The Archaeology of South West England

South West Archaeological Research Framework

Resource Assessment
and
Research Agenda

Edited by C J Webster

Somerset County Council
2007

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Front Cover: Aerial view north-east across the Quantock Hills, with the Trendle in the foreground and Hinckley Point nuclear power station beyond. Photograph © English Heritage. NMR.
Back Cover: Excavation at the end of Stukeley's, often disbelieved, Beckhampton Avenue in 2000. Photograph © M Gillings, J Pollard and D Wheatley.

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Foreword

The South West of England is one of the richest archaeological regions in the UK and the results of this Resource Assessment and Research Agenda present a significant document for archaeological work from both a regional, national and European perspective. The project was coordinated and supported by SWALGAO with direct financial support from English Heritage. During the gestation period of this report there have been numerous developments in policies and plans along with changes in personnel. It has taken over 10 years of discussions, meetings, seminars, consultation and cajoling to carry out this survey and publish the results. I would like to thank all the period convenors and contributors to this report and particularly thank Adrian Olivier and Kathy Perrin of English Heritage for their patience and support. This report will be of value to local authority archaeologists, English Heritage staff, university researchers and students, local groups, developers, regional agencies, contractors and consultants involved with research into the historic environment of the region. The volume has a projected life of five years but its publication represents a significant milestone by providing a statement of our knowledge of the region at the start of the 21st century. It arrives at an important time when local government changes are underway and the whole focus of heritage protection in England is set to change. Chris Webster of Somerset County Council was seconded for over two years to pull together this report and we owe him a considerable debt in pulling together a wide range of evidence and presenting it in a readable and comprehensive report. This is very much a shared vision for the region and one that will provide a platform for further research – it is a beginning and not an end it itself.

R A Croft, chair of SWALGAO

Editor's Preface

This volume presents the outcome of the first two phases of the South West Archaeological Research Framework (SWARF) project: The Resource Assessment (Chapters 1 to 9) and the Research Agenda (Chapter 10). These have been compiled by small groups working on each period assisted by a wider group of consultees who have improved the document as it has developed. Because of the composite nature of the work and the method of group working it is not possible to identify the authorship of any particular section; the editor (usually the convenor of the group) and contributors are given at the head of each chapter. Further details of the project methodology can be found in Section 1.1 on page 1.

Many people were involved in the setting up of the project and over 200 people were consulted during the preparation of this report. Some of those approached were, understandably, too busy to contribute but only one person replied that they did "not wish to contribute to or be associated with the scheme". Some of the groups found their work more difficult than we envisaged at the start and we struggled with some chapters but I hope that most found it an enjoyable and productive excercise. It is also hoped that the mixing of people with varied period and local interests will have fostered new relationships and research interests across the region. It was certainly a feature of the seminars and part of the work on the final phase of the project, the Research Strategy, will be to develop a mechanism by which the enthusism generated by SWARF can be maintained for the benefit of research in the future.

Digital versions of this text and other supporting documents from the project are available at http://www.somerset.gov.uk/swarf.

Chris Webster

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Organisations

In addition to local authorities, universities, contracting units and English Heritage, the following societies supported the project:
Bristol and Gloucestershire Archaeological Society
Cornwall Archaeological Society
Council for British Archaeology: Wessex
Council for British Archaeology: South West
Devon Archaeological Society
Dorset Natural History and Archaeological Society
Somerset Archaeological and Natural History Society
Wiltshire Archaeological and Natural History Society

Seminars

The following attended one or both of the seminars held in Bristol in 2005 (Resource Assessment) and 2006 (Research Agenda), providing lively and valuable debate:
Christine Anderson, Mick Aston, Talya Bagwell, Martyn Barber, Laura Basell, Peter Bellamy, Duncan Black, Oliver Blackmoor, Mike Bone, Mark Bowden, Gail Boyle, Kate Brady, Lee Bray, Gary Brown, Tony Brown, Richard Brunning, Judith Cannell, Toby Catchpole, Margaret Chapman, Peter Cox, Paul Cripps, Bob Croft, David Dawson, Bruce Eagles, Martin Ecclestone, Joy Ede, David Etheridge, David Evans, David Field, Hannah Firth, Andrew Fitzpatrick, Stuart Foreman, Lucy Franklin, Ralph Fyfe, Paula Gardiner, Catriona Gibson, Brian Gittos, Moira Gittos, Faye Glover, Frances Griffith, Joanne Hall, Teresa Hall, Susan Haywood, Veryan Heal, Frances Healy, Peter Herring, Bridget Hetzel, Neil Holbrook, Bill Horner, Rob Hosfield, David Hunt, Roger Jacobi, Charles Johns, Nick Johnson, Andrew Jones, Bob Jones, Julie Jones, Natalie Kennedy, Oliver Kent, Graeme Kirkham, Jonathan Last, Andrew Lawson, Peter Leach, Jane Marley, Katy Matthews, Richard McConnell, Steven Membery, Thomas Moore, Ian Morrison, David Mullin, Angela Newcombe, Rebecca Nicholason, Jacky Nowakowski, Richard Osgood, Ian Oxley, Martin Papworth, Charles Parry, Ruth Pelling, Claire Pinder, Josh Pollard, John Rhodes, Hazel Riley, Graham Scott, Andrew Smith, Wendy Smith, Mel Solik, Vanessa Straker, Graham Tait, Heather Tinsley, Ianto Wain, Katherine Walker, Chris Webster, Russell Weston, Cressida Whitton, Keith Wilkinson, Eileen Wilks, Howard Williams, Jan Wills, Frank Willy, Rachel Young.

The following organisations were represented:
AC Archaeology, Avon Archaeological Society, Axbridge Archaeological Society, Bristol City Council, Bristol City Museum, British Museum, CBA South West, Clevedon Archaeological Society, Context One Archaeological Services, Cornwall County Council, Cotswold Archaeology, Defence Estates, DEFRA, Devon County Council, Dorset County Council, English Heritage, Exeter University, Gloucester and District Archaeological Research Group, Gloucestershire County Council, National Trust, Oxford Archaeology, Plymouth University, Pre-Construct Archaeology, Royal Albert Memorial Museum, Exeter, Royal Cornwall Museum, Somerset County Council, South Gloucestershire Council, Stroud and District Museum Service, Terrain Archaeology, University of Bristol, University of Exeter, University of Newcastle upon Tyne, University of Oxford, University of Reading, University of the West of England, University of Wales, Wessex Archaeology, Wiltshire Archaeological and Natural History Society, Winchester University, Yeovil Archaeological Society.

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Josh Pollard, *University of Bristol*
Steve Rippon, *University of Exeter*
Chris Webster, *Somerset County Council*

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The project would not have been possible without the hard work and enthusiasm of all those listed above who contributed in some way: writing, reading, commenting and discussing. Although it is invidious to single out an individual, Rob Hosfield deserves particular mention for leaping to the project's aid at the start of the first seminar when he was plucked from the audience to give a presentation on the Palaeolithic following the non-appearance of the then group convenor Nick Barton. Rob subsequently took over the group and has been a stalwart of the project ever since.

The two seminars were hosted by Bristol University and Blaise Castle House Museum and we are grateful to Mark Horton and his staff (particularly Alison Johnson) at the University and to Gail Boyle of Bristol City Museums for the venues and providing catering.

We are particularly thankful to Bronwen Russell of the Archaeological Investigations Project who provided information from their database of recent archaeological activities and to the staff of the National Monuments Record of English Heritage who provided data for many of the maps in Chapter 1.

The project has been made immeasurably easier by the presence in Taunton of the Somerset Archaeological and Natural History Society's comprehensive library and its Honorary Librarian, David Bromwich.

In addition to the facilities of the SANHS library, the collection of information to produce the radiocarbon date tables was facilitated by Lesley Freke (Wiltshire HER), Jan Grove (Somerset County Council), Tim Grubb (Gloucestershire HER) and Naomi Payne (Somerset and Dorset Finds Liaison Officer) who provided details or lent reports. Chris Gerrard kindly provided dates from the forthcoming Shapwick report. Derek Hamilton of English Heritage provided the error terms for the radiocarbon dates in Rodwell (2001), which are not quoted in the report.

Photographs were kindly supplied by Toby Catchpole and Jon Hoyle (Gloucestershire County Council), David Dawson, Charles Johns (Cornwall County Council), Tom Mayberry (Somerset County Council), Joshua Pollard (University of Bristol), and Andrew Pye and Gary Young (Exeter City Council).

Talya Bagwell of Somerset County Council may be the only person other than the editor who has read the entire report and we are very grateful to her for her comments and proof-reading of earlier versions.

Summary

This volume presents the results of the first two phases of the South West Archaeological Research Framework (SWARF) project: a Resource Assessment and a Research Agenda for archaeology in South West England. It covers the area of the historic counties of Cornwall, Devon, Dorset, Somerset, Wiltshire and Gloucestershire and is a project sponsored by English Heritage and the local authorities of the region. The project has as its aim the provision of a structure in which to make decisions about future archaeological research and is part of an English Heritage initiative to prepare a series of such reports for the whole country.

The regions of England, as defined by central government, have a short history and so this is the first report to cover the area now called South West England. The first part of the report contains a comprehensive overview of the region from the Palaeolithic to the present day with the aim of providing an accessible and up-to-date review of the current state of archaeological knowledge. It also hopes to define the character of that resource to act as a reference when taking decisions on the future of the resource. The second part of the report highlights the major gaps in our knowledge and also areas where the region's archaeological resource may have most to contribute to national and international research questions.

In order to make the Research Framework as comprehensive as possible the work has been carried out by a large number of people with research interests across the region. The reports originated from a smaller number who prepared draft documents for each period. The membership of these period groups was drawn from all sectors of the archaeological community in order to get as wide a view of the issues as possible. The draft documents were circulated to a wider group which intended to include all those working, researching or just interested in the archaeology of the region. As part of the process two seminars were held, one to discuss the Resource Assessment and one to discuss the Research Agenda. These were attended by over 150 people and provided a forum for discussion that has contributed greatly to the quality of the final document. The final stage of the project, the Research Strategy, will be developed in a similar way and published separately.

The current document comprises chapters summarising our knowledge of the region by chronological period: Palaeolithic and Mesolithic, Neolithic and Early Bronze Age, Later Bronze Age and Iron Age, Roman, Early Medieval, Medieval, Post-Medieval and Modern. These are accompanied by an introduction to the project and the region, a chapter on environmental archaeology in the Neolithic and Early Bronze Age and the Research Agenda. The text is supported by maps, diagrams and an extensive bibliography.

As the work demonstrates, South West England is probably the most diverse of the English regions and contains some of its best-known archaeological sites. The caves of Mendip and Torbay contain some of the finest Palaeolithic remains in England whilst later in prehistory sites such as Avebury, Stonehenge and Maiden Castle are of international repute. The Roman period is famous for its spectacular mosaics from sites such as Chedworth and Cirencester and may have remained in contact with the empire into the 5th and 6th centuries. Glastonbury is famous for its Abbey and early Christian associations but the region contains many fine churches and cathedrals, of which Salisbury and Wells are perhaps the best known. The importance of mining in some areas is reflected in the recent successful bid for World Heritage Site status.

Much of the region is dominated by its coast which has allowed extensive influence from bordering areas such as Wales, Ireland and Brittany but has also allowed the spread of people and ideas from the region to all corners of the world. The coast, and the inland areas, present a wide variety of environments: from the rocky cliffs of Cornwall, via the granite uplands of Bodmin and Dartmoor, the wide alluvial deposits of Somerset to the chalk downland of Dorset and Wiltshire and the limestone hills of Gloucestershire. This diversity provides a wealth of avenues for archaeological research to which can be added the important urban deposits of the great medieval and later port of Bristol and other cities such as Gloucester and Exeter.

Archaeological research is not static and many new sites have had to be added to this report as it was being written but it is hoped that this report of the state of archaeology at the beginning of the 21st century will provide a springboard for future research and a focus around which we can pool our energies.

Résumé

Ici figurent les résultats des deux premières phases du projet intitulé « Cadre de recherche archéologique pour le Sud-Ouest de l'Angleterre » (*South West Archaeological Research Framework* ou *SWARF*) : Evaluation des ressources et Priorités de recherche pour les comtés historiques de Cornouailles, Devon, Dorset, Somerset, Wiltshire et Gloucestershire. Ce projet, parrainé par *English Heritage* et par les collectivités locales de la région, a pour objet de fournir une structure permettant de prendre des décisions pour les recherches archéologiques futures et fait partie d'une initiative de *English Heritage* devant produire une série de rapports qui couvrira tout le pays.

