about seven years ago. Still, Cedric’s passion for the collections and palaeobotany burned on. He embraced the digital age, allowing him to continue to publish with Chris Cleal. He shared his valuable knowledge and advice with the current Curator of Palaeobotany up until just a couple of days before his death. He will be very sorely missed by all those who knew him.

The Linnean Society Palaeobotany Specialist Group will be holding a celebration of the life of Cedric Shute at a meeting entitled “Palaeobotany: current techniques and the importance of collections in research” hosted by the Linnean Society of London on the 23rd of October 2019. For further information and offers of talks, please contact Dr Peta Hayes ([p.hayes@nhm.ac.uk](mailto:p.hayes@nhm.ac.uk)).

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*Peta Hayes (Natural History Museum, London, UK)*

## Hazel Patricia Wilkinson (1932–2019)

*Paula Rudall and Peter Gasson remember "Kew's Miss Marple".*

A widely respected Kew researcher, Dr Hazel P. Wilkinson, died in January 2019 at the age of 87. Hazel retired from Kew staff in 1992, but continued to work in the Anatomy lab almost daily as an Honorary Research Fellow until within a few months of her death, despite being restricted by debilitating back problems in recent years. Known affectionately from her forensic work as "Kew's Miss Marple" (an epithet that appealed to her), Hazel will be greatly missed by those who knew her.



Following the award of a PhD in 1971 at the City of London Polytechnic (now part of London Metropolitan University), Hazel was appointed in 1973 to work on the Kew-based volume series *Anatomy of the Dicotyledons*, which was published by Oxford University Press and edited initially by the former Jodrell Keeper Charles Metcalfe and subsequently by David Cutler and Mary Gregory. She published papers on the anatomy of several eudicot families, including Anacardiaceae, Gunneraceae, Menispermaceae, Pittosporaceae and Pterostemonaceae. She deposited large numbers of microscope slides into Kew's microscope slide collection, thus establishing them as a permanent and accessible resource. Perhaps Hazel's most enduring work in this series was her chapter on the Plant

Surface, in which she described not only the many different types of hairs that occur on leaf surfaces, but also extrafloral nectaries and domatia that form the basis for plant–insect interactions, later supplemented by a study of leaf teeth.

In addition to (and complementing) her work as a plant anatomist, Hazel was a noted palaeobotanist who specialised in the fossil woods of the Eocene London Clay Flora. Throughout her life, Hazel made frequent fossil-collecting trips to the Isle of Sheppey on the north coast of Kent, either alone or accompanied by other researchers and interested friends and associates, including several Kew staff. She published several papers on this topic, some of them in collaboration with her PhD student, Imogen Poole, who was awarded a PhD at Royal Holloway, London University in 1993. One of Hazel's most significant finds was fossilized mangrove hypocotyls, including characteristic starch grains. The chance discovery of unusually well-preserved fossil fungal hyphae in pyritized twigs formed the basis for another publication.

In recent years, Hazel's interests turned to forensic work, most notably the high-profile case of "Adam", which was the name given by the Metropolitan Police to an unidentified young boy whose torso was discovered in the river Thames in 2001. Hazel identified most of the plant material found in Adam's small intestine, including calabar beans and other poisonous herbs used in Nigeria. As the police searched for evidence of the identity and origin of the victim and how he died, Hazel appeared on various news channels and newspaper articles. "Of course we all want to learn Adam's identify and trace his killers," she said. "But this is fascinating work, too. It's challenging trying to discover something, especially when you know the answer could be around the corner. It draws you on to find out more" (Daily Telegraph, 26 Nov 2006).

Hazel was awarded a Kew Medal in 1993, when the citation read as follows: "Hazel Wilkinson has been a tireless worker for Kew for the last 20 years, both as an employee and as a volunteer. Hazel has always kept a low profile, preferring to work conscientiously on a subject which she loves, and this work has been to the considerable benefit of Kew's reputation."

- Paula & Pete -

(Originally published on: <https://www.kew.org/blogs/kew-science/hazel-patricia-wilkinson>)

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## **Paleobotanical Collections of the Biodiversity Institute and Natural History Museum at University of Kansas, Lawrence, KS, USA.**

The University of Kansas (KU) paleobotanical collections, estimated to include about 400,000 specimens, includes include compressions, impressions, and permineralized fossils from Precambrian to Pleistocene stratigraphic horizons from numerous localities around the world. The Division of Paleobotany at the Museum was instituted in 1995 when Edith L. Taylor and Thomas N. Taylor moved to the University of Kansas, bringing with them their extensive collections, acquired during their tenures at the Ohio State University. The Taylor Collection, well known for North American Carboniferous holdings, and permineralized Permian and Triassic material from Antarctica, and the Baxter Collection, with particular strengths in Kansas Carboniferous coal balls, forms the core of the KU Paleobotany collection, but we have acquired other important collections from other institutions, including portions of the collections of Ted Delevoryas (Triassic of North Carolina; Jurassic of Mexico), Lawrence C. Matten (Devonian of Ireland), Gar W. Rothwell (early seed plants) and Gene Mapes (Pennsylvanian of Kansas, Oklahoma and Texas). The fossils were initially stored in wooden cabinets, but a National Science Foundation Research Collections grant provided funds to install a state-of-the-art compactor system with metal drawers. After the installation of the compactor system both the Taylor collection and the Robert Baxter collection were integrated and rehoused. It was also at this time (1997) that Rudolph Serbet joined the Museum and became the first dedicated collections manager of Paleobotany. During the past 2 years, our Division has acquired additional storage space complete with a new compactor system and a more precise climate control system. This new space will support the growth of the collection for many years to come.



