Introduction to Plant Fossils

This book provides an excellent practical introduction to the study of plant fossils, and is especially written for those who have had little previous experience of this type of palaeontology. The illustrated text summarises the main groups of plants that occur as fossils and explains how best to investigate them. It provides useful guidance about modern research techniques that reveal hidden details of anatomical and reproductive characteristics, and of the kinds of features that are used to identify the most commonly found plant fossils. The main approaches for interpreting plant fossils are assessed, and the book highlights how such methods can be employed by the palaeobotanist to increase our knowledge of plant evolution, palaeoecology, palaeogeography and stratigraphy.

This guide to plant fossils includes a discussion on how the science of palaeobotany has developed over the last 300 years, and incorporates examples from a global range of plant groups. It is essential reading for students of introductory or intermediate courses in palaeobotany, palaeontology and plant evolution, and a valuable resource for amateurs looking for help in identifying and studying plant fossils.

- Extensive illustrations of plant fossils and living plants enable the reader to think of fossils as once-living organisms rather than parts of 'dead plants'
- Set-aside boxes describing the key characteristics of major groups of plant fossils provide expert guidance on their identification
- A chapter on the techniques available for the study of plant fossils assists the reader on how to approach the subject
- A chapter on the changing patterns of vegetation through time provides an overview of how and why vegetation has changed
- Emphasis on compressions and impressions, the most common types of plant fossil, is tailored to aid student understanding

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Preface

This book introduces the reader to the study of plant fossils, and is especially aimed at those who have had little previous experience of this type of palaeontology. We have provided an illustrated text that summarises the main groups of plants that occur as fossils and explains how one should go about investigating them. Practical guidance is given on techniques that can be used to reveal hidden details of anatomical and reproductive characters, as well as the sorts of features that are used to identify some of the most commonly found plant fossils. Many of the approaches that are used to interpret plant fossils are discussed and we show how they can be used by the palaeobotanist to increase our knowledge of plant evolution, palaeoecology, palaeogeography and stratigraphy.

Although we have covered the main groups of fossils that the reader is likely to encounter, there has inevitably been some subjectivity in the coverage, reflecting our own research interests that are focussed on Late Palaeozoic floras of Euramerica and China. Nevertheless, we trust that the sorts of approaches we have given will have a wide applicability, and will be of help to all who are looking at plant fossils for the first time.

Many of the illustrations that we have included here were originally prepared for our previous book entitled *Plant Fossils*, our field guide on Coal Measures plants published by the Palaeontological Association, and the two volumes in the Geological Conservation Review series that we co-authored. The drawings are mostly by Annette Townsend, Deborah Spillards and Dale Evans of Amgueddfa Cymru – National Museum Wales (hereafter referred to as NMW) to whom we are deeply indebted. Others are based on paintings by Annette Townsend and the late Pauline Dean, prepared for books that we published on past plant life (Pardoe & Thomas, 1992; Thomas & Cleal, 1993, 1998, 2000); these paintings are in the collections of NMW. We are also indebted to many friends and colleagues who have made available photographs that illustrate this book: John Anderson (Pretoria), Sidney Ash (Albuquerque), Richard Bateman (Birmingham), Bill Chaloner (London), Margaret Collinson (London), Bill DiMichele (Washington DC), Tatyana Dimitrova (Sofia), Muriel Fairon-Demaret (Liège), Else Marie Friis (Stockholm), Pat Gensel (North Carolina), Alan Hemsley (Cardiff), Hans Kerp (Münster), Paul Kenrick (London), Jiři and Zlatko Kvaček (Prague), Jean-Pierre Laveine (Lille), Franz-Josef Lindemann (Oslo), Steve Manchester (Gainesville, Florida), Nick Rowe (Montpellier), Ruth Stockey (Edmonton), Don Tidwell (Utah), Maria Aquirre Urreta (Argentina), Bob Wagner (Cordoba), Lynda Warren (Aberystwyth), Joan Watson (Manchester), Wang Ziqiang (Tianjin), Erwin Zodrow (Sydney, Nova Scotia) and Nickolas Zouros (Lesvos). Many of the other photographs (notably those previously included in *Plant Fossils*) were taken by the Photography Department of NMW, to whom we are also very grateful. Thanks go to Charles Wellman (University of Sheffield) who first suggested we write this book, and to Lynda Warren whose careful reading of the manuscript made many improvements. Finally, we are extremely grateful to the staff of Cambridge University Press for their patience and help in seeing this book through to completion.