Les régions d'Angleterre ayant vu leurs contours redessinés par le gouvernement central récemment, ce rapport est le premier pour la région maintenant dite *South West England* (Sud-Ouest de l'Angleterre). On trouvera en première partie un aperçu général de la région depuis le Paléolithique jusqu'à nos jours qui présente l'état actuel des connaissances archéologiques sous un format facilement accessible. L'espoir est également de faire de cet ouvrage un outil de référence pour les décisions à venir. La deuxième partie signale les principales lacunes dans nos connaissances mais également les domaines où les ressources archéologiques de la région ont le plus à contribuer en matière de recherches nationales et internationales.

Ce Cadre de recherche devant être aussi exhaustif que possible, le travail a fait appel à de nombreux collaborateurs dont les axes de recherche couvrent toute la région. Les rapports ont été rédigés par un petit nombre d'entre eux de façon à produire un document par période. Les membres des équipes travaillant sur chaque période ont été choisis de façon à représenter tous les secteurs archéologiques et les intérêts les plus variés. Les projets de rapports ont été diffusés auprès d'un groupe plus vaste encore dans l'espoir d'atteindre tous ceux qui s'intéressent à l'archéologie de la région, travailleurs, chercheurs et amateurs éclairés. Ce faisant, deux séminaires ont été tenus, l'un pour discuter de l'évaluation des ressources (*Resource Assessment*) et l'autre pour établir les priorités de recherche (*Research Agenda*), qui ont attiré plus de 150 personnes et ont constitué un forum de discussion qui a fortement contribué à la qualité du document final. L'étape finale du projet, intitulée Stratégie de recherche (*Research Strategy*), se déroulera de façon analogue et fera l'objet d'une publication séparée.

Dans le présent document figurent des chapitres résumant l'état de nos connaissances sur la région par période chronologique : le Paléolithique et le Mésolithique, le Néolithique et l'âge du Bronze ancien, l'âge du Bronze final et l'âge du Fer, les époques romane, médiévale ancienne, médiévale, post-médiévale et moderne. Chaque chapitre comporte une introduction au projet et à la région, et il s'y ajoute un chapitre sur l'archéologie de l'environnement à l'Age néolithique et au premier Age du Bronze et un autre sur les priorités de recherche. Le texte est assorti de cartes, de diagrammes et d'une ample bibliographie.

Comme cet ouvrage le démontre, le Sud-Ouest de l'Angleterre est sans doute la région la plus variée de toute l'Angleterre et comprend certains de ses sites archéologiques les plus connus. Les cavernes de Mendip et de Torbay contiennent des vestiges paléolithiques parmi les plus beaux d'Angleterre tandis que pour la préhistoire plus récente des sites comme Avebury, Stonehenge et Maiden Castle sont mondialement connus. La période romane s'illustre avec de spectaculaires mosaïques sur des sites peut-être restés en contact avec l'empire jusqu'aux 5^{e} et 6^{e} siècles, comme Chedworth et Cirencester. Glastonbury est célèbre pour son abbaye et pour ses liens avec le début de l'ère chrétienne mais la région possède également nombre de belles églises et cathédrales, Salisbury et Wells étant sans doute les plus connues. Les extractions minières d'autrefois ont par ailleurs valu à la région d'être inscrite récemment au patrimoine mondial de l'Unesco.

Le littoral qui domine une bonne partie de la région l'a ouverte aux influences venant des régions voisines, pays de Galles, Irlande et Bretagne, mais il a également facilité la dispersion des individus et des idées aux quatre coins du monde. La côte et les terres intérieures présentent une grande variété de paysages : depuis les falaises rocheuses de Cornouailles jusqu'aux collines crayeuses (*downland*) du Dorset et du Wiltshire, en passant par les plateaux granitiques de Bodmin Moor et de Dartmoor, les dépôts alluviaux du Somerset et les côteaux calcaires du Gloucestershire. Cette diversité offre d'infinies possibilités de recherche archéologique sans compter les importants dépôts urbains du port de Bristol, datant du Moyen Age ou plus tardifs encore, et des autres grandes villes que sont Gloucester ou Exeter.

La recherche archéologique est toujours en mouvement et de nombreux sites ont dû être ajoutés alors que ce rapport était déjà en cours de rédaction mais cet ouvrage sur l'état de l'archéologie en ce début du 21^{e} siècle servira, nous l'espérons, de tremplin aux recherches futures et d'axe de travail qui rassemblera nos énergies.

Susanne James Associates

Zusammenfassung

In diesem Bericht werden die Ergebnisse der ersten beiden Phasen des Projekts *South West Archaeological Research Framework* (SWARF) vorgestellt: die Bestandsaufnahme (*Resource Assessment*) und die Forschungsagenda (*Research Agenda*) für archäologische Forschungstätigkeiten in der Region *South West England*, welche die historischen Grafschaften Cornwall, Devon, Dorset, Somerset, Wiltshire und Gloucestershire umfasst. Das Projekt wurde durch *English Heritage* sowie regionale Lokalbehörden finanziert und verfolgte das Ziel, eine Grundlage für künftige Entscheidungen hinsichtlich archäologischer Forschungstätigkeit zu schaffen. Im Rahmen dieser *English Heritage* Initiative soll eine Serie von Berichten nach der Art des vorliegenden Bandes für das ganze Land erstellt werden.

Die Regionen Englands, wie von der Regierung im Sinne der Verwaltungsgliederung definiert, sind relativ jung in der Geschichte des Landes. Der vorliegende Bericht ist daher der erste, der sich mit der Region befasst, die nun *South West England* bezeichnet wird. Der erste Teil des Berichtes enthält einen detaillierten Überblick über die Geschichte der Region von der Steinzeit bis heute. Damit soll eine überschaubare und aktuelle Bestandsaufnahme der vorhandenen archäologischen Wissensbasis geboten werden. Gleichzeitig soll der Modellcharakter dieser Ressource dokumentiert werden, damit sie in späteren Entscheidungsprozessen als Referenzwerk herangezogen werden kann. Der zweite Teil des Berichts identifiziert wesentliche Lücken in den vorhandenen Kenntnissen und nennt Bereiche, in welchen die archäologischen Ressourcen der Region zu nationalen und internationalen Forschungsfragen beitragen können.

Um den Forschungsrahmen möglichst umfassend zu gestalten, wurde die Arbeit von zahlreichen Fachleuten mit entsprechenden Forschungsinteressen aus der gesamten Region durchgeführt. Erste Berichtvorlagen für die einzelnen historischen Perioden wurden in Arbeitsgruppen entworfen, die alle Bereichen der archäologischen Gemeinschaft vertraten, um das Spektrum der Ansätze so breit wie möglich zu gestalten. Die Berichtvorlagen wurden einem ebenfalls breit gestreuten Expertenkreis vorgelegt und überarbeitet. Im Rahmen der Berichterstellung wurden zwei Seminare veranstaltet, eines zum Thema *Resource Assessment* und das andere zum *Research Agenda*. Die Teilnahme von über 150 Personen an den Diskussionsforen gewährleistete größtmögliche Qualität des endgültigen Berichts. Die dritte und letzte Phase des Projekts betrifft die Forschungsstrategie (*Research Strategy*), die in ähnlicher Weise durchgeführt und separat veröffentlicht wird.

Der vorliegende Band präsentiert den derzeitigen Wissensstand zur Region in den folgenden, chronologisch gegliederten Kapiteln: Alt- und Mittelsteinzeit, Jungsteinzeit und Frühbronzezeit, Spätbronzezeit und Eisenzeit, Römische Periode, Frühmittelalter, Mittelalter, Spätmittelalter, und Neuzeit. Außerdem enthält er eine Einführung zum Projekt und zur Region, einen Abschnitt über Umweltarchäologie in Bezug auf Steinzeit und frühe Bronzezeit, sowie den Abschnitt *Research Agenda*. Die Texte werden durch Pläne und Diagramme illustriert und eine umfangreiche Bibliographie ergänzt.

Wie die Ausführungen zeigen, weist *South West England* geologisch und landschaftlich das wohl breiteste Spektrum unter den Regionen Englands auf und besitzt einige der bekanntesten archäologischen Stätten. Die Höhlen von Mendip und Torbay enthalten Englands berühmteste Funde aus der Altsteinzeit, während spätere, vorgeschichtliche Stätten wie Avebury, Stonehenge und Maiden Castle weltweit bekannt sind. Berühmte Beispiele für die römische Zeit sind die außergewöhnlichen Mosaikböden der Anlagen von Chedworth und Cirencester, die möglicherweise bis ins 5. und 6. Jh. mit Rom in Verbindung standen. Glastonbury ist bekannt für die Abtei und frühchristliche Verbindungen; darüber hinaus gibt es in der gesamten Region zahlreiche andere historisch interessante Kirchen, wobei die Kathedralen von Salisbury und Wells die bekanntesten sind. Die Bedeutung des Bergbaus in einzelnen Gebieten bestätigte sich jüngst in deren Anerkennung als Welterbestätte.

Ein Großteil der Region ist durch die Küstenlange geprägt, was den Einfluss aus benachbarten Gebieten wie Wales, Irland und der Bretagne ermöglichte, gleichzeitig aber auch die Verbreitung von Menschen und Ideen der Region in alle Teile der Welt erlaubte. Die Küste sowie die Binnengebiete zeichnen sich durch eine Vielfalt von Landschaftsformen aus: die Kliffküste Cornwalls, die Granithochflächen von Bodmin Moor und Dartmoor, die weitflächigen postglazialen Ablagerungen in Somerset, die Kreidekalk-Niederungen von Dorset und Wiltshire, und die Kalksteinhügel von Gloucestershire. Dieser geologische Reichtum bietet dem Archäologen zahlreiche Forschungsmöglichkeiten, zu welchen die urbanen Fundschichten des mittelalterlichen Hafens von Bristol sowie der Städte Gloucester und Exeter noch hinzuzuzählen sind.

Archäologische Forschung ist kein statisches Betätigungsfeld – während der Berichterstellung wurde die Liste der aufzunehmenden Stätten mehrmals ergänzt. Dieser Bericht zum Stand der Archäologie am Beginn des 21. Jahrhunderts soll daher als Sprungbrett für weitere Forschung dienen und als Koordinationsbasis für künftige Aktivitäten.

Susanne James Associates

Abbreviations and Glossary

The military sections of Chapter 14 contain a large number of abbreviations and acronyms; only those used more than once or not explained in close proximity are included here.

AA	Automobile Association or Anti-Aircraft (artillery).
ADP	Automatic Data Processing.
ALGAO	The Association of Local Government Archaeological Officers.
AMS	Accelerator Mass Spectrometry. A method of radiocarbon dating technique which directly measures the ratio of ^{14}C to ^{12}C rather than measuring the radioactivity of ^{14}C .
AONB	Area of Outstanding Natural Beauty. A planning designation with some of the attributes of a National Park.
BB1	Black Burnished Ware type 1. A Roman pottery style produced in the Poole Harbour area and elsewhere in the South West (South-Western BB1).
BBC	British Broadcasting Corporation.
BGS	British Geological Survey.
BT	British Telecom. The privatised GPO.
BVD	Base Vehicle Depot.
CBA	Council for British Archaeology.
CRAAGS	The Committee for Rescue Archaeology in Avon, Gloucestershire and Somerset. An excavation unit funded by central government and active in the 1970s.
DOB	Defence of Britain Project, a national project of volunteer recording of defence sites. The results were incorporated into an online database (DOB 2002) but this is not updated.
EH	English Heritage.
EUP	Early Upper Palaeolithic.
EUS	Extensive Urban Survey. See Section 1.2.4 on page 11.
FM	Frequency Modulation (of radio signals).
GCHQ	Government Communications Headquarters.
GCI	Ground Controlled Interception. Radar used to guide fighter aircraft to their target.
GPO	General Post-Office. The UK postal and telecommunications authority until privatisation. See BT.
GWR	Great Western Railway.
HEATH	Heathland, Environment, Agriculture, Tourism and Heritage. A project by Cornwall County Council to improve management and understanding of the heaths of West Cornwall.
HER	Historic Environment Record, see Section 1.2.5 on page 15.
HF	High Frequency (radio transmissions).
HM	Her/His Majesty's.
HMS	Her/His Majesty's Ship. Also used for naval shore stations.
HQ	Headquarters.
IPCC	Intergovernmental Panel on Climate Change.
LBK	Linearbandkeramik. An early European Neolithic pottey style and associated culture.
LGM	Last Glacial Maximum.
LNEBA	Late Neolithic/Early Bronze Age.
LUP	Late Upper Palaeolitic.
MARISP	Monuments at Risk in Somerset Peatlands. A project to assess the current condition of known wooden structures in the peat.
MHD	Military Home Defence.
MLA	Museums, Libraries and Archives Council.
MPP	The Monuments Protection Programme. An English Heritage programme to identify sites and monuments for statutory protection. Some types (such as industrial monuments) were covered thematically in a series of "Step" reports, proceeding from the general to recommendations for individual monuments. Reaction to intended changes in heritage protection legislation has led to the demise of the programme in an incomplete state.
MPRG	Medieval Pottery Research Group.
NAAFI	Navy, Army and Air Force Institute. Providing food and refreshments to the forces.
NATO	North Atlantic Treaty Organisation.
OD	Ordnance Datum (mean sea level at Newlyn)
OIS	Oxygen Isotope Stage. Divisions based on the ratio of oxygen isotopes preserved in deep ice cores which indicate periods of global cooling and warming. Glacial stages are even-numbered.