Rudolph Serbet



Brian A. Atkinson

The Division of Paleobotany utilizes the collections to conduct research, research training, and graduate education that focuses on various aspects of plants in the geologic past—their global diversity, evolution, geography, structure, morphology, and ecology. It is important that the stewardship of the collections are maintained for future generations. The Division also uses the collections to broaden outreach about its research to a diverse public audience at multiple levels of education. To this end, we are involved in a number of activities including, teaching and mentoring of women and

students from underrepresented groups, mentoring graduate students and postdoctoral fellows, support of outreach programs at the KU Natural History Museum and workshops and field trips with various public school districts. Using our collections during these interactions has led to an increase in public awareness of not only what we do, but we hope that these types of interactions instill a sense of discovery so that some of the public and students will build on these experiences to further their education in some area of science, technology, engineering or mathematics. We also provide tours of our extensive collections to members of the community, as well as hosting colleagues from around the world. Current Faculty and Staff augmenting and making use of these collections include Brian Atkinson (assistant professor), Rudolph Serbet (collections manager), Edith L. Taylor (curator Emerita), Carla Harper (postdoctoral researcher), Taryn Dunivant (graduate student), Benjamin Perry, Sharyn Serbet, Shannon Warren (undergraduate collections assistants) and Alyson Wilkins (collections consultant). Additional users of the collections include but not limited to, Brian Axsmith (USA), Anne-Laure Decombeix (France), Ignacio Escapa (Argentina), Roberto Iannuzzi (Brazil), Steven Manchester (USA), Kelly Matsunaga (USA), Patricia Ryberg (USA), Andrew Schwendemann (USA), Alexandru Tomescu (USA), Jonathan Wilson (USA) and the Field Museum (Chicago, USA).



Brian Atkinson and Rodolph Serbet during field work in Antarctica (photo courtesy of Brian Atkinson)

Paleobotany has a long history at KU. The first collection of fossil plants at the University of Kansas appears to have been initiated in 1888 when Prof. Francis Huntington Snow led the first expedition to collect fossils from the western part of Kansas. Numerous plant fossils were recovered during this trip from the Cretaceous Dakota Sandstone Formation not only by Snow but also by E. Putnam West, R.D. Lacoe, and A. Wellington. Many of these specimens remain an important part of the KU collections. In 1892 Leo Lesquereux published "The Flora of the Dakota Group" describing and illustrating not only the fossils collected by KU staff but also those collected by Charles H. Sternberg, a



well-known Kansas-based dinosaur collector. This was one of the first comprehensive and important publications on Kansas plant fossils.

In the early part of the 20th century growth of the collection continued when Elias Howard Sellards, from the University of Kansas, discovered one of the richest and most significant localities in Kansas near the town of Elmo. Although he published numerous papers on the beautiful insect fossils from this site he also published several papers on the associated Permian plants. There are over 300 specimens of plants from the Permian and Pennsylvanian of Kansas in the collection that were collected and identified by Sellards.

In the early 1930's, Maxim Konrad Elias investigated Cenozoic deposits of western Kansas. He made an extensive collection of vegetative and reproductive remains of numerous grasses and seeds from various angiosperm families. The fossils attributed to the grass family were one of the best collections in the world at that time. This material is also part of the KU collections.

In 1936, Raymond Cecil Moore published a paper on Pennsylvanian plants from Garnett, Kansas. This flora had a distinct "Permian" aspect despite the fact that the stratigraphic position indicated it was Pennsylvanian in age. Over 300 specimens from this unique locality were added to the KU collections including some important conifers.

The growth of the collection was directly impacted by the establishment of a Paleobotany course at the University in 1947. This course continued to be taught by Robert Wilson Baxter and in the 1954-1955 academic year, he offered an additional course called "Paleobotany of the Coal Age." During his 34 years at the University of Kansas, Robert Baxter enhanced the collections with a large number of carboniferous coal balls from Illinois, Iowa, Indiana and Kansas. With the retirement of Robert Baxter in 1983, paleobotany at the University of Kansas virtually came to a standstill and the existing collection went into storage. However, it was at this time that Alicia Lesnikowska was hired to assist with the preservation and cataloging of material which has provided a concise inventory of what was collected over the years.

The growth of this diverse assemblage of fossils is facilitated by activities related to the research interests of the Division and to the acquirement of so-called orphaned collections. During the last decade or so, we have acquired the collections of James M. Schopf (various Pennsylvanian sites; Permian, Triassic and Jurassic of Antarctic along with numerous other localities), Donald Eggert (Pennsylvanian), Ted Delevoryas (Triassic of North Carolina; Jurassic of Mexico), Lawrence C. Matten (Devonian of Ireland and the US), Gar W. Rothwell (early seed plants) and Gene Mapes (Pennsylvanian of Kansas, Oklahoma and Texas).

Our Division provides loans to institutions and qualified researchers. In some cases students, post-doctoral fellows, or emeritus faculty can have access to our material. In keeping with conservational methodology, some specimens are not available for loan, including specimens judged too fragile or environmentally sensitive to transport. Moreover, in general the Division does not make loans of type or figured specimens, or single representatives of a taxon. However, researchers are always welcome to visit the collections to enhance their research objectives. A high percentage of the collections have been digitized and databased (Specify platform) and is currently on-line (<http://collections.biodiversity.ku.edu/KUPaleoBot/>) It can be accessed directly through our Museums web page (<http://biodiversity.ku.edu/paleobotany>) or through data aggregators like iDigBio (Integrated Digitized Biocollections) or GBIF (Global Biodiversity Information Facility).

