

## History of Palaeobotany: an Introduction

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This volume concentrates on selected historic aspects of palaeobotany that are, perhaps, hard to find elsewhere. In writing historical accounts it is often of much greater value to provide fresh material concerning little known personages and events rather than re-invent the wheel by going over well-trodden paths more expertly tackled in other works. Therefore we have not endeavoured to include all those who have made substantial contributions to the science, so that there are inevitable gaps and omissions. Instead, we hope that the compilation presented in this volume will be of interest to those who wish to explore some of the byways of our palaeobotanical heritage. A full history of 'Palaeobotany' has yet to be written, but we hope that this volume may help to spur such future activity.

The history of palaeobotany contains fascinating insights into scientific endeavour. In the past it has been too easily dismissed as the 'Cinderella' of palaeontological studies in which many of the early workers were pursuing personal interests rather than a full-time career.

This publication falls into several broad sections with a couple of minor themes occurring throughout. The first two papers serve as an introduction into the early developments of selected aspects of palaeobotany. **Wilding** briefly examines the work and setting of Robert Plot and Edmund Lhwyd, who laid down foundations for what would eventually become the sciences of Palaeontology and Palaeobotany. **Torrens** looks at the life and work of the Moravian minister, Reverend Henry Steinhauer, who became a disciple of William Smith's stratigraphic methods. Steinhauer's tragic premature death from consumption in 1818 may have contributed to his subsequent obscurity.

Early 19th century developments are covered by **Chaloner & Pearson** in their account of some of the work of John Lindley. Lindley was a pioneer in the true sense of the word, combining experimental technique with meticulous description. Together with William Hutton, John Lindley published the much-acclaimed *Fossil Flora of Great Britain*. Aspects of Lindley's pioneering work in palaeobotany remain topics of active research today. **Cleal et al.** examine the role of 'Illustrations and Illustrators' during the early 19th century. Their accounts of the works by Schlotheim, Sternberg and Brongniart demonstrate the importance of collaboration

between taxonomists, artists and illustrators in raising the awareness of the value of palaeobotanical material amongst the larger scientific community.

The later 19th century and 20th century developments are covered by a number of papers that examine the lives of individuals and their contributions to the advance of palaeobotany. **Anderson** provides a preliminary assessment of Hugh Miller's contribution to the discipline. Miller travelled extensively throughout Scotland and these forays, plus his local knowledge, helped to uncover fresh sources of fossil plant material. Miller was a great communicator of science and religion who wrote extensively for the general public, and was thus instrumental in helping the public to appreciate the concept of deep time and the complexities of past, long-vanished worlds. **Anderson** explores the contribution made to the popular understanding of fossil plants by Miller in his published works, as well as presenting an appendix of the type and figured palaeobotanical material in the Hugh Miller collection, held in Edinburgh by the National Museums of Scotland.

**Pearson** examines the work of the Italian palaeobotanist Baron Achille de Zigno who wrote extensively on the early Mesozoic floras from the Venetia region of Italy. This 19th century work has been of importance in the investigation of a rare Middle Liassic flora that has helped to elucidate the palaeobiogeography of the Tethys area in Lower Jurassic times.

**Thomas** looks at the manner in which the discovery of spectacular plant fossils in the USA, Canada and Great Britain acted as a spur to early efforts in geoconservation. In a similar vein, **Simkiss & Bowden** look at the role that two amateur collectors played in the rescue collecting of fossil plant material from the Ravenhead site and its subsequent taxonomic status following Kidston's revisions. The loss of some of this material during the Liverpool Blitz in 1941 highlights an issue that raised its head during the production of the papers for this publication, namely the importance of conserving collections. This is shown as a very real problem with many key specimens being lost or inaccurately curated and only a few subsequently found (Torrens *et al.*, 2000; Burek 2003). Without properly curated and conserved specimens how will the next generation of palaeobotanists fare? They will be without

the type specimens so vital to our understanding of biostratigraphy. We must look back in time and learn by our mistakes, especially in conservation. This is especially true of a field-based science like palaeobotany where key sites disappear at the drop of a hat.

A recurrent theme has been the substantial contribution made by females to the advancement of palaeobotany. Originally botany was not considered of interest to women, whereas mathematics, astronomy and geology were. However, as the following quotes show, this changed in the 18th century, when botany was regarded as a suitable feminine science since 'plants are placid like females'. Rousseau agreed in 1762 that it 'required nothing but patience to begin' so let women pursue it (Schiebinger 1989). However, the first botany book actually aimed at women and written by a woman (Mrs Priscilla Wakefield) was not published until 1796. This book, '*An Introduction to Botany*', reached its 11th edition in 1841 (Phillips 1990), showing the popularity of the subject. By the end of the 19th century botany had replaced geology and entomology as a leading subject of interest for women, and palaeobotany emerged as the natural link between them. The late arrival of women into higher education in the UK during the 1880s meant that it was only during the 20th century that there appeared professionally recognized female palaeobotanists with a university education, such as Marie Stopes.