OS	Ordnance Survey. The national mapping agency of Britain.
OSL	Optically Stimulated Luminescence. A technique for dating when particles of sediment were last exposed to light.
PHEW	Institution of Civil Engineers Panel for Historic Engineering Works
POW	Prisoner of War.
PPG	Planning Policy Guidance. Principally those relating to archaeology (PPG 16, DoE 1990) and the historic environment (PPG 15, DoE 1994).
SANHS	Somerset Archaeological and Natural History Society
SWALGAO	South West ALGAO (see above).
RAC	Royal Automobile Club.
RAE	Royal Aircraft Establishment.
RAF	Royal Air Force.
RAFVR	Royal Air Force Volunteer Reserve.
RCAHMS	Royal Commission on the Ancient and Historical Monuments of Scotland.
RCHME	Royal Commission on the Historical Monuments of England. Now part of English Heritage.
RIB	Roman Inscriptions in Britain. A published catalogue (Collingwood and Wright 1965).
RN	Royal Navy or Royal Naval.
RNAS	Royal Naval Air Station.
ROC	Royal Observer Corps.
SPMA	Society for Post-Medieval Archaeology.
TA	Territorial Army. A reserve force.
TL	Thermoluminescence. A technique for dating when certain minerals (often in pottery) were last exposed to high temperatures.
TV	Television.
UBSS	University of Bristol Spelaeological Society
USAAF	United States Army Air Force.
VHF	Very High Frequency (radio transmissions).
XRF	X-Ray flourescence. An analyitical technique for identifying the elemental composition of an object.
YMCA	Young Men's Christian Association. A charitable organisation which also provided recreational facilities for soldiers.
YWCA	Young Women's Christian Association.

Note on radiocarbon dates

Radiocarbon dates used in the text have, where possible, been recalibrated using OxCAL 3.10 (Bronk Ramsey 2005) and the IntCal04 curve (Reimer *et al.* 2004). Lab numbers are given in the text and full details are given in the table at the end of each chapter.

1

Introduction to the Project and the Region

Chris Webster with a contribution from David Dawson

1.1 Introduction to the Project

This document comprises the first two stages of a project to prepare an Archaeological Research Framework for the South West of England (SWARF). The Resource Assessment (Chapters 1 to 9) aims to describe the current state of knowledge of the archaeological resource in the historic counties of Gloucestershire, Somerset, Wiltshire, Dorset, Devon and Cornwall. It provides the basis for identifying gaps in our knowledge and thus research priorities for the future which form the Research Agenda (Chapter 10). It has already brought together a wide range of people with an interest in the past of the region who otherwise seldom meet and will hopefully produce new partnerships to carry forward research.

The Archaeological Research Framework is a response to a perceived lack of directed academic enquiry in the majority of archaeological projects today, brought about by the development-led nature of most of the work. Archaeology has come a long way from its origins as an intellectual pastime of the landed and middle classes in the 19th century but, because of the way it developed after the Second World War, the location of most archaeological work in Britain today is tied to the planning process and development. Since the formalisation of requirements for archaeological work in PPG16 (DoE 1990) there has been a continual rise in the amount of archaeological work in the region (see Figure 1.1 on the next page and Figure 1.13 on page 19). The popularity of television programmes devoted to archaeology, particularly Time Team, has never been higher and suggests significant public interest in certain aspects of the subject. Universities have also seen a significant rise (now falling again) in numbers of students which has led to an increased amount of fieldwork, although this is often directed away from local projects by the demands of the Research Assessment Exercise. Despite this increased interest and participation, however, the vast majority of archaeological investigation is driven by the needs of construction projects rather than research questions.

Recognising this situation in the early 1990s, English Heritage surveyed the work of professional archaeologists, resulting in the publication of *Frameworks for our Past* (Olivier 1996). This showed that there had been work on national research priorities but there were major gaps at more local levels: the levels at which the planning process works. It also criticised the methodology of previous frameworks which reflected strongly the interests of a limited number of authors and omitted significant areas in which the authors had no interests (Olivier 1996, 9). The result of this appraisal was the development of a programme of Regional Research Frameworks which would provide a context within which the development control archaeologist could consider work, sites outside the development control system could be evaluated and the funding from developers used to best effect (Olivier 1996, 2).

Methodology

The production of this Archaeological Research Framework was initiated by the SW group of the Association of Local Government Archaeological Officers (SWALGAO) and English Heritage in 1996 which led to the production of a number of draft research objectives and agreement of the wider archaeological community to work towards a coherent Regional Research Framework for the South West following the model proposed in *Frameworks for our Past*.

In 2001 the project was re-awakened and it was agreed that SWALGAO should draw up a draft proposal for English Heritage. Two seminars

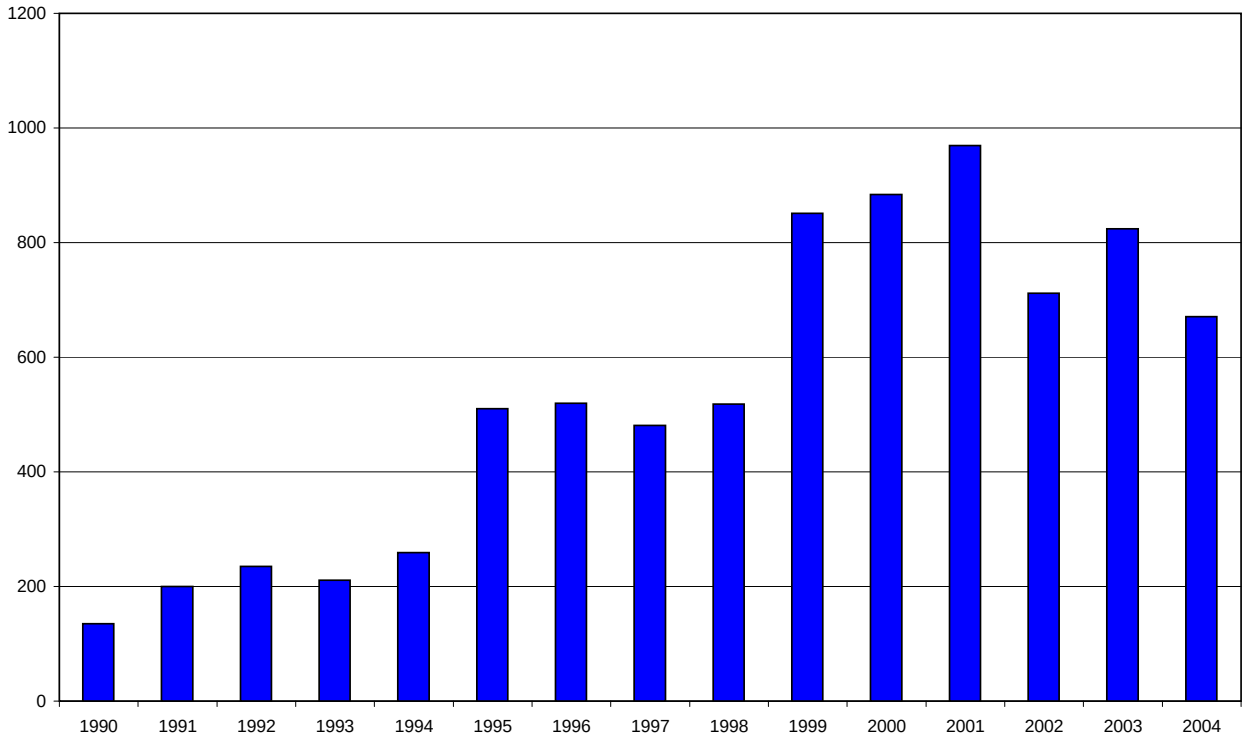

Figure 1.1: *Annual numbers of all types of archaeological activity in the South West recorded by the Archaeological Investigations Project, Bournemouth University.*

(at Exeter and Swindon in December 2001) were attended by over 60 people, with 30 apologies, and proved to be an important first step in assessing the scope and scale of the Framework project. Invitations were sent to a wide range of the heritage sector in the South West and delegates attending the meeting came from a wide variety of backgrounds - universities, local authorities, contracting units, museums, local amenity societies and independent consultants. A project design was prepared by Bob Sydes (then of Bath and North East Somerset Council) but he was unable to complete the task for internal management reasons. A revised version was prepared by Bob Croft of Somerset County Council and submitted to English Heritage in December 2003. Following discussions with Kathy Perrin and Vanessa Straker of English Heritage in February 2004 a new version of the project design was prepared, following more closely the model established in other regions. This was agreed and work began in the summer.

The production of Research Frameworks falls into three phases as set out in *Frameworks for our Past*. The basis is an assessment of previous work and current knowledge, followed by the identification of gaps in knowledge and thus research priorities. The final phase is the production of a strategy to address these issues.

Phase 1: The Resource Assessment What we know

Phase 2: The Research Agenda What we would like to know

Phase 3: The Research Strategy How we are going to find out

The current document contains the results of the first two phases of the Research Framework; the strategy will be circulated separately as it is intended to be updated more frequently.

The Authors

The Research Framework, including the current document, has been written by archaeologists working in, or with an interest in, the archaeology of South West England. They comprise local authority archaeologists, academic archaeologists, archaeological contractors and amateur archaeologists who have collaborated in 8 period-based groups to produce a report under the editorship of a Group Convenor. The initial membership of the groups was suggested by SWALGAO but was then supplemented by other suggestions and volunteers. Input from others was welcomed and, indeed, encouraged.

The current document thus represents the collated texts from many authors and because of this it is not possible to identify the individual authorship of a block of text. The contributors to the text are given at the head of each section of the Resource Assessment and a full list of those involved is given on pages xv–xvi.

The sections on the environmental background are slightly different. It did not prove possible to form a group of environmental specialists and thus almost all the work had to be undertaken by one person, Vanessa Straker. It was originally intended that this material should be produced first and incorporated into the writing of the period chapters but, because most of the work could not be shared out, in the event it was some of the last to be completed and most has had to be inserted with only a limited amount of integration.

The first version of the Resource Assessment was presented at a two-day seminar in Bristol in May 2005 and the Research Agenda a year later. Both meetings were open to all and allowed a wide range of views to be expressed, many of which are incorporated into this final version. The report thus boasts not only many authors but also a great many contributors from all sections of the archaeological community of the South West.

1.2 Introduction to the Region

The region is that covered by the Government Office for the South West and comprises the historic counties of Gloucestershire, Somerset, Wiltshire, Dorset, Devon and Cornwall. For the most part the region reflects the historic boundaries of the counties but an area of Hampshire (around Christchurch) was transferred to Dorset in 1974. The county of Avon was also established in 1974 comprising the hinterland of Bristol and Bath but this has now been spilt into the unitary authorities of South Gloucestershire, Bristol, North Somerset, and Bath and North East Somerset. Five other unitary authorities have also been carved out of counties: Swindon, Bournemouth, Poole, Torbay and Plymouth. There are also two National Parks: Dartmoor in Devon, and Exmoor straddling the Devon/Somerset border. Together they cover around 3% of the region.

South West England is the largest of the nine English local government regions, covering an area of 23,837 km^2 (18.3% of England). It is also the least compact, stretching for over 360km with the Isles of Scilly a further 50km beyond Land's End. Tewkesbury, in the north, is about the same distance from Scotland as it is from Penzance in the West. Despite its size it has the third lowest population but is one of the most culturally diverse: from inner-city Bristol to the Isles of Scilly.

In the South West, the Historic Environment is one of the main drivers for the economy largely through tourism-linked activities. The archaeological and built heritage of the region adds to the character and quality of life of the South West. It will be important that all future planning, development regeneration, agri-environment, social and cultural strategies acknowledge and take account of the context of archaeological research frameworks.

1.2.1 Geology of the South West

The South West contains most types of geological formation known in Britain from the granite of Dartmoor to the recent peats and clays of the Severn estuary (Figure 1.2 on the next page).

Cornwall and Devon are dominated by the granite moors: Dartmoor, Bodmin Moor and smaller areas, including West Penwith and the Isles of Scilly. These areas are also the source of the minerals that have had a profound effect on life in the area. The higher lands are surrounded by lower rolling countryside, composed mostly of Devonian and Carboniferous sandstones. These rise to high moorland on Exmoor.