*Rudolph Serbet (KU)*

## Meeting reports

### Linnean Society Palaeobotany Specialist Group meeting, London (21 Nov 2018)

This annual event at Burlington House, Piccadilly, attracted over forty participants from across the UK and mainland Europe. Dianne Edwards (Cardiff) chaired the morning session and Peta Hayes (London) the afternoon talks.

Emily Roberts (Portsmouth) described the flora of the Crato Formation, a *Konservat Lagerstaeette* from the Aptian of NE Brazil. This assemblage of riparian and lagoonal plants deposited in a saline basin includes a wide range of pteridophytes and seed plants, including some fascinating gnetophytes and angiosperms. FTIR and ATR analyses of amber-like inclusions in *Welwitschiophyllum* leaf fossils disclosed gum-like substances closely comparable to carbohydrates found in extant *Welwitschia* (see photograph; courtesy of Mr Roger Pinkney).



*Welwitschia mirabilis* Hooker fil. growing beside per-mineralized trunk of Permian *Agathoxylon arberi* (Seward) Pearson at Khorixas, Namibia.

Andrew Scott (Egham) added to his account of the Kingswood flora given at Dublin in August. This limestone from near the famous Pettycur locality in Fife, Scotland, is Visean (late Dinantian) in age. It appears to have preserved plants from two habitats near to a post-eruptive volcanic crater. After collaboration with Brigitte Meyer-Berthaud, Gillian Rex and Howard Falcon-Lang, Andrew showed images of well-preserved calcareous permineralizations and fusainized plants, such as the small lycopsid *Oxroadia* and various reproductive organs of gymnosperms. The latter include a hirsute, ovulate organ, *gen. et sp. nov.*, soon to be published following work with Jean Galtier and Jason Hilton.

Barry Lomax (Nottingham) gave an experimental evaluation of the use of discriminative uptake of carbon-13 by C3 plants as a proxy for palaeoatmospheric CO<sub>2</sub>. Using *Arabidopsis thaliana*, Barry and his co-workers explored the relative influence of pCO<sub>2</sub> and changes in water-use efficiency on stomatal opening. This most current topic led to debate, with questions regarding the effects of shelter upon CO<sub>2</sub>-uptake. Also, there are possible political consequences if Barry's call for caution in interpretation were to be mistaken for nihilism in the use of this proxy.

Christopher Berry (Cardiff) gave a sequel to his 2016 talk at Burlington House with a report on his recent visits to museums in Norway and his fieldwork in Svalbard this summer with John Marshall and Charles Wellman. Happily, Chris' and his colleagues have now identified precise field localities where Vogt and Hoeg had collected Devonian plants in this Arctic Archipelago between the two World Wars. New material of *Svalbardia* and *Ibyka* give insights into the tropical flora of Mid-Devonian times. Also, new localities in NW Spitsbergen, dated by biostratigraphy as from Upper Silurian to Mid-Devonian, include new and rare examples of soils with roots.

Barry Thomas (Aberystwyth) presented instances of confusion and false assumptions over the last seventy years that have resulted in today's troublesome taxonomy for Carboniferous lycopsid cones. Harking back to mid-twentieth century work by Dijkstra, Chaloner and others, Barry summarized how links were made between *Lepidostrobus* cones and dispersed megaspores then called *Triletes*. Of course, not all such cones yield spores and *L. variabilis* became a repository for those imperfectly-known strobili. Recent work by Barry and Leylah Seyfullah on *in situ* megaspores from the Silesian fossil forest at Brymbo, North Wales, has highlighted these taxonomic issues for those working on adpressions. Barry agreed that another spectrum of difficulties arises when one considers permineralized *Lepidostrobus*, *Flemingites* etc.

Claire Belcher (Exeter) provided an update on her 2012 talk at this venue on the subjects of wildfire and charcoal. Referring to recent conflagrations in the USA and controlled laboratory experiments she and her co-workers have conducted on wood of *Thuja plicata*, Claire posed three questions: 1) Does charcoal's maximum reflectance form at peak fire intensity? Whilst carbon is finally lost to oxidation after prolonged combustion, Claire reported that reflectance continues to rise throughout burning. 2) Does total energy release relate to reflectance? Yes, these two factors are directly related. 3) Does the kind of fuel/wood alter its charcoal's reflectance? Working on certain species of *Eucalyptus*, *Fagus*, *Ochroma* and *Quercus*, Claire found that higher reflectance relates to higher bulk density of the wood, since the latter is directly related to the heat released when the wood burns. Audience questions concerned the distinction between burning of bark and the charring of wood; also which duration of burning compares most closely with real wildfires.

The coffee, lunch and tea breaks gave opportunities for ongoing discussions and the chance to view the poster by Richard Jones (Cardiff); this dealt with spores and mega fossil plants ( eg *Prototaxites*, *Salopella*, *Pachytheca*) of Lower Devonian age from near Abergavenny, South Wales. His poster combined images of fossils, maps and field localities and it attracted several comments and questions.

Peta Hayes is to be thanked and congratulated in drawing together so many speakers whose talks stimulated much ongoing debate. Linnean Society staff (none of them fossil botanists) remarked to me how well-attended and active these autumn meetings of our Specialist Group are. Long may that continue and we thank them for the warm welcome they give us once again.