The role of women and the significant impact they have had on the development of the discipline has often been understated and many of the problems they have faced both in the past and at present underplayed. Some of these are outlined in the papers on Emily Dix (**Burek & Cleal**), Marie Stopes (**Chaloner**) and the Manchester department (**Watson**).

**Howell** examines the work of James Lomax and his business techniques. Lomax was an example of an amateur palaeobotanist who developed this interest commercially as a professional fossil and thin section preparator, founding the Lomax Palaeobotanical Company Limited in 1906.

**Wilding** provides an introductory paper giving a brief overview of the life and work of Dukenfield Henry Scott and Sir Albert Charles Seward, forerunners in the great growth of palaeobotanical work in the 20th century.

**Marshall** examines the life and work of Arthur Raistrick who undertook pioneering work on the pollen analysis of peat. He used the knowledge so gained to successfully correlate Carboniferous coal seams using quantitative spore profiles. Raistrick's work became widely adopted by many coal laboratories in the UK and overseas, forming the foundation for the modern development of the discipline.

Another recurrent theme throughout the book is the rise and fall of various departments over time. The problems of maintaining research facilities in universities, especially in the modern era, reveal an

absence of a national UK strategy to preserve centres of excellence in an avowedly specialist area. This probably reflects the nature of science and changing fashions within university and museum administration/funding and fashion. The histories of three different UK university Schools of Palaeobotany are outlined. **Liston & Sanders** examine the development of the Glasgow 'School of Palaeobotany' centred on the university's Botany Department. **Watson** looks back over 150 years of palaeobotany at Manchester University, whilst **Wellman** reviews half a century of palynology at Sheffield University.

Although this publication has a predominantly UK focus, two interesting studies outline the history of palaeobotanical work in Argentina and China. **Ottone** provides an overview of the development of palaeobotany in Argentina during the 19th century. Many of the early fossil plant records resulted from visits of 19th century naturalist explorers such as Azara, d'Orbigny, Darwin, de Moussy, Burmeister and Bonpland. This, in turn, led to primary geological investigations by German geologists. The early work on palaeobotany in Argentina was also primarily by European scientists. It took a while for a 'home grown' Argentinian School, of Palaeobotany to develop, flourishing under the guidance of Alberto Castellanos and his disciples during the 20th century.

**Qi-Gao Sun** provides an account of the rise of Chinese palaeobotany and places it into a global context. Chinese records indicate that notification of fossil plants was recorded as early as 1068 during the Song dynasty by Shen Kuo, who probably made the first palaeoecological determination based on plant fossils. However, the real development of Chinese palaeobotany took place during the 20th century. The first half of the 20th century saw a primarily geological approach adapted to palaeobotanical studies that was applied to the needs of economic development, whilst a more biological approach was adopted from the 1940s onwards.

This Special Publication of the Geological Society arose as a result of a joint meeting held at the Linnean Society in October 2000. The meeting was organized by the Linnean Society Palaeobotany Specialist Group (LSPSG) and the History of Geology Group of the Geological Society (HOGG).

Thanks are due to Dr J.C. Marsden, Executive Secretary and Miss G. Douglas, Librarian and Archivist, and other members of staff of the Linnean Society, also to Dr I. Poole, University of Utrecht and of LSPBSpG, all of whom did much to help organize the conference on which much of this book is based.

The task of the editorial team has been greatly eased by the willing assistance and expertise of the referees. The subdiscipline of Historical Palaeobotany is a small field in the UK, and this is perhaps reflected in the choice of referees who had the necessary expertise to comment usefully

on the papers sent for peer review. Much of the reviewing process has been internal to this volume for this very reason. To all contributors and referees we thank them for their patience and forbearance during the lengthy gestation period of this Special Publication. In particular we wish to thank Prof. W. Chaloner, Prof. B. Thomas and Dr C. Cleal for their guidance and generous assistance with our queries. Other referees were Dr R. Cleevely, Dr J. Edmondson, Dr J. Hilton, Prof. R. Howarth, A. Howell, Dr M. Kolbl-Ebert, J. Liston, Dr A. MacGregor, Dr J. Marshall, Dr C. Page, H. Pearson, Dr G. Tresise and Dr C. Wellman. To all referees we extend our grateful thanks for their time and patience.

## References

- BUREK, C.V. 2003. Time to take responsibility for collections. *Earth Heritage*, **20**, 22–23.
- PHILLIPS, P. 1990. *The Scientific Lady*. Weidenfeld & Nicolson, London.
- SCHIEBINGER, L. 1989. *The Mind has no Sex*. Harvard University Press, Cambridge, MA.
- TORRENS, H., BENAMY, E., DAESCHLER, E.B., SPAMER, E.E. & BOGAN, A.E. 2000. Etheldred Benett of Wiltshire, England, the first lady geologist – Her fossil collection in the Academy of Natural Sciences of Philadelphia, and the rediscovery of ‘lost’ specimens of Jurassic Trigoniidae (Mollusca, Bivalvia) with their soft anatomy preserved. *Proceedings of the Academy of Natural Sciences of Philadelphia*, **150**, 59–123.