Much of Somerset and the Severn valley lies on Triassic marls and the mixed clays and limestones of the Lias. In the south the Greensand of the Blackdown Hills continues into Devon to reach the coast. To the east, in Dorset and eastern Somerset lies the ridge of Jurassic limestone which also forms the Cotswolds in the north. Much of Dorset lies on chalk with younger sediments in the areas around Poole Harbour. The chalk continues north to form much of Wiltshire, including the high areas of Salisbury Plain and the Marlborough Downs. Mendip and the area around Bristol contain areas of carboniferous limestones with coal measures that also continue across the Severn to form the Forest of Dean.

Many of the lower lying areas along the Severn are covered by recent marine sediments and peats formed as the sea level fluctuated. The effects of these changes are represented further west by the rias of the north, and particularly, south coasts of Devon and Cornwall. Many of these are choked in their higher reaches by alluvium caused by tin-streaming on the moors above.

1.2.2 Landscape Character

In 1996 English Nature and the Countryside Commission (now combined as Natural England), with help from English Heritage, produced a map of England that depicts the natural and cultural dimensions of the landscape. Two categories were mapped: Natural Areas and Countryside Character. Natural Areas are biogeographic zones that reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England. The Countryside Character Areas sometimes follow the Natural Areas boundaries and are described as "unique in terms of a combination of physiographic land use, historical and cultural attributes". Concerns about the simplistic nature of the historical and cultural attributes used to define these areas led to English Heritage's Historic Landscape Character analysis (below). The CCAs

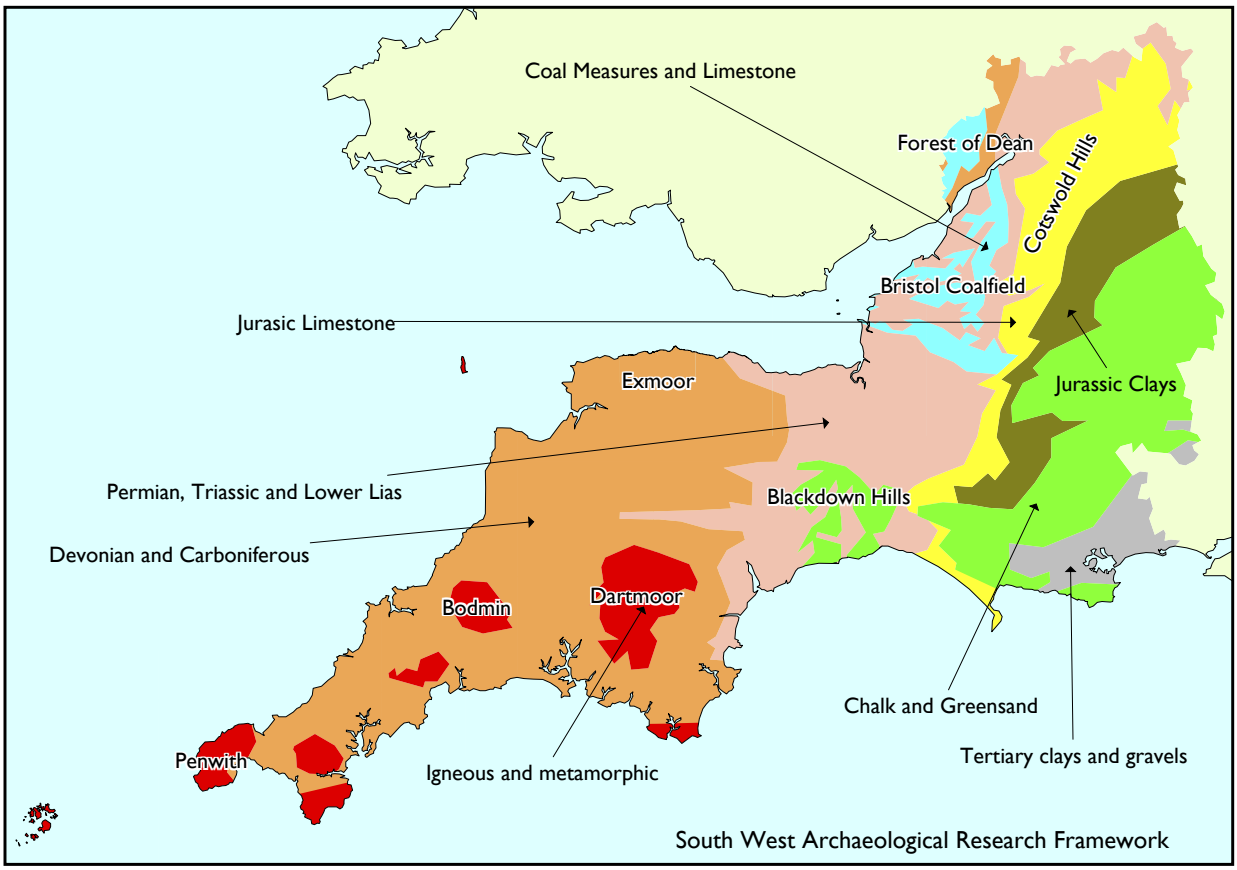

Figure 1.2: *Simplified geology of the South West.*

do, however provide a broad overview of landscape types and are shown in Figure 1.3 on the facing page. The regional boundary is also shown to indicate how poorly the region is defined, on its landward side, by the characterisation. There are 159 CCAs defined, of which 40 (25%) lie in whole, or part, in the South West. As the region covers only 18.3% of the land area of England this provides another indication of the diversity of the South West.

1.2.3 History of Regional Government in the South West

The origins of the current region lies with the military government imposed by Cromwell in 1655. Concern over potential rebellion led to the creation of a series of county militias which were grouped into regional associations. On 2nd August John Desborough was given command of the militia association covering Cornwall, Devon, Somerset, Dorset, Wiltshire and Gloucestershire with the rest of the country being divided up into a further 9 associations a week later. In September it was decided that the heads of the associations were to be called Major-Generals, would have (poorly defined) civilian powers and were to be funded by a new tax system (the decimation tax). The system was deeply unpopular, not just because of the tax but also as many of the Major-Generals followed a strongly puritan agenda which attempted to rid the existing systems of local government of "ungodly" men. Despite attempts to rig the 1656 election, the parliament that assembled voted in January 1657 against making the decimation tax permanent and, deprived of the funding base, the system was abolished by Cromwell (Durston 2001), only to be revived in the years following the First World War.

The involvement of the whole population in the war effort was seen to require military-style government, and the threat of revolution (on the Russian model) was considered very real. The Emergency Powers Act 1920 enabled the appointment of District Commissioners to oversee this and the act was used to declare a state of emergency during the 1926 General Strike. The military district commanders were ordered to provide troops if the commissioners requested but in the event few of the powers were required. In 1938 this became the basis of the Civil Defence Emergency Scheme, again based on Regional Commissioners with wide powers, which was made public in February 1939 and became operational on 25th August. The commissioners remained in post until 1945 and were mainly involved with air-raid precautions although they

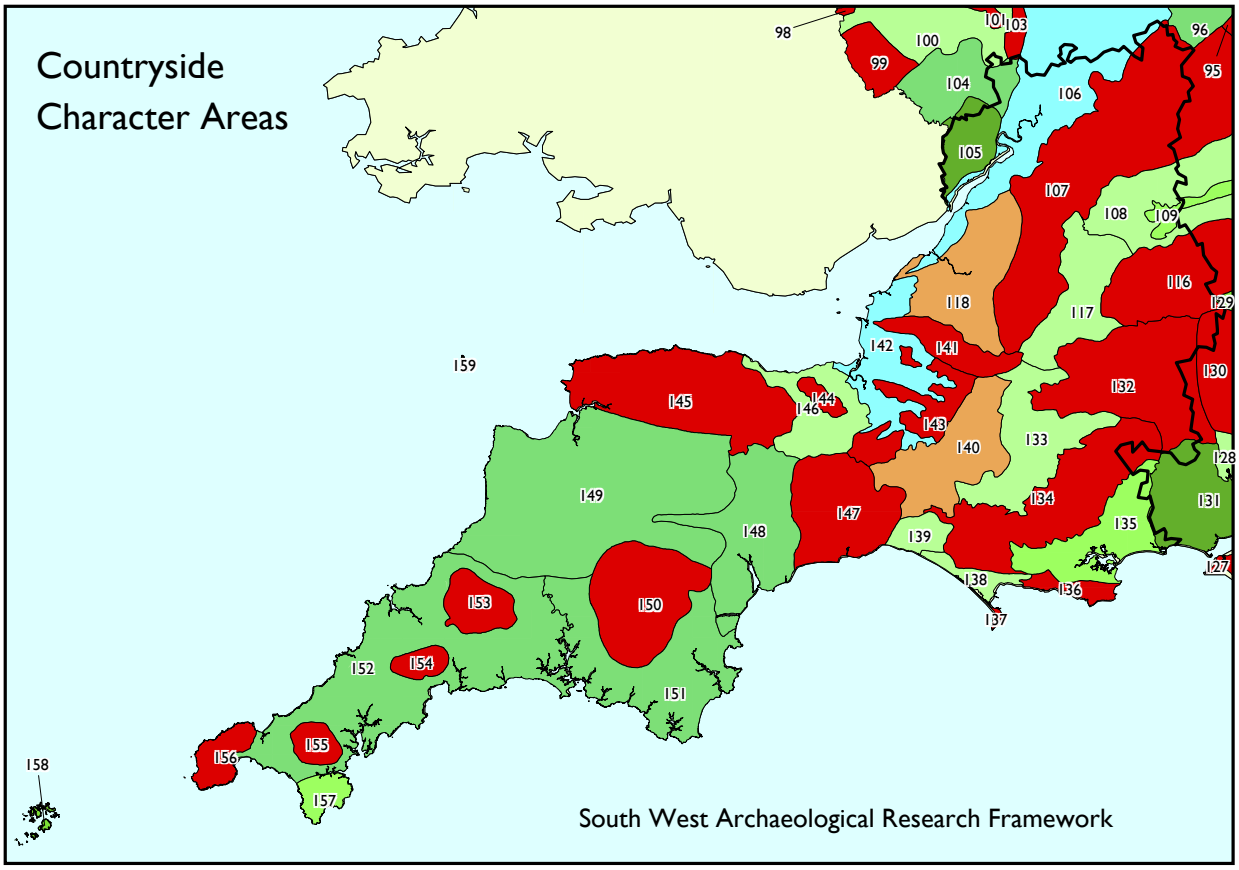

Figure 1.3: *Countryside Character Areas*

95	Northamptonshire Uplands	128	South Hampshire Lowlands	145	Exmoor
96	Dunsmore and Feldon	129	Thames Basin Heaths	146	Vale of Taunton and Quantock Fringes
98	Clun and North West Herefordshire Hills	130	Hampshire Downs	147	Blackdowns
99	Black Mountains and Golden Valley	131	New Forest	148	Devon Redlands
100	Herefordshire Lowlands	132	Salisbury Plain and West Wiltshire Downs	149	The Culm
101	Herefordshire Plateau	133	Blackmoor Vale and the Vale of Wardour	150	Dartmoor
103	Malvern Hills	134	Dorset Downs and Cranborne Chase	151	South Devon
104	South Herefordshire and Over Severn	135	Dorset Heaths	152	Cornish Killas
105	Forest of Dean and Lower Wye	136	South Purbeck	153	Bodmin Moor
106	Severn and Avon Vales	137	Isle of Portland	154	Hensbarrow
107	Cotswolds	138	Weymouth Lowlands	155	Carnmenellis
108	Upper Thames Clay Vales	139	Marshwood and Powerstock Vales	156	West Penwith
109	Midvale Ridge	140	Yeovil Scarplands	157	The Lizard
116	Berkshire and Marlborough Downs	141	Mendip Hills	158	Isles of Scilly
117	Avon Vale	142	Somerset Levels and Moors	159	Lundy
118	Bristol, Avon Valleys and Ridges	143	Mid-Somerset Hills		
127	Isle of Wight	144	Quantock Hills		

would have been able to take over the full (emergency) powers of central government if needed. The South Western region (also known as Region 7) was governed from Bristol and covered the same area as Desborough's association and the current region with the exception of Dorset which lay in Region 6 (Campbell 1982; O'Brien 1955).