Hugh Pearson (EDF, Sizewell, UK)

### **Report on Linnean Society Palynology Specialist Group meeting, London (27 Nov 2018)**

Barry Lomax (Nottingham) convened and chaired this day of palynological talks at Burlington House, Piccadilly. It brought together about 30 workers in this field from across the UK, China, France, Germany and Norway.

Thomas Servais (Lille) spoke about Lower Palaeozoic acritarchs, trying to make sense of them in ecological, taxonomic and other biological contexts. He drew comparison with human morphotypes and the variabilities displayed by dinoflagellate cysts and *Cannabis* foliage. Richard Bateman reminded us of the disparity between morphotypes and DNA-based taxa amongst some extant orchids; caution is certainly advisable when interpreting acritarch biology.

Geoff Warrington (Leicester) described both the human and palaeobotanical histories of the isospores produced by one of the few whole plants known from the Trias; viz. the small bryophyte *Naiadita*. In the centenary of the first female Fellows admitted to London's Linnean Society, it is apt that the first photographs of *N. lanceolata* isospores were published by one Miss IBJ Solla in 1901. Linked with the dispersed spore *Porcellispora*, subsequent work has shown this bryophyte was much more widespread in Rhaetian times than in the Bristol area alone. Palynology reveals its presence from Devon to Yorkshire in England, in N.Ireland, northern and central mainland Europe, N.Africa, the Middle East and N.America.

Matt Kent (Nottingham) described the use of Fourier Transform Infrared Spectroscopy (FTIR) combined with the SporoSpec analytical programme to investigate the chemical structure of sporopollenin and cutin. This combination, allowing faster analysis of large numbers of sporomorphs, has been applied to grains from near the Permo-Triassic boundary; a time when ozone loss and higher UVB levels might have resulted in higher rates of mutation, eg malformation of tetrads. FTIR is also applied to palaeoaltimetry-eg to decide in which Cainozoic epoch/s the Tibetan plateau and Himalayas were elevated. The distinction between inherited mutations and temporary disruption of tetrad development was discussed.

Shu Wenchao (Wuhan, China) compared the Late Permian megafossil plants and palynomorphs of northern China, land which lay between 30 and 40 degrees N on the eastern side of Pangaea at that time. Mudstones within redbeds yield variscan conifers, peltasperms and *Neocalamites*, preserved along with bisaccate pollen, *Cycadopites* and *Lundbladispora*. Many of

these palynomorphs are dark-walled and some appear malformed; again this might be related to low ozone and high UVB levels. Barry Lomax expressed no concerns when it was queried whether high thermal maturity in these Chinese strata might influence application of FTIR to these grains.

Borja Cascales Minana (Lille) spoke about spore diversity in the Lower Devonian Posongchong Formation of SW China. Of the 32 species from 18 genera of *sporae dispersae* so far identified, *Aneurospora* and *Retusotriletes* are the most abundant, with *Emphanisporites* notably absent. Dianne Edwards remarked that very few mega fossil plant species are common to the early Devonian floras of southern China and Laurussia; the contemporaneous fish fauna of that part of China also displays marked endemism.

Emma Reeves (Southampton) built upon her 2017 presentation here with further details of the Tournaisian micro- and megafloras of the Anglo-Scottish border. Linking *Setosispora* with the small lycopsid *Oxroadia*, *Didymosporites* with the fern-like *Stauropteris*, plus the prepollens *Colatisporites decorus*, *C. denticulatus* and *Prolycospora* with the ovules *Stamnostoma*, *Lyrasperma* and *Genomosperma* respectively, she reconstructed a highly dynamic environment; one in which terrestrial vegetation was recovering from the End Devonian Mass Extinction under a cyclical wet/dry climate.

Julia Gravendyck (Berlin & Oslo) described palynological events around the Triassic/Jurassic (T/J) boundary using fossils from Bonenburg, near Mariental, Germany. Situated around 30 degrees N at that time, the well-preserved grains (Figure 1) from Upper Rhaetian beds became much darker near the T/J boundary, in the so-called *Triletes* Bed. Hirmerellacean conifer pollen (*Classopollis*) is found here often in abnormal tetrads and a fern-spike with abundant *Polypodiisporites* is also associated with the T/J boundary. As with the End Permian extinctions, discussion dealt with proposed high levels of UVB, heat stress and /or increased heavy metals concentrations as possible causes for these abnormal palynomorphs.

