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## British Lower Carboniferous stratigraphy

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Cover illustration: Folded marine rocks of the Lower Carboniferous (Arundian) Birnbeck Limestone at the Flat Holm GCR site in the Bristol Channel (see Chapter 9 for further details). Photograph by P.J. Cossey.

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## **Access to the countryside**

This volume is not intended for use as a field guide. The description or mention of any site should not be taken as an indication that access to a site is open. Most sites described are in private ownership, and their inclusion herein is solely for the purpose of justifying their conservation. Their description or appearance on a map in this work should not be construed as an invitation to visit. Prior consent for visits should always be obtained from the landowner and/or occupier.

Information on conservation matters, including site ownership, relating to Sites of Special Scientific Interest (SSSIs) or National Nature Reserves (NNRs) in particular counties or districts may be obtained from the relevant country conservation agency headquarters listed below:

Countryside Council for Wales, Maes-y-Ffynnon, Penrhosgarnedd, Bangor, Gwynedd LL57 2DW.

English Nature, Northminster House, Peterborough PE1 1UA.

Scottish Natural Heritage, 12 Hope Terrace, Edinburgh EH9 2AS.

## **Preface**

Britain has often been referred to as the birthplace of modern geology and its islands are considered to include the greatest diversity of geological phenomena of any country of equivalent size on Earth. It is therefore no surprise that British geological sites have been particularly influential in the development of the Earth sciences, and that some of the oldest and the most fundamental of geological principles were originally established within the British Isles. Subsequently, these sites have been important in many areas: in the training of countless generations of geologists, as a test-bed for the development of new geological concepts and theories, and in the unravelling of many colourful pages in Earth history. Others have proved critical in the definition of geological time periods now recognized throughout the world. In fact the 'Carboniferous' was the first of the modern 'systems' to be named. The name was proposed by William Daniel Conybeare and William Phillips from British successions in 1822.

In order to learn more about Britain's rich Earth science heritage it is clear that the most important geological localities need to be documented and effectively conserved for the use of future generations. The launch of the Geological Conservation Review (GCR) in 1977 marked a significant stage in the development of a coherent geological conservation strategy in Britain. No other country has attempted a systematic and comprehensive review of its Earth science sites on anything like the same scale. The primary objective of the GCR was to identify a series of sites that would represent the key features of British geology and geomorphology. This ambitious site assessment and selection programme involved a widespread consultation process (with scientists from higher education, government, industry and the voluntary sector) and the consideration of many hundreds of sites, until a consensus was reached among collaborating specialists about which British sites were of sufficient geological interest to justify conservation.

To ensure that the original GCR site assessments were based on a firm logical and scientific foundation, the range of scientific interest was based upon around 100 subject 'blocks', reflecting the natural divisions of stratigraphy, palaeontology, igneous petrology, mineralogy, structural and metamorphic geology, and geomorphology. The 'Dinantian of Scotland', the 'Dinantian of northern England and North Wales', the 'Dinantian of southern England and South Wales', the 'Dinantian of Devon and Cornwall', and the 'Namurian' were five of these blocks. Each of these blocks (but only a part of the Namurian Block; see page 6) is considered in the present volume on 'British Lower Carboniferous Stratigraphy'.

This volume summarizes the results of the GCR assessment and selection programme of British Lower Carboniferous sites conducted in the late 1970s and 1980s. The minimum criterion for site selection was that sites should offer the finest and/or the most representative sequence/feature for illustrating a particular aspect of British Lower Carboniferous stratigraphy. The resulting Lower Carboniferous GCR sites are thus, at the very least, of national scientific importance and many of these include features regarded as either 'classic' (i.e. a 'textbook example') or simply 'unique'. Some are, in addition, visually spectacular. Others, such as the stratotype sites, have a particularly high international conservation value and are of considerable importance to the global geological community.

These GCR sites have been used as building blocks for establishing a new set of Sites of Special Scientific Interest (SSSIs). If no additional features of special scientific interest were recognized at, or adjacent to the GCR site, a proposal will have been made to notify the site as a geological SSSI for its Lower Carboniferous interest alone. If, however, other features of special scientific interest (either geological or biological) had been recognized at, or adjacent to the Lower Carboniferous GCR site, a composite SSSI would have been proposed, perhaps made up of several overlapping GCR sites and/or areas of special biological interest. Despite the heterogenous nature of such composite sites, it is important to remember that their Lower Carboniferous interest alone would be sufficient justification of their SSSI status. Details of the Lower Carboniferous GCR sites identified in this survey have been sent to the appropriate national conservation agency (English Nature, Scottish Natural Heritage, Countryside Council for Wales), whose governing bodies are responsible for their notification as SSSIs.

This volume is not intended to be a field guide to British Lower Carboniferous sites, nor does it address any practical problems concerning their future conservation. Its remit is to put on record the scientific justification for conserving the sites, documenting and evaluating the significance of the features found there, and placing them in a wider stratigraphic context. The volume records details of our knowledge of sites available at the time of writing, in 1998–2001, and must be seen in this context. Each site report begins with a general 'Introduction' in which summary statements relating to site geology, location, literature and the site's importance are presented. Detailed 'Description' and 'Interpretation' sections then follow; these sections being unavoidably couched in technical language, because the conservation value of each site is mostly based on a specialist understanding of the stratigraphical, sedimentological and palaeontological features present. The depth of the interpretation varies considerably across the sites, as over the years, some have been more thoroughly investigated than others. Each site report ends with a 'Conclusions' section which is, wherever possible, cast in less technical language, in order to help the layman.

Finally, it should be emphasized that this volume does not provide a 'fixed list' of important Lower Carboniferous sites. Stratigraphy, like any other science, is a rapidly evolving subject and progressive developments in our understanding of Lower Carboniferous stratigraphy, arising perhaps from new discoveries or the formulation of new concepts, may require changes to the Lower Carboniferous GCR site network in the future. Indeed, during the writing of this volume six new sites have been proposed for addition to the GCR site list (mostly in the north of England) and proposals to modify the boundaries to a further 18 existing GCR sites are planned to accommodate such new developments. In addition, it is anticipated that further sites of importance will be identified in the future. Nevertheless, there is still much to learn about the GCR sites documented here, many of which are as important today — in increasing our knowledge and understanding of Lower Carboniferous geology — as they were when they were first selected. It is the authors' view that these sites will, undoubtedly, provide the core of the Lower Carboniferous GCR site network for many years to come. We therefore hope that this account will clearly demonstrate the value of British sites to Lower Carboniferous stratigraphy and the importance of the sites within the wider context of Britain's outstanding scientific and natural heritage.

## [References](#)