Three years after the system had been dismantled it was reactivated by the Civil Defence Act 1948 when it was decided that each region would have a purpose-built headquarters, a "War Room", to provide protected accommodation for the Regional Commissioner and his staff. To reduce the danger from bombing the buildings were constructed just outside the cities and that for Region 7 survives at Brislington, near Bristol. By the time all were constructed in the later 1950s it was apparent that the threat from the hydrogen bomb meant that plans to coordinate relief to civilians were no longer tenable. Accordingly a new system of Regional Seats of Government was set up in the hope that an administrative system would survive a nuclear attack. The headquarters were moved away from population centres and Region 7 would have been governed from a converted Rotor project radar station, known as Hope Cove but in fact situated on nearby Bolt Head in southern Devon.

During the 1960s a system of Sub-Regional Headquarters was proposed in which the Bristol War Room and a former Anti-Aircraft Operations Room at Ullenwood in Gloucestershire were included. By the late 1960s the system had changed again so that only the sub-regions were provided with headquarters, called Sub-Regional Controls, based at Hope

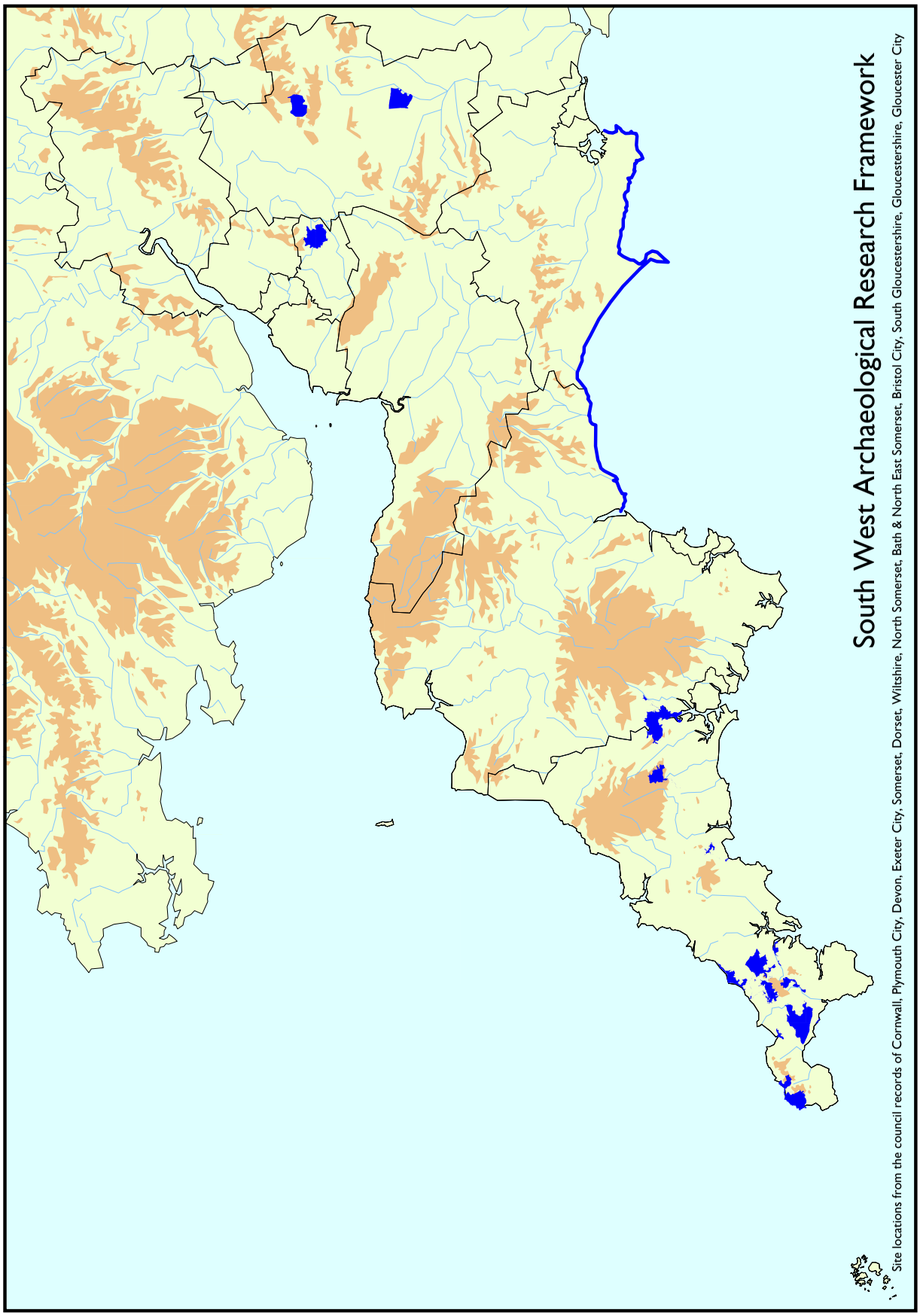

Figure 1.4: *World Heritage Sites in the South West.*

Cove (S-RC 7.1) and Ullenwood (S-RC 7.2). It is likely that Dorset joined Region 7 in a reorganisation of 1973. Civil defence was run down in the 1970s but increasing tension in towards the end of the decade led the Conservative government of 1979 to propose the creation of 17 new protected headquarters, to be known as Regional Government Headquarters (RGHQ). Under this plan Hope Cove and Ullenwood were upgraded and remained in use until 1985 when construction started on a new RGHQ at Chilmark. Following the collapse of the Soviet Union in 1992 the system of planned emergency government was run down (McCamley 2002; Cocroft and Thomas 2003).

Below this regional layer, local government retained a structure inherited from the last quarter of the 19th century until the reorganisation of 1974. This saw the creation of a two tier structure of counties and districts and a new county of Avon in the major population centre around Bristol and Bath. In the mid-1990s it was proposed to remove the two tier system but, in the event, this occurred in a piecemeal fashion. New "Unitary" authorities were created from the former districts within Avon, together with Plymouth, Torbay, Poole, Bournemouth and Swindon.

The regional emergency government structure was reused when government regional offices were set up in 1994 following the Maastricht Treaty of 1992 which foresaw a "Europe of the Regions". This was followed by the creation of further regional organisations such as the Regional Development Agencies in 1998 and the regionalisation of organisations such as English Heritage. An unelected regional assembly was intended to be followed by an elected body (and single tier local government) but the rejection of this system by a referendum in the North East in 2004 put this on hold for the foreseeable future.

1.2.4 Historic Environment Designations

World Heritage Sites

The South West contains 4 of the 17 World Heritage Sites designated by UNESCO in England: *Stonehenge, Avebury and Associated Sites* (1986), *The City of Bath* (1987), *Dorset and East Devon Coast* (2001) and *Cornwall and West Devon Mining Landscape* (2006), shown on Figure 1.4 on the preceding page. Of these, Dorset and East Devon Coast is included for geological interest but the designation of the others is based on their historic environment. More details of World Heritage Sites are available at http://whc.unesco.org/pg.cfm?cid=1

Scheduled Monuments

The South West contains over a third of all the Scheduled Monuments in England although it covers only about one fifth of the area (Figure 1.5 on the following page). According to the Record of Scheduled Monuments maintained by English Heritage there were 6972 Monuments (on 22/07/2004) from a total of about 19,000 (36.7%). Table 1.1 shows the break-down of these by local authority across the region.

Authority	Monuments
Devon	1718
Cornwall	1339
Wiltshire	1299
Dorset	1015
Somerset	602
Gloucestershire	464
Isles of Scilly	238
North Somerset	66
Bath and North East Somerset	56
Swindon	52
Plymouth	36
South Gloucestershire	31
Bristol	24
Poole	16
Torbay	13
Bournemouth	3
	6972

Table 1.1: *Numbers of Scheduled Monuments by local authorities (22/07/2004).*

Much of the disparity in numbers between local authorities is obviously based on their vastly differing areas. The following table lists the number of monuments per square kilometre in each authority. The average for the region is 0.29 as shown by the line in Table 1.2 on page 11. The high figure for Plymouth is due to a preference by the navy for historic buildings to be Scheduled rather than Listed.

Of these 6972 monuments, 4929 (70.7%) have been scheduled (or rescheduled) by the Monuments Protection Programme. The others retain their earlier (often much earlier) documentation which in some cases amounts only to a name and an outline map.

Listed Buildings

There were 88,078 Listed Buildings in the region in July 2004 as shown in the distribution map (Figure 1.6 on page 9). This represents 23.8% of the c. 370,000 in England, again above the expected value for a region of this size (18.3% by area). In many ways the distribution complements that of the Scheduled Monuments with obvious gaps on the moors and other areas where settlement is sparse. In other areas, for example the area between Exeter and Exmoor, it is less clear why there are fewer Listed Buildings than elsewhere. The pattern in Wiltshire is particularly clear with the buildings clearly indicating settlement along the river valleys.