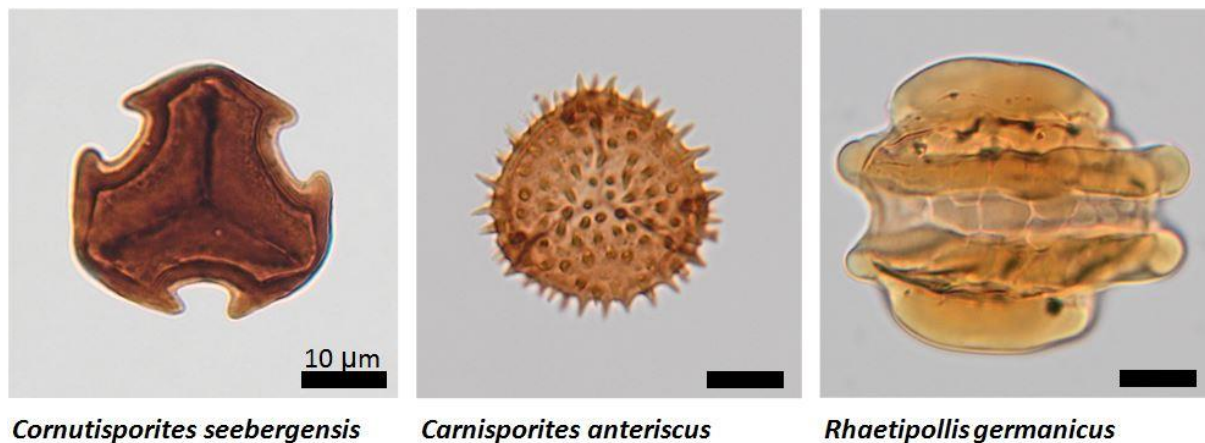


Figure 1. Photographs courtesy of and © of Julia Gravendyck (Freie Universität Berlin, Germany). Palynomorphs are from a new outcrop 'Bonenburg' in North Rhine-Westphalia (Germany) from the Exter Formation (Triassic) in the Germanic Basin.

Eva-Maria Sadowski (Goettingen) showed us remarkable pollen organs from Baltic amber of late Eocene age. Most of these have fagacean affinity and, following research since the nineteenth century, about 6 species of staminate inflorescences are now recognized in this *Lagerstaette*. The



morphology of the anther apices, mode of filament fixation and *in situ* pollen provide critical taxonomic characters. Along with other angiosperms and conifers, these fagacean fossils help to reconstruct the Baltic amber environment; coastal swamps, a riparian floodplain and a combination of meadows/mixed woodlands free of flooding. An example of modern Fagaceae (*Quercus robur*) male inflorescences present by Eva-Maria is shown below (Figure 2).



Figure 2: Extant Fagaceae (*Quercus robur*) male inflorescences. Photographs courtesy of and © of Eva-Maria Sadowski

Martha Gibson (Sheffield) has examined pollen and spores from the Zechstein forest of NE England, late Permian in age (some of wonderful palynomorphs are shown in Figure 3). These come from conifers, pteridosperms and sphenopsids that lived around the repeatedly-transgress/regressive Zechstein Sea situated in the tropics of Pangaea. Alongside light microscopy, Martha made TEM sections of *Luekosisporites vikkiae* that had not been treated with Schultze's solution. These spores show variation in shape and size related to differing degrees of hydration; so-called harmomegathy. Spore contents here have been interpreted as protoplasmic residues, fragments of microgametophyte and/or perhaps a new record of Zechstein chytrid fungus.

Steve Stukins (London) carried out nanotomography on certain bisaccate pollen, particularly from extant Pinaceae and some Jurassic grains from the Isle of Eigg, Scotland. Surprisingly, this disclosed a foam-like interior for these exines. The function of this spongy, light and durable layer remains obscure; its permeability is unknown. X-ray fluorescence mapping shows some areas of calcium concentration in this foam-like material. Calcium is an inhibitor of pollen tube growth. Paula Rudall suggested a possible link with the change from proximal spore germination in pteridophytes to distal in spermatophytes.

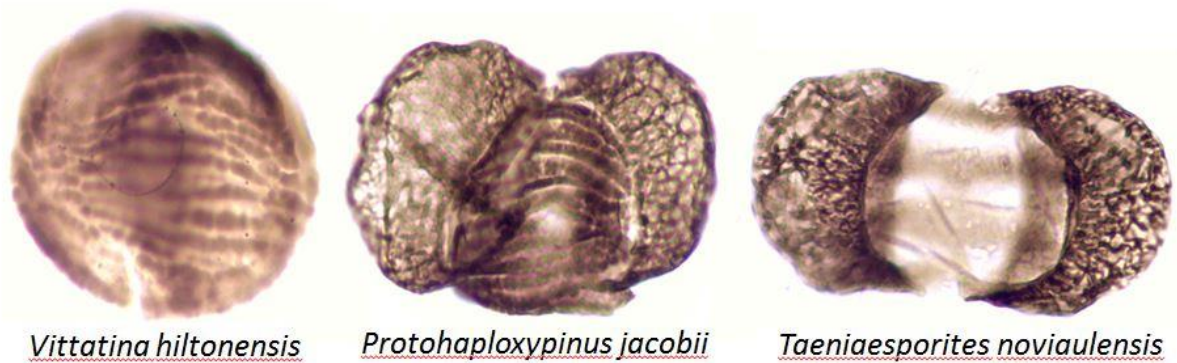


Figure 3: Photographs courtesy of and © of Martha Gibson (University of Sheffield). Palynomorphs are from the Cadeby Formation from a railway cutting in Kimberley, Nottinghamshire.

Georgina Brennen (Bangor, N.Wales) has investigated some allergenic properties of grass pollen. The abundance of such pollen in the northern hemisphere from May to September 2018 allowed target, high-throughput sequencing of Poaceae pollen from several localities across Great Britain. DNA metabarcoding shows that all British grass genera have discretely-timed and sequenced peaks of pollen incidence. Subsequent discussion included some surprise that plastid DNA has been detected in pollen from Poaceae, *Pinus* and *Urtica*.

Luke Mander (Milton Keynes) addressed the perennial issue of the latitudinal gradient in biodiversity. He reviewed many Holocene lake sediment logs from Greenland to Brazil in order to explain the evolution of plant morphology in a biogeographical context. Luke finds the peak diversity in angiosperm pollen forms at the highest latitudes; its minimum oddly occurs from 40 to 50 degrees N. Moreover, taxonomic diversity does not equate to morphological diversity in angiosperm pollen. Work by Chaloner, Crane *et al.* proposes that functionality has a greater influence than has phylogenetics in this question. John Marshall and others suggest that sedimentological considerations play a role here too, such as the proximity of beaches and/or slopes to the lakes where the pollen was fossilized.

