
Quaternary of the Thames

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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:

English Nature, Northminster House, Peterborough PE1 1UA.

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

Countryside Council for Wales, Plas Penrhos, Ffordd Penrhos, Bangor, Gwynedd LL57 2LQ.

Preface

The principal aim of this volume is to provide descriptions of Sites of Special Scientific Interest, selected as part of the Geological Conservation Review, that yield evidence for the Pleistocene history of the River Thames and its tributaries. Although defined thematically, the volume covers all Pleistocene GCR sites in the Thames valley. A number of sites in southern East Anglia are also included because they provide important evidence bearing on the history of the Thames system. The justification for a GCR volume devoted to the Thames lies in the special importance of the river in the British Quaternary. The volume is concerned with the history of Britain over approximately the last two million years of geological time, during the repeated glacial phases of the Quaternary 'Ice Age' and the warmer intervals between them. Many such climatic fluctuations are recorded in the deposits of the Thames, which can be shown to have existed as the predominant west to east drainage line in south-eastern England throughout the Pleistocene.

The Thames has left a detailed record of its earlier presence in the form of deposits, which comprise fluviially aggraded floodplain sediments (predominantly gravels) preserved on the valley sides, where they form geomorphological terrace features. The oldest deposits are at the highest levels, forming a terrace 'staircase' that records successive stages in the evolution of the valley. Thames deposits are also found in areas no longer drained by the river and are a testament to the dramatic changes that have occurred in the catchment and courses of the Thames and its tributaries through time. The deposits contain, at certain localities and stratigraphical levels, the remains of plants and animals. These have been used as the main indicators of past climates, which varied from extreme Arctic cold to conditions at least as temperate as today. In addition, the fluvial and associated sediments have yielded prolific evidence, in the form of flint tools and very rare human bones, for the activities of early humans in southern Britain. There is considerable overlap between the research by geologists and that by archaeologists on the Thames deposits laid down during the last 500,000 years, many of which yield important archaeological evidence that is of considerable value to the geologist as a potential means of dating.

The Thames terrace deposits represent a less complete record than, for example, the considerable accumulation of sediment that underlies The Netherlands, laid down at the edge of the subsiding North Sea Basin by the Rhine, but they

provide what is probably the most detailed terrestrial Pleistocene sequence in the British Isles. The neighbouring East Anglia region, better established as a rich source of Quaternary information (much of which is marine) and the home of several Pleistocene stratotypes, has a less complete record of the cold stages, which are represented by the gravel terraces of the Thames. Correlation of the Thames sequence with those of East Anglia and The Netherlands is in its early stages, but promises major advances in the near future.

The Thames sequence, although based on a terrace system in which downcutting events and periods of non-deposition account for a significant (but unknown) proportion of the time represented, nevertheless benefits from a degree of continuity, in that it derives from a single continuously existing source, the river itself. It therefore promises, amongst the British terrestrial sequences, to be the most readily correlated with the global oceanic record. In recent years an oxygen isotope stratigraphy, providing a detailed record of climatic fluctuations during the Pleistocene, has been reconstructed from the more or less continuous sequence of deep-sea sediments. Its use as a chronostratigraphical and 'climato-stratigraphical' standard provides a basis for correlating the often widely separated interglacial and glacial deposits of terrestrial sections throughout the world. Relating the major terrestrial sequences, such as that in the Thames basin, to this standard thus offers the best prospect for global correlation within the Pleistocene. An improved understanding of the biostratigraphical and lithostratigraphical evidence yielded by the terrace sediments, as well as the application of geochemical dating methods, has made it possible to place the Thames sequence more precisely within the emerging global geochronological framework.

A pragmatic approach to the task of selecting Thames Pleistocene sites has been employed. Important sites that allow the demonstration of stratigraphical relations have been selected, as have sites with fossiliferous sediments that provide evidence for dating the Thames sequence, as well as sites yielding significant Palaeolithic evidence. To these have been added a number of sites that are important for tracing the early evolution of the river. No attempt has been made to grade sites according to their relative significance.

By the very nature of the geological record, it is clear that some sites will represent unique occurrences for which no parallels exist, while others are merely the best available sites in deposits of extensive and widespread interest, for which alternative localities could be substituted at a later date. It is important for those engaged in geological conservation to recognize the difference between these two types of site. On the one hand careful management and maximum protection are required, while on the other hand there is a need to recognize when a designated locality is no longer a key site and has been superseded. The latter calls for a degree of flexibility in the provision of geological sites, so that the coverage can be updated to keep abreast with both advances in the science (from continuing research) and with the creation of new sites by continued quarrying activity.

Accounts of the evolution of the Thames, as evidenced by its terrace sequence, have been required reading for generations of students. Many treatises on the Thames deposits and their fossils have become classics of the scientific literature; the Swanscombe Skull, for example, has been of particular fascination for scientists and lay readers alike. The story of the blocking and diversion of the Thames by an ice sheet some 450,000 years ago is fundamental to an understanding of the shaping of southern Britain. This volume brings together, for the first time, all the themes and debates that have figured in the many attempts to reconstruct the history of this important river.

A general introduction to the Quaternary, aimed at the less specialist reader, but also providing a succinct overview for the earth scientist, is given elsewhere in this series (Campbell and Bowen, 1989).

D.R. Bridgland and W.A. Wimbledon

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