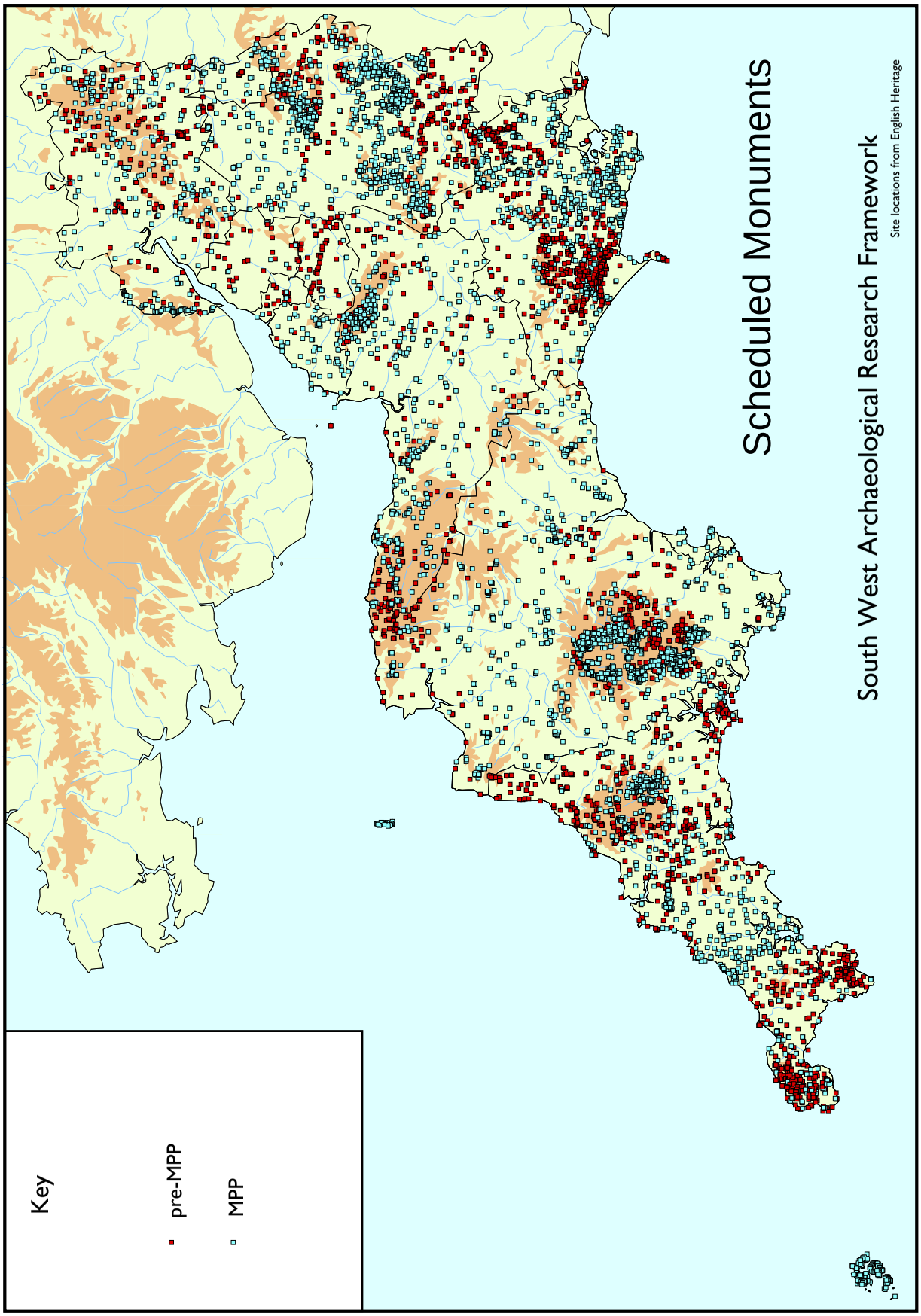

Figure 1.5: *Scheduled Monuments in the South West (22/07/2004).*

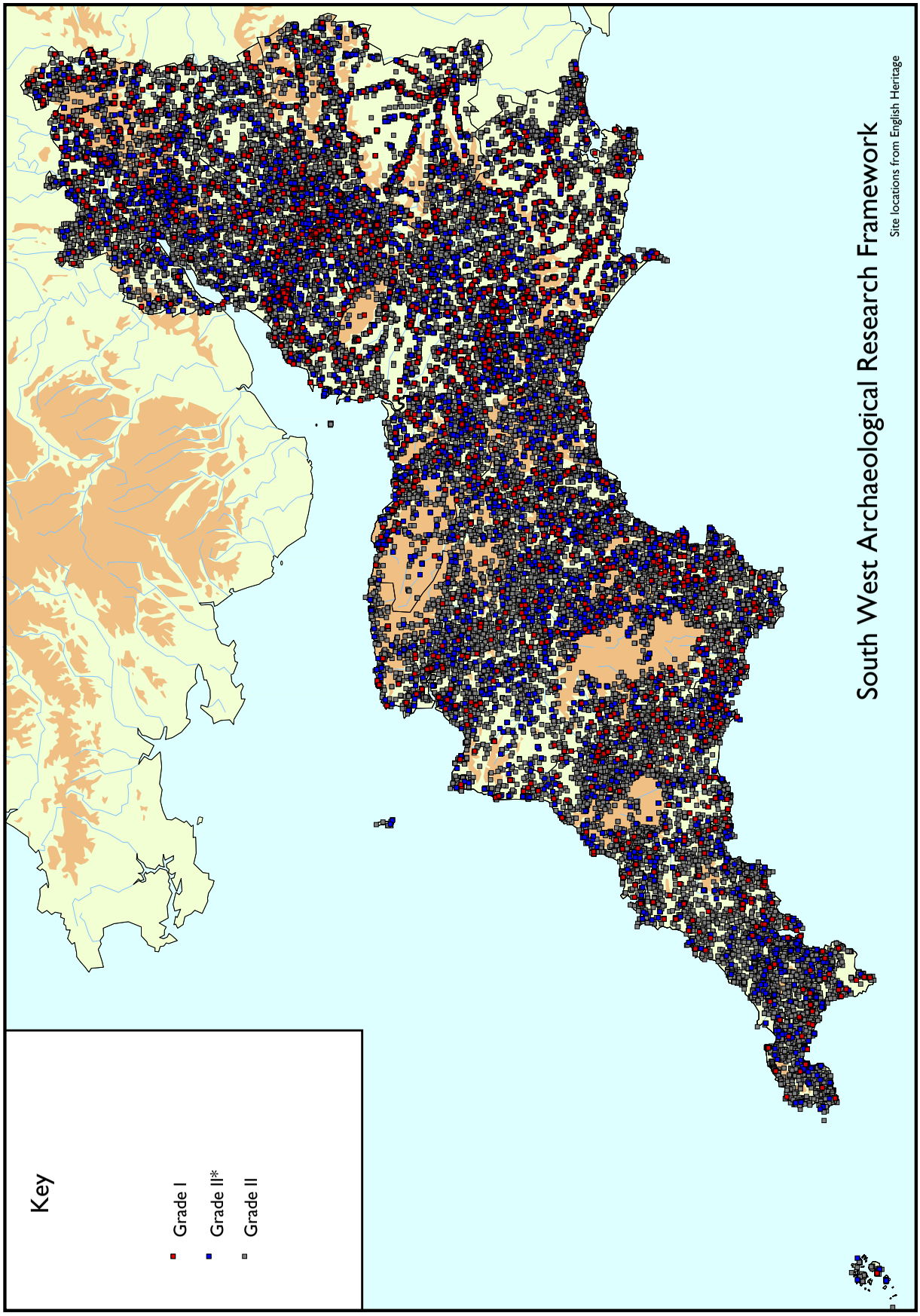

Figure 1.6: *Listed Buildings in the South West (July 2004).*

Authority	Total	Grade I	Grade II*	Grade II
Devon	30,246	392	1106	17,462
Gloucestershire	12,810	257	696	11,812
Cornwall	12,356	217	572	11,558
Wiltshire	12,231	271	680	11,163
Somerset	11,590	309	762	10,492
Dorset	9661	250	480	8679
Bath and North East Somerset	3034	99	128	2708
Bristol	2093	52	208	1833
South Gloucestershire	2030	44	119	1867
North Somerset	1040	37	76	918
Torbay	859	5	30	824
Plymouth	738	24	90	624
Swindon	642	14	27	601
Bournemouth	356	3	17	219
Poole	224	8	17	199
Isles of Scilly	129	4	8	117
	88,078	1986	4987	81,105

Table 1.3: *Listed Buildings by local authority (July 2004).*

Authority	Total	Grade I	Grade II*	Grade II
Bristol	19.52	0.48	1.94	17.10
Torbay	13.36	0.07	0.46	12.82
Plymouth	9.74	0.31	1.18	8.23
Bath and North East Somerset	8.64	0.28	0.36	7.71
Bournemouth	7.26	0.06	0.34	4.47
Isles of Scilly	5.54	0.17	0.34	5.03
Gloucestershire	4.81	0.09	0.26	4.44
Devon	4.63	0.06	0.16	2.67
South Gloucestershire	4.19	0.09	0.24	3.86
Dorset	3.78	0.09	0.18	3.39
Wiltshire	3.75	0.08	0.20	3.42
Cornwall	3.51	0.06	0.16	3.28
Somerset	3.37	0.09	0.22	3.05
Poole	3.19	0.11	0.24	2.83
North Somerset	2.88	0.10	0.21	2.54
Swindon	2.84	0.06	0.11	2.66

Table 1.4: *Density of Listed Buildings by local authority, ordered by total density per km^2 (July 2004).*

Authority	Total	per km^2
Isles of Scilly	238	10.23
Plymouth	36	0.76
Wiltshire	1299	0.40
Dorset	1015	0.40
Cornwall	1339	0.38
Devon	1718	0.26
Swindon	52	0.23
Poole	16	0.23
Bristol	24	0.22
Torbay	13	0.20
North Somerset	66	0.18
Somerset	602	0.18
Gloucestershire	464	0.17
Bath and NE Somerset	56	0.16
South Gloucestershire	31	0.06
Bournemouth	3	0.06
	6972	

Table 1.2: *Density of Scheduled Monuments by local authority (22/07/2004).*

The numbers of Listed Buildings in each local authority are shown in Table 1.3 on the facing page. Although the density of the distribution map obscures this, the Listed Buildings are primarily urban as is shown in Table 1.4 on the preceding page where the small urban authorities rise up the rankings because of the density of buildings in their area. The average density over the whole region is 3.70 buildings per km^2 as shown by the line in Table 1.4. The table is ordered by the total density but examination of the data split by grade shows some interesting anomalies, for instance the high numbers of Grade II* buildings in Plymouth and the low numbers of Grade I in Torbay, when compared to the overall density.

Registered Battlefields

There are 8 battlefields entered in the English Heritage Register of Battlefields out of a total of 43 (18.6%) which is only marginally above the number expected for a region of this size (18.3% by area). All the battles occurred during the Civil War with the exceptions of Tewkesbury (1471) and Sedgemoor, the last battle fought on English soil in 1685. The locations of the battlefields are shown in Figure 1.7 on the following page.

Registered Parks and Gardens

The South West contains 292 (18.4%) of the 1587 sites on the English Heritage Register of Parks and Gardens which is very close to the expected value for a region of this size (18.3% by area). The locations of the sites are shown in Figure 1.8 on page 13. The numbers of registered sites per authority is shown in

Authority	Battlefields
Cornwall	2
Gloucestershire	2
Somerset	2
South Gloucestershire	1
Wiltshire	1
	8

Table 1.5: *Entries in the register of Battlefields, by local authority (July 2004).*

in Table 1.6 and the density in Table 1.7 on page 15.

Authority	Total	I	II*	II
Gloucestershire	54	7	30	17
Devon	40	4	25	11
Somerset	38	5	22	11
Wiltshire	36	5	21	10
Cornwall	36	3	21	12
Dorset	31	2	14	15
Bath and NE Somerset	13	1	9	3
North Somerset	8		5	3
Bristol	8		4	4
Torbay	6		5	1
South Gloucestershire	6	1	2	3
Plymouth	6		5	1
Poole	3		2	1
Swindon	2		2	
Bournemouth	2			2
Isles of Scilly	1	1		
	290	29	167	94

Table 1.6: *Entries in the register of Parks and Gardens, by local authority (July 2004).*

Other English Heritage National Programmes

Urban Archaeological Databases Seven of the region's historic towns have UADs as shown on Figure 1.9 on page 14. The current status of these projects is shown in Table 1.8 on page 15. The databases are usually situated in the planning departments of the local authority and divorced from the surrounding HER (see below). They also cover only a rectangular area around the "historic core" of the town so that there is often an area around this that is less well recorded.

Extensive Urban Surveys This English Heritage project covered the smaller urban areas and did not attempt to catalogue all urban deposits in the way that a UAD did. The projects researched previous work in the towns and attempted to characterise the buried archaeology into areas, mapped by GIS. The location of the towns covered by the survey is shown on Figure 1.9 on page 14. The reports for