This day of diverse and fascinating presentations concluded with a wine reception in the library of the Linnean Society. We thank the Society for its warm welcome. Barry Lomax is to be heartily congratulated for organizing such a successful and enjoyable event. Please note next year's Linnean Society Palynology Specialist Group meeting will take place at the same venue but at the earlier date of Thursday 24 October 2019; a Red-Letter Day to keep free in your agenda.

*Hugh Pearson (EDF, Sizewell, UK)*



## 27<sup>th</sup> International Workshop on Plant Taphonomy in Darmstadt (7–9 Dec 2018)



Group photo credit: Benjamin Adroit and Torsten Wappler

The 27<sup>th</sup> International Workshop on Plant Taphonomy saw more than 20 participants from 10 organizations and 5 nationalities gather in Darmstadt, Germany from Friday, December 7 through Sunday, December 9. Following the 26<sup>th</sup> Workshop last year in Göttingen, this year was hosted at the Hessisches Landesmuseum Darmstadt by Torsten Wappler, curator of the Messel collection, and Sabine Hahn.

Upon arrival on Friday, participants were given access to the museum, which features stunning exhibits on not only the Messel fossils, but also minerology, zoology, modern art, Egyptian, Greek and Roman culture, and more. The official welcome and icebreaker was held in the museum near the Messel collection, carefully watched over by an imposing mastodon skeleton which famously survived the WWII bombs that heavily damaged the rest of the museum. In between sipping refreshments and catching up with colleagues old and new, those present browsed the Messel fossils, including the famed “Dawn Horses” (*Propaleotherium* sp. and *Eurohippus messelensis*) collected in 2015 and 2016. Across from the museum, the Darmstadt Christmas Market sparkled and buzzed with activity even through a light rain, providing hot *Glühwein* to wrap up the first evening.

Saturday was dedicated to twelve talks relating to various aspects of plant taphonomy, with several focused on the local Messel and Prinz von Hessen localities. The invited keynote lecture was given by Thomas Servais on the topic of “Phanerozoic Phytoplankton Dynamics” in which he discussed patterns and fluctuations in the fossil record of phytoplankton. Among others, highlights included the identification of a new genus and species of fossil water lily from Messel by Carole T. Gee, after which Lutz Kunzmann posed the ongoing mystery of fossil leaves discovered in German localities with a white coating. Additionally, Victoria McCoy untangled the possibility of “monkey-

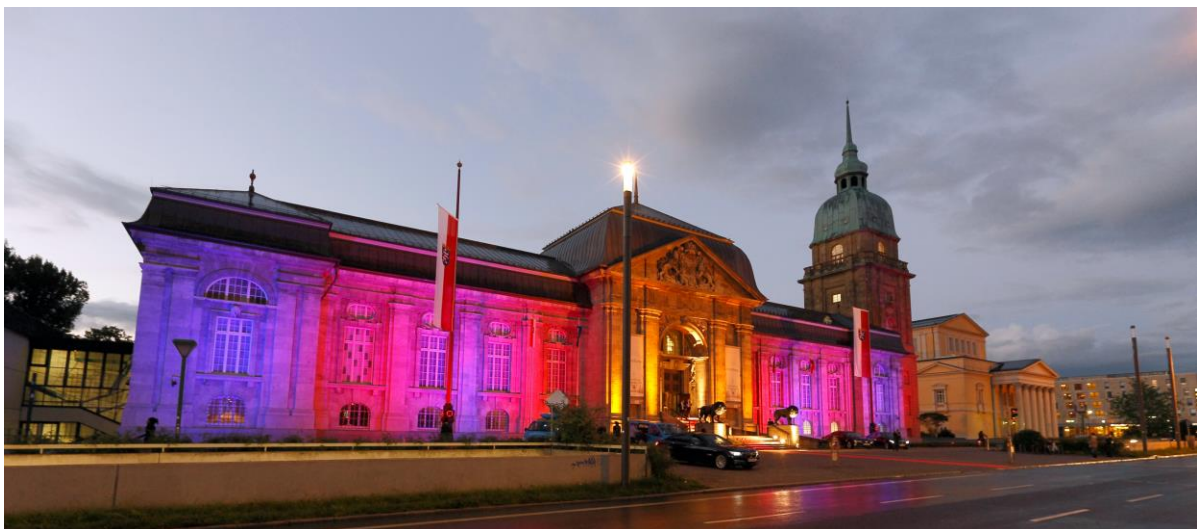
hair” from Geiseltal actually being composed of naturally vulcanized rubber and Mayam Moshayedi revealed the connection between climate, tectonics, and the palynoflora of the nearby Prinz von Hessen basin. Benjamin Adroit rounded out the day of talks with a unique damage type found only in fossil *Parrotia persica* leaves that was discovered in living members of the species. After a full day of talks, the workshop dinner was held at Ngoc Lan, a Vietnamese restaurant that provided not only a plethora of delicious food but a warm refuge to continue insightful discussions.

Although the weather over the weekend was predicted to be full of rain, the attendees eagerly braved the weather to go on short excursions to the Grube Prinz von Hessen and the Grube Messel sites. At the Prinz von Hessen pit, a former mining quarry that is now a popular swimming lake, Olaf Lenz and Michael Wuttke provided explanations of the geology and history of the site.

