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978-0-521-18892-0 - Plant Life of the Quaternary Cold Stages: Evidence from the British Isles

R. G. West

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PLANT LIFE OF THE QUATERNARY COLD STAGES: EVIDENCE FROM THE BRITISH ISLES

The Quaternary period is characterised by extensive glaciations in the Northern Hemisphere, separated by much shorter temperate stages. For Britain and Ireland, the vegetational history of the temperate stages is relatively well known, but the flora of the cold stages has never been considered in any detail, despite the fact that records of pollen and macroscopic plant remains have accumulated over the years. In this book, Richard West brings together for the first time the published information on the Quaternary cold stage flora of over 80 sites in Britain and Ireland to present a factual cold stage flora from the fossil record. His account provides a basis for an interpretation of the flora, vegetation and environments of some of the most extraordinary periods in the Earth's most recent history, now only seen in the imperfect mirror of today's Arctic, and which precede the life we see today. This important study aims to reveal the nature of an environment, relatively stable, but totally different from that of today. As such it will be significant not only to those interested in the Quaternary, but also to a wider audience of those studying the present flora, fauna and environment, including climate and climatic change.

A database of the cold stage flora in a comma-delimited format is also available on the book's web pages.

RICHARD WEST F.R.S. is Emeritus Professor of Botany at the University of Cambridge and Fellow of Clare College, Cambridge. His research career at Cambridge spans nearly five decades, during which time he has made a significant contribution to the field of Quaternary research. He is author of *Pleistocene Geology and Biology* (1968, 1977), *The Ice Age in Britain* (1972 with B.W. Sparks), *Preglacial Pleistocene of the Norfolk and Suffolk Coasts* (1980) and *Pleistocene Palaeoecology of Central Norfolk* (1991).

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For Hazel

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Frontmatter

[More information](#)

Contents

<i>Preface</i>	<i>page</i> ix
<i>Acknowledgements</i>	xi
1 Introduction	1
2 Geological setting	13
3 Sedimentary environments and taphonomy	24
4 The data tables	37
5 The sites	60
6 Identification of the flora	72
7 The flora	77
8 Representation of taxa in the fossil record	121
9 Biological aspects of the cold stage flora	155
10 Habitats of the cold stages	164
11 The present distribution of taxa found fossil	173
12 The vegetation: types and their flora	191
13 Evidence of climate	227
14 A wider view of cold stage biota	252
15 Origin and fate of the cold stage stadial flora	259
16 A final word	264
References	271
Appendix I Works consulted in the identification of macroscopic remains	284
Appendix II Taxa recorded in cold stage sediments	285
<i>Index</i>	309

Plates I to VIII between pp. 190–191*

* Plates I to VIII are available for download in colour from
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Preface

Those studying the Earth's biota will realise that to understand present life on earth we have to know much about the antecedent life. That knowledge, of life in times past, must rest on a geological foundation. Immediately a biologist departs from the present to the past, many aspects of earth science have to be enrolled in our investigations – including geomorphology, stratigraphy, sedimentology and chronology. This is a major challenge to a biologist. The reverse also applies, that it is a major challenge for a geologist to get involved in the study of past biota, which will include taxonomy, morphology, ecology and physiology.

Such combination of scientific disciplines is a characteristic and necessity of research into the life and environments of the last few million years, the Quaternary Era, with its many climatic changes of alternating temperate and cold stages. The combination is certainly a challenge for those wanting to understand the complex interactions of life and environment in the geologically recent past.

There is an equally daunting challenge in the understanding of the plethora of data on these matters which has accumulated in the last forty or more years. This accumulation has more recently been very much encouraged by the wider perception that climates change, that climate change affects life and environments, that the climate system has to be analysed, and that recent past changes of climate must be understood to assist in providing powers of prediction.

In the lifetime of my own research the application of specialisms old and new in biology and geology to Quaternary research has increased enormously, in parallel with the accumulation of data. It now seems hardly possible that a single researcher can take into account the many facets of the sciences involved and the data produced.

As an undergraduate I read both botany and geology and I then had a

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[More information](#)

x

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decision to take in deciding which of these two took priority of interest. The answer lay in Quaternary research, a subject then rapidly developing in Cambridge under the stimulating leadership of Sir Harry Godwin, Director of the newly-formed Subdepartment of Quaternary Research in the Botany Department. My own research has covered some geological aspects, including stratigraphy, sedimentology and periglacial matters, and some biological aspects, including mainly the forest history of temperate stages in the British Quaternary, studying both pollen assemblages and macroscopic plant remains. But I have also studied floras from the cold stages, and latterly became more interested in them because of their peculiarities. In trying to understand them I have made excursions to Svalbard, the Canadian Arctic Archipelago, Yukon, North West Territories and the arctic slope of Alaska. I realised that there has been no attempt to bring together the large amount of data on cold stage floras of the British Isles (or elsewhere), so that a coherent view of the flora and vegetation of those times could be presented. Cold stages of the Quaternary occupy a major part of Quaternary time, and their importance in the study of past biota and environments can hardly be underestimated.

This account of cold stage floras and vegetation tries to remedy this situation. No doubt there are omissions of fact and interpretation – it is a vast subject. At least, I hope it will provide a basis for an interpretation of the flora, vegetation and environments of extraordinary periods in the earth's recent history, now only seen in the imperfect mirror of the present-day Arctic, and which precede the life we see today.

But I also hope that this work will set a scene not only for those interested in the Quaternary, but also, just as important, for the wider audience of those interested in the present flora, fauna and environment, including climate. I hope the study will reveal the nature of an environment, relatively stable, but totally different to that of today, which existed over thousands of years at times in the Quaternary, and which only faded away some 13,000 years ago as climates improved (from the point of view of today's north temperate biota).

R.G.W.
December 1998

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