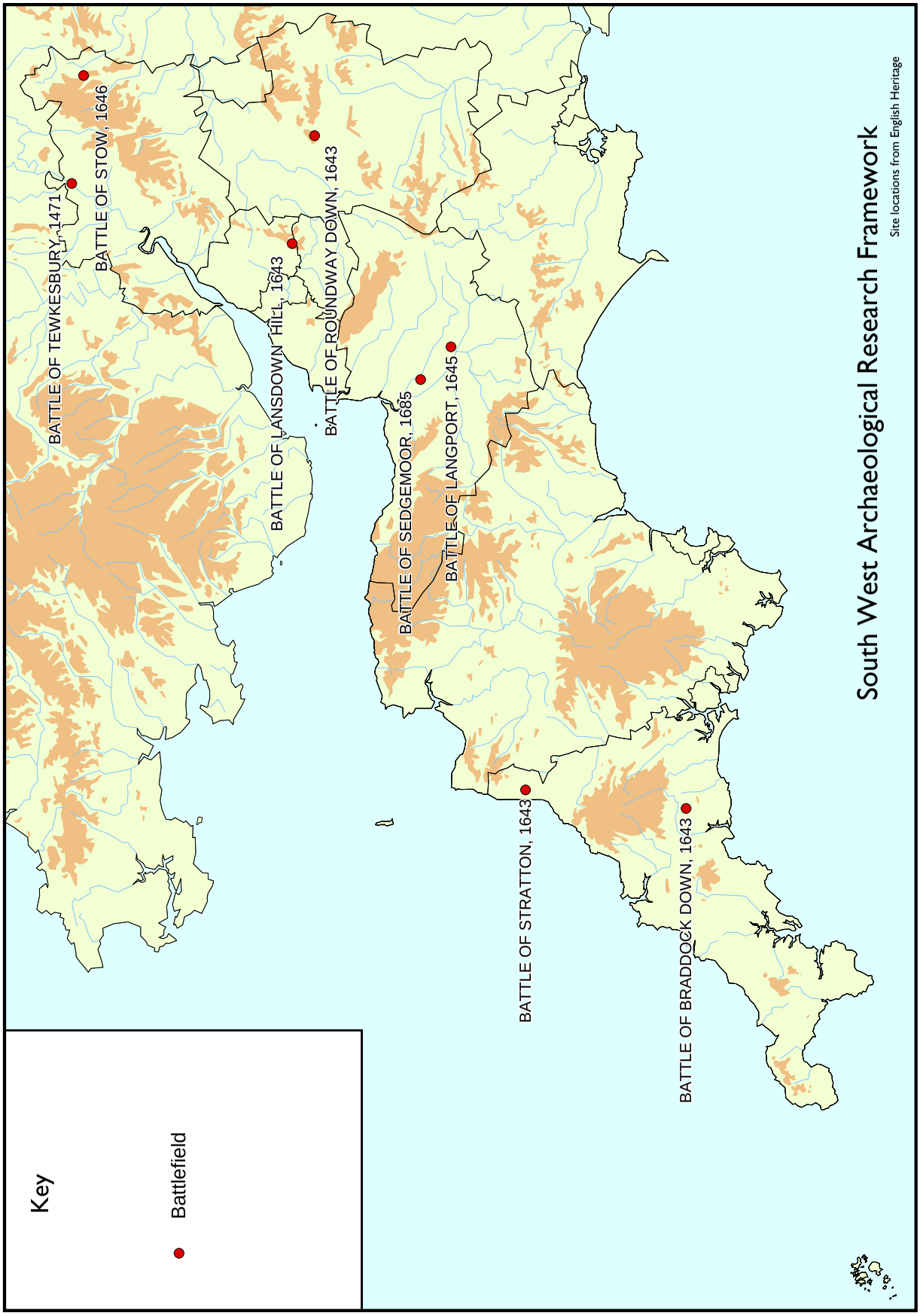

Figure 1.7: *Registered battlefields in the South West (July 2004).*

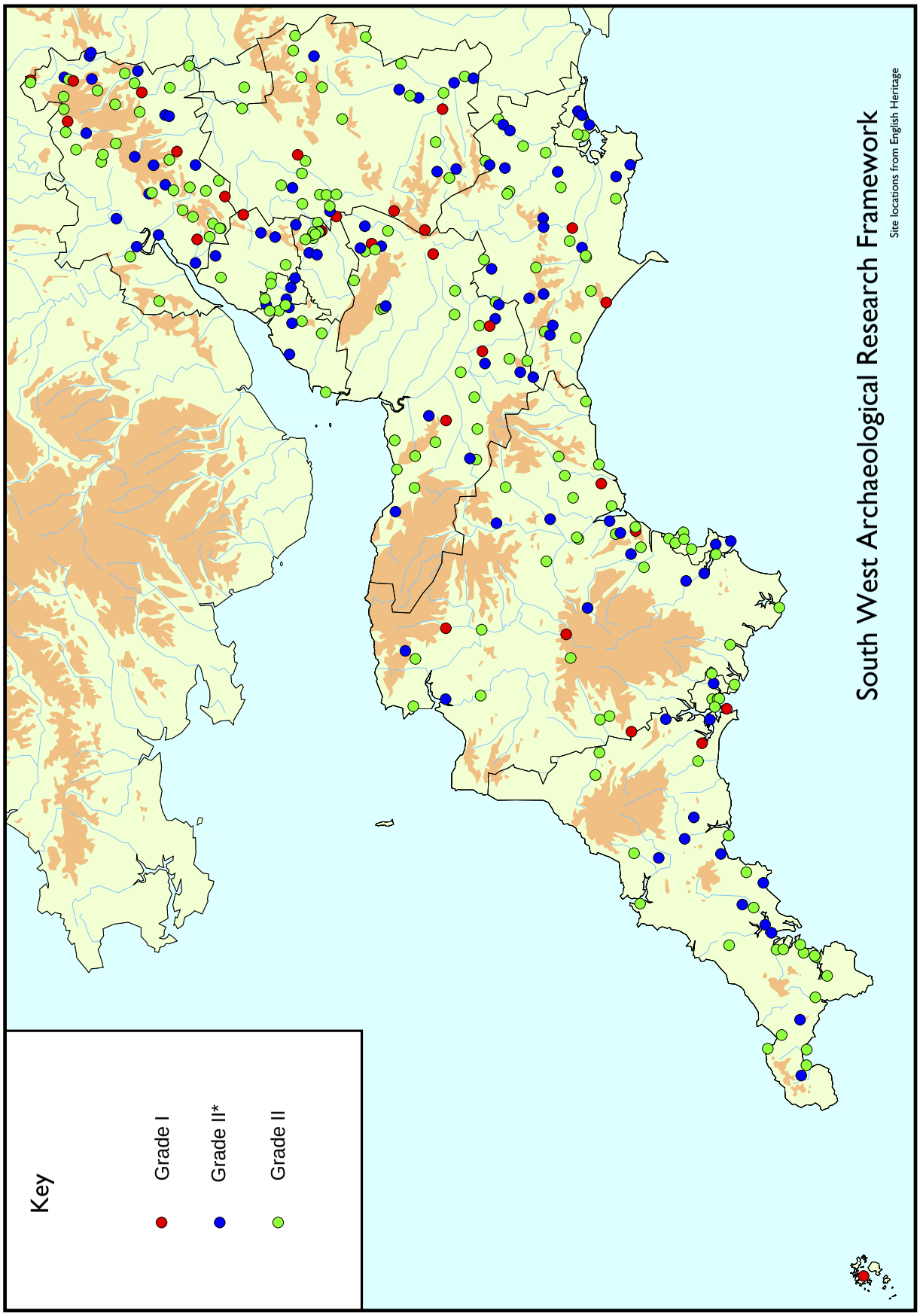

Figure 1.8: *Registered Parks and Gardens in the South West (July 2004).*

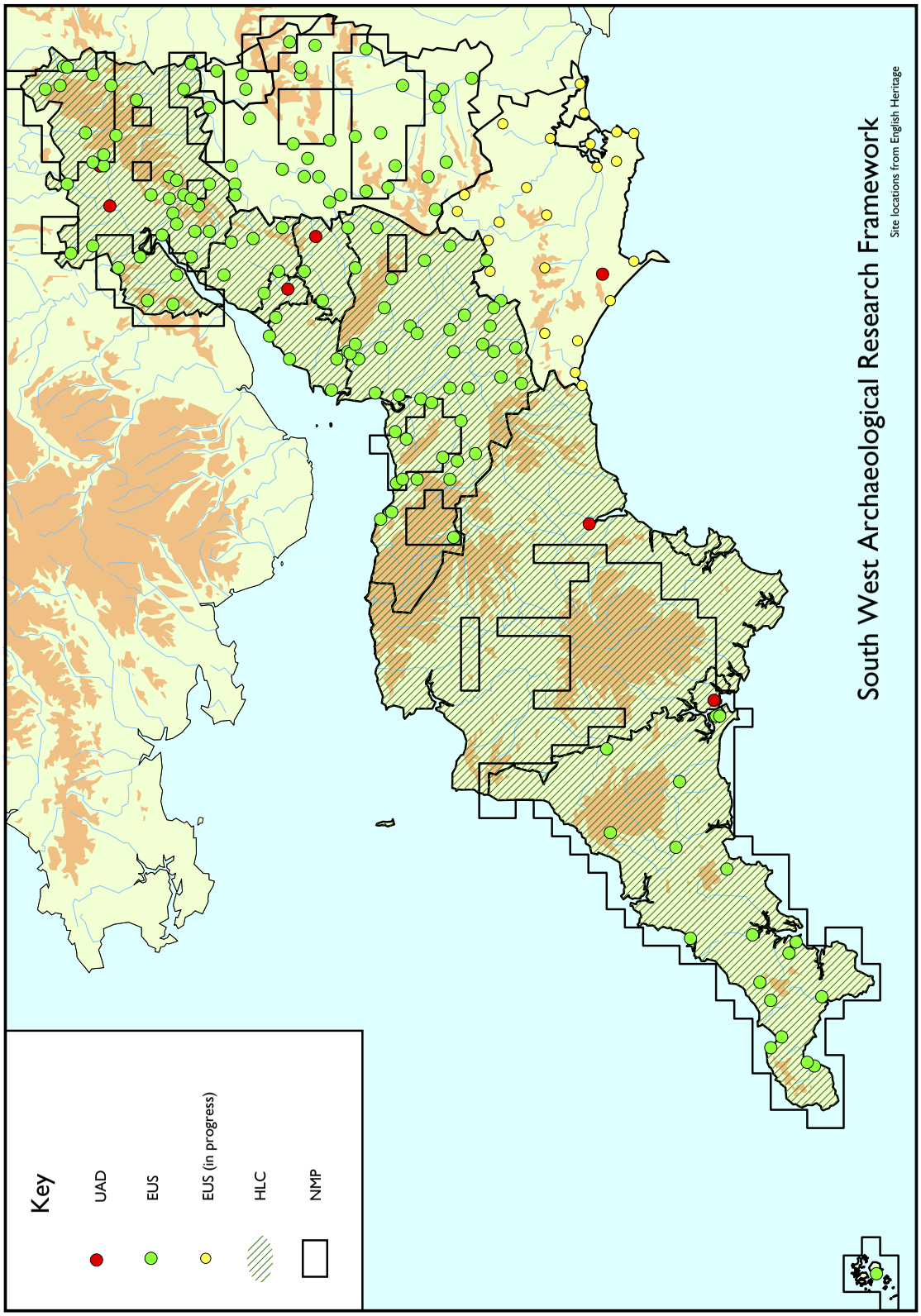

Figure 1.9: *English Heritage national projects in the South West Region.*

Authority	per km^2
Torbay	0.09
Plymouth	0.08
Bristol	0.07
Isles of Scilly	0.04
Poole	0.04
Bournemouth	0.04
Bath and North East Somerset	0.04
North Somerset	0.02
Gloucestershire	0.02
South Gloucestershire	0.01
Dorset	0.01
Somerset	0.01
Wiltshire	0.01
Cornwall	0.01
Swindon	0.01
Devon	0.01

Table 1.7: *Density of entries in the register of Parks and Gardens, by local authority (July 2004).*

Town	UAD status
Cirencester	Paper-based record only
Gloucester	Data collection completed
Bristol	Data collection and assessment completed
Bath	Data collection complete to 1998, assessment in draft, strategy nearly complete, Planning Guidance adopted.
Exeter	Data collection completed
Plymouth	Data collection completed
Dorchester	Data collection almost completed

Table 1.8: *Status of UADs in the South West*

Somerset have been published on the web (http://www.somerset.gov.uk/heritage) as have those of the similar project in Cornwall, targeting 19 towns that are likely to be affected by regeneration projects (http://www.historic-cornwall.org.uk). The others exist only as "grey literature".

Historic Landscape Characterisation HLC projects funded by English Heritage have been undertaken over the northern and western parts of the region (Figure 1.9 on the preceding page). Cornwall was one of the areas used to develop the methodology and because of this, is in a slightly different form to those carried out later. Each HLC project was then modified locally, so that a there is a degree of consistency lacking across the region.

National Mapping Programme The National Mapping Programme (NMP) grew out of Royal Commission on the Historical Monuments of England projects to map large areas of archaeological remains visible on aerial photographs. Following pilot projects the programme started in 1990. Some of the work is carried out by staff in the National Monuments Record whilst other work is carried out by local authorities, such as Cornwall and Gloucestershire. The areas covered in the South West are shown in Figure 1.9 on the facing page and these comprise 35% of the region although work is ongoing in some areas. In addition Wiltshire County Council has had a long established practice of mapping aerial photographic evidence.

1.2.5 Historic Environment Records

The entire region is covered by local authority based Historic Environment Records — some retain the original name of Sites and Monuments Record (or Register in the case of Devon). For the sake of brevity they will usually be referred to as HERs in the following text. Most of the HERs were set up in the 1970s and were based in the county tier of local authorities created in 1974. Subsequent reorganisation has seen this structure broken; some of the Unitary Authorities created in the 1990s have taken over their part of the record whilst others have entered service level agreements with their former county as shown in Table 1.9.

Authority	HER
Gloucestershire	HER
South Gloucester	HER (former Avon)
Bristol	HER (former Avon)
North Somerset	HER (former Avon)
Bath and NE Somerset	HER (former Avon)
Somerset	HER
Wiltshire	HER
Swindon	Wiltshire HER
Dorset	HER
Bournemouth	Dorset HER
Poole	Dorset HER
Devon	HER
Torbay	HER
Plymouth	HER
Cornwall	HER
Isles of Scilly	Joint service with Cornwall HER

Table 1.9: *HER provision in the South West*

Exeter and Gloucester maintain their own HERs based around the Urban Archaeological Database. Dartmoor National Park has recently agreed to maintain its own HER as part of a database hosted by Devon County Council. Exmoor's situation is complicated as it is covered by the Devon and Somerset HERs and also has a database supplied by English Heritage, originally populated with a copy of the National Monuments Record data for the park.