Afterwards, Torsten Wappler led an informative visit to the Messel pit itself. Beginning at the visitors’ center, the group was able to overlook the pit from a viewing platform. The tour then took everyone into the pit itself, stopping along the way to smell (and even taste) the Miocene oil shale composing the site. As participants descended, Dr. Wappler described the challenges of collecting from the oil shales, discussed the measures taken during excavation in order to best preserve this incredible UNESCO World Heritage Site for future generations, and showed participants the most recent excavation sites, where the 2016 Dawn Horse was discovered, and where the drill core was taken. Luckily for everyone in attendance, the rain held back until the last seconds of the tour, only pouring down as the last person entered the visitors’ center, heralding the end of the 27<sup>th</sup> International Workshop on Plant Taphonomy.

As always, the relaxed nature of the Workshop provided an excellent atmosphere to discuss new ideas, pose questions, and offer suggestions. Thank you to Sabine and Torsten for hosting a successful workshop. We eagerly look forward to gathering again next November in Münster with Hans Kerp for the 28<sup>th</sup> International Workshop on Plant Taphonomy.

*Mariah M. Howell (Steinmann Institute, Bonn, Germany)*



Hessisches Landesmuseum (Hessian State Museum) Darmstadt: main building

**Upcoming meetings**



**MPC 36**

**5-7 April 2019**

**Lawton, Oklahoma**



**Cameron University  
and  
The Museum of the Great Plains  
invite you to attend the  
36th Mid-Continent  
Paleobotanical  
Colloquium**

**Cameron University and the Department of Agriculture, Biology and Health Sciences are proud to host the 36<sup>th</sup> Mid-Continent Paleobotanical Colloquium 5-7 April 2019.**

The designated Hotel is Springhill suites by Marriott.

The Friday night mixer will be held at Mike's Sports Grill.

Saturday presentations, lunch, social hour and banquet will be held at The Museum of the Great Plains.

Sunday, a half day field trip will highlight the unique geology, paleontology, anthropology and history of southwestern Oklahoma.

**Getting here:**

By air:

Lawton is served by American Airlines via the Lawton/Fort Sill Airport. All flights go through Dallas every two hours or so from 5:30am-ish to 10:00pm-ish.

Rental cars are available: Google 'rental cars lawton airport'

I am told we now have Uber, but I don't know anything about that.

Cabs all get 1 out of 5 on Yelp reviews, and from personal experience, I think that rating is too high. So if you use them, please call and make an appointment. Numbers can be found by Googling.

Alternatively, Oklahoma City (Will Rodgers International Airport) is 90 minutes north, and Dallas/Fort Worth is 3 hours south. There are no shuttles, so car rental is the only option there.

By Car:

From the north, Interstate 44 serves Lawton and we are about 90 minutes from Oklahoma City.

From the south, Interstate 44 ends in Wichita Falls, TX. Several routes are available depending on where you are coming from.

Likewise, from the east or west, the route you choose will depend on where you are starting from

Call me if you have questions. 580-581-2287 (office), 580-917-7230 (cell)



**Lodging:**

A block of rooms has been reserved at Springhill Suites by Marriott.

3 SE Interstate Drive  
Lawton, OK 73501  
t: 580-248-8500  
f: 580-248-3256  
[springhillsuites.com/LAWSH](http://springhillsuites.com/LAWSH)

The negotiated price (all Queens) is \$84.00 per night, and is tax exempt.

When registering please ask for group rate: Cameron University-MPC-Tax exempt.

Please register before 20 March.

The continental breakfast looks pretty good, although I have not personally tried it. If you want a sit down real breakfast, Cracker Barrel is across the parking lot (north) from the hotel.

**Friday night mixer:**

Mike's sports grill is across the parking lot from the hotel (northwest).

The mixer will be cash meal and beverages. The menu can be found at:

<https://locu.com/places/mikes-sports-grill-lawton-us/>

We have what's called the 'fish bowl' starting at 7:00pm, but it's a nice bar so you can start whenever you would like.

**Saturday:** 8:00am-10:00pm. Museum of the Great Plains

601 NW Ferris Ave.  
Lawton, OK73507  
United States

<https://www.discovermvp.org/>

The venue is almost exactly one mile as the crow flies from the hotel.

The exact starting time will depend on how many talks we get, so I will keep everyone who registers updated.

Talks, coffee breaks, lunch, the mixer, and banquet will all be held in the same room. And all are included with registration.

Lunch will be box lunches from Atlanta Bread Company:

### SIGNATURE SANDWICHES

*Served with kettle chips (150 Cal) or apple (50 Cal) & pickle spear (4 Cal)  
Sandwiches include lettuce, tomato & red onion and  
feature all-natural chicken, ham, turkey & roast beef*

#### ABC 770 Cal

roast beef, turkey, ham, provolone,  
pepperoncini, mayo & spicy  
mustard on baguette

#### Bella Chicken 650 Cal

chicken, pesto, mayo & provolone  
on Mediterranean focaccia

#### California Avocado 890 Cal

avocado, provolone & dill sauce on  
tomato onion focaccia

#### Chicken Waldorf 760 Cal

chicken, dried cranberries, fresh  
apples, walnuts & mayo  
on cranberry walnut bread

#### Turkey Bacon

Avocado 890 Cal  
on nine grain with lemon  
basil aioli

We will have an open beer and wine bar for the mixer and banquet. Regional and local tap beer, and red and white box wine. The museum can't allow hard stuff, so if you feel the need, BYO Flask, and keep it in your pocket.

The Banquet will be Texas Bar-B-Que. Menu to be determined depending on registration. Refried beans, tortillas, and fixings will be available for vegivoures.

#### Sunday: Field Trip. 8:00am -2:00pm

We will depart the hotel at 8:00am and make several interpretive stops that include the unique geology and paleontology of the area, as well as the archeology and history of southwestern Oklahoma. Very minor walking will be involved.

This includes the Wichita Mountains that are the oldest exposed mountains in the world, and the unique origin of those mountains. The evolution of the flora and fauna of the region. And the dynamic changes in the peoples who inhabited and inhabit the region.

We should be back between 1:00 and 2:00pm. Lunch will be included, but the details of lunch are yet to be worked out.

The registration process is very retro, but that can't be helped. Please see below.

REGISTRATION

36<sup>th</sup> MPC

5-7 April 2019

Name \_\_\_\_\_

Affiliation \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Will you be presenting?      Yes \_\_\_\_      No \_\_\_\_

If yes circle one:      Poster      Oral talk

If you are presenting, please email the title of your talk, abstract (300 word max), up to 5 keywords, and names and addresses of co-authors to: [michaeld@cameron.edu](mailto:michaeld@cameron.edu)

Lunch choice: ABC \_\_\_\_      Chicken Waldorf \_\_\_\_      Bella Chicken \_\_\_\_

Turkey Bacon Avocado \_\_\_\_      California Avocado \_\_\_\_

At this time, we are not able to process credit cards. Please make checks out to Cameron University and send your registration and payment to:

Michael T Dunn PhD  
Professor  
Department of Agriculture, Biological and Health Sciences  
Cameron University  
Lawton, Oklahoma 73505, USA

Professional    \$100    \_\_\_\_\_

Student        \$25        \_\_\_\_\_

Field Trip      \$30      \_\_\_\_\_

Total            \_\_\_\_\_



### 3<sup>rd</sup> International Congress on Stratigraphy, Milano, Italy, July 2–5, 2019



#### ***Special session invitation from Evelyn Kustatscher (Natural History Museum Bolzano, Italy):***

Dear colleagues and friends,

I would like to invite you to the **STRATI2019** to be held in Milano, July, 2-5, 2019.

There are several sessions that may be of interest to you, including stratigraphic, time scales, carbonate systems, history of stratigraphy etc.

Please have a look at the following link for more details.

<http://strati2019.it/index.php/program/scientific-sessions>

I will organize with Guido Roghi and Marco Vecoli a session with the title: Towards a calibrated paleobotanical zonation: from –zoic to –phytic (ST2.7). I hope we will have again a lot of contributions and interesting discussions in Milano and look forward to see you all there!

<http://strati2019.it/index.php/program/scientific-sessions/9-sessions/21-t2-7-towards-a-calibrated-paleobotanical-zonation-from-zoic-to-phytic>

#### ***ST2.7 Towards a calibrated paleobotanical zonation: from –zoic to –phytic***

*Convener:* Guido Roghi [guido.roghi@igg.cnr.it](mailto:guido.roghi@igg.cnr.it)

*Co-Conveners:* Evelyn Kustatscher, Marco Vecoli

There is an ongoing strong need to improve our knowledge on life as a measure of time. Comparing plant and animal distribution ranges and their rates of change through time increases our understanding of major extinction events, radiations and plant turnover from the Paleophytic to the Cenophytic. This session will provide an overview on the recent advances in pollen, spores and plant macrofossil biostratigraphy of Paleozoic, Mesozoic and Cenozoic sedimentary successions. All contributions on micro- and macrobotanical zonation, supported by parallel and independent time diagnostic analyses (e.g., biochronology, astrochronology, cyclostratigraphy, marine biozonations, luminescence dating, tephrochronology, etc.), are especially welcome.

Please take note that the submission of the abstracts is already open and the deadline is **March, 10, 2019**.

Early-bird registration deadline is May 15, 2019.

See you all soon again!

Evelyn Kustatscher

## 19<sup>th</sup> International Congress on Carboniferous and Permian, Cologne, Germany, July 29 – August 2, 2019



Dear Colleagues and friends,

the website is online and the second circular is available! Please have a look at:

<http://iccp2019-Cologne.uni-koeln.de/> and find the circular for download.

Contact: [ICCP-2019@uni-koeln.de](mailto:ICCP-2019@uni-koeln.de)

**Early-bird registration: until April 15, 2019; Abstract submission deadline: April 30, 2019**

I would be happy, if you would spread the announcement across your community, resp. your colleagues to reach as many people as possible. You also might add the photograph of the invitation below, as well as email and website of the ICCP to your email signatures to attract people. We are confident that we will have a splendid meeting with as many Carboniferous-Permian people as possible from all over the world – actually, few days ago I wandered around in Cologne looking for photographs for the website and (as many times before) thought, it's a great place to meet!

We will update the website regularly to keep everybody informed on ongoing preparations.

Besides spreading information, I ask you to propose more specialized sessions below the main topics of the congress. We should discuss/choose/group the most awarding proposals afterwards to be announced in the second circular, and finally gather potential contributors.

All the best!

Hans-Georg Herbig

University Cologne, Germany, Institute of Geology and Mineralogy

Chair of palaeontology and historical geology

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### **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 (119) until end of May 2019**.

Contributions should be sent to [Lutz.Kunzmann\(at\)senckenberg.de](mailto:Lutz.Kunzmann(at)senckenberg.de).



Homepage: [www.palaeobotany.org](http://www.palaeobotany.org)



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