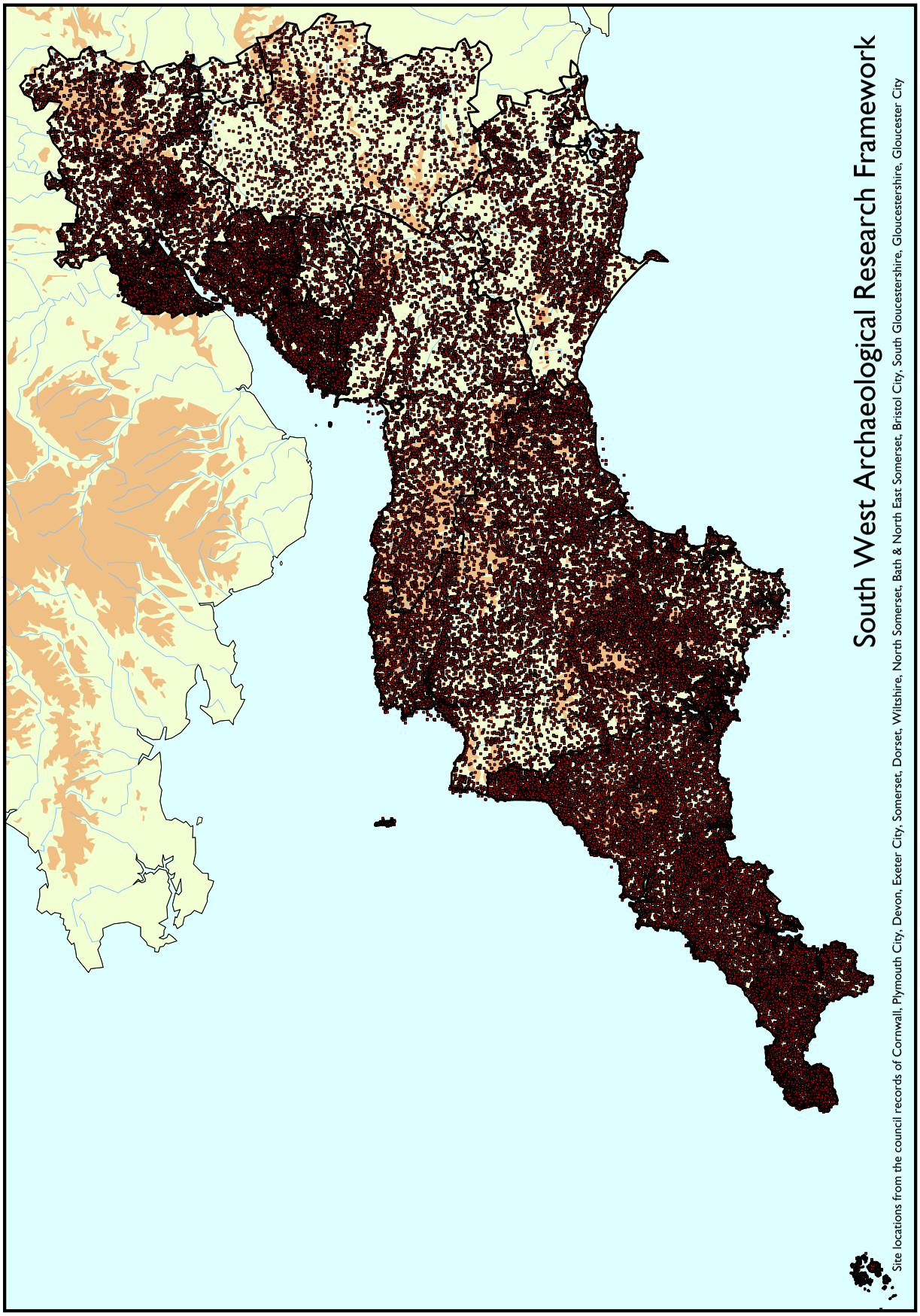

Figure 1.10: *All sites recorded in the Historic Environment Records for the South West (2004).*

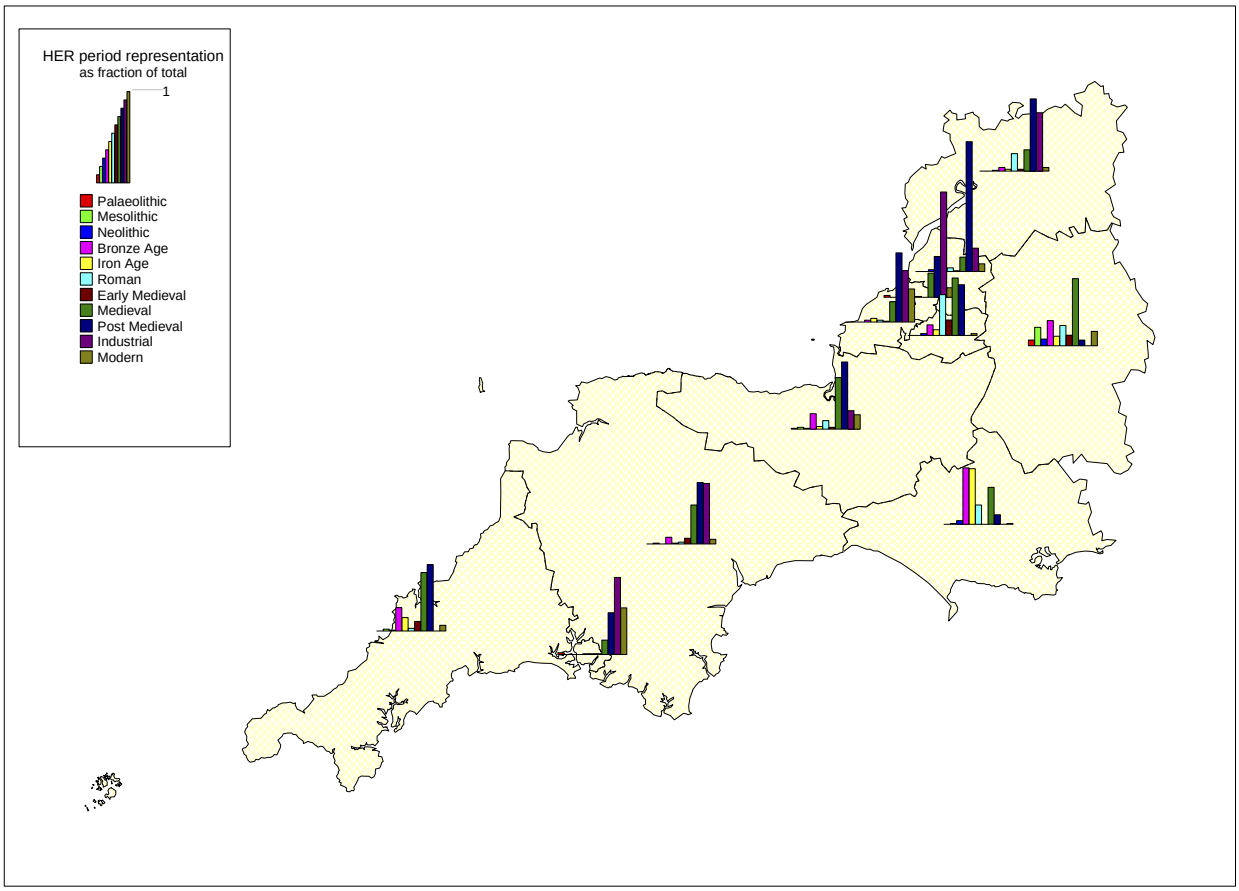

Figure 1.11: *Representation of periods in HERs as a fraction of the total in each HER (2004).*

As part of the SWARF project, data was collected from the HERs, classified into periods and by monument class (as defined in the English Heritage Thesaurus of Monument Types, available at http://www.english-heritage.org.uk/thesaurus/. The data returned comprised over 172,000 records of sites, stray finds and buildings. It should be noted that multi-period sites will appear multiple times and the number of unique locations is just over 110,000. Using this measure, the numbers of sites recorded by each record is shown in Table 1.10 and the density of sites in Table 1.11. The average density is 4.61, shown by a line on the table.

Distribution maps of HER records by period can be found in the summary reports prepared following discussions with local authority archaeologists (Webster 2004a;b;c;d;e;f;g;h;i;j). Not all HERs record the same information (for example the Wiltshire HER does not record systematically sites more recent than 1700) but Figure 1.10 on the preceding page shows the total distribution of sites. Much of the detail is obscured by the large numbers but some patterns do stand out. The high density of sites in North Somerset, for example, is due to an active Defence of Britain Project and the recent survey work in the Forest of Dean is also apparent. The difference in site density across the Devon/Cornwall boundary is a result of the National Mapping Programme of aerial photography in Cornwall.

HER	Records
Devon	56,295
Gloucestershire	35,548
Cornwall	29,588
Somerset	14,196
Dorset	10,285
South Gloucestershire	9037
North Somerset	6404
Wiltshire	4268
Bristol	2336
Plymouth	1933
Bath and North East Somerset	1722
Torbay	1355
Exeter	900
Gloucester	545

Table 1.10: *Numbers of uniquely located monument records in the HERs (2004).*

The HERs also have markedly different profiles when the number of sites per period is examined. This

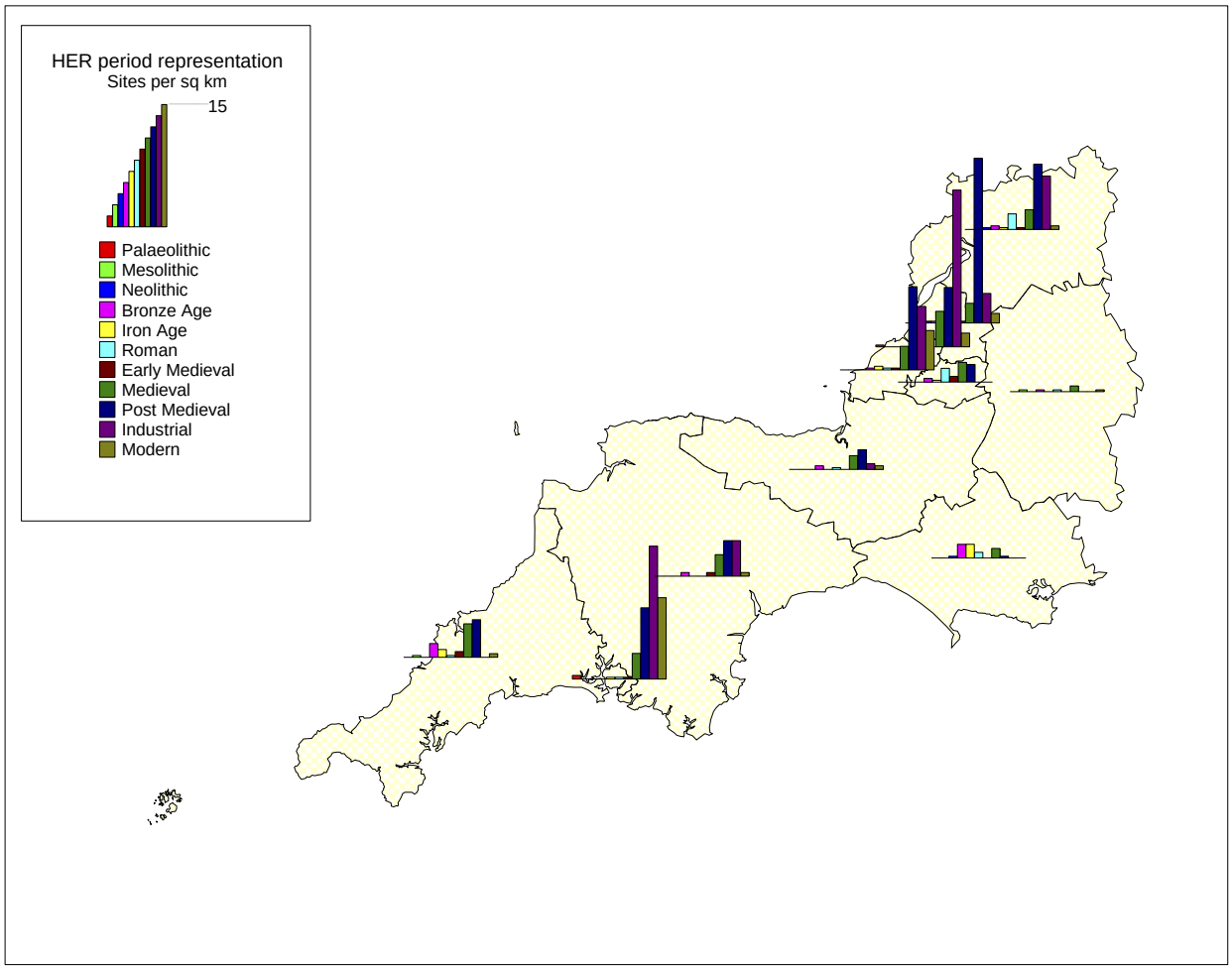

Figure 1.12: *Representation of periods in HERs by area (2004).*

HER	Records per km^2
Plymouth	25.52
Bristol	21.80
Torbay	21.09
South Gloucestershire	18.69
North Somerset	17.75
Gloucestershire	13.36
Devon	8.63
Cornwall	8.42
Bath and North East Somerset	4.91
Somerset	4.13
Dorset	4.02
Wiltshire	1.31

Table 1.11: *Density per km^2 of uniquely located records in the HERs (2004).*

is shown in Figure 1.11 on the preceding page and is a reflection of both the archaeological resource and the recording policy of the HER. Dorset and Wiltshire show a clear bias towards the prehistoric as compared to the more westerly HERs and contain very few monuments more recent than the Medieval period. In contrast, a city record such as Plymouth's or Bristol's contains almost entirely Post-Medieval to Modern monument records. The same data is shown in Figure 1.12 as numbers of sites per square kilometre. Again the difference between urban and rural areas is obvious.

1.2.6 Planning-related Archaeology

The amount of planning-related archaeology can be assessed from the work of the English Heritage funded Archaeological Investigations Project (AIP) at Bournemouth University which has carried out an annual count by visiting each HER and contracting unit in England. Just under 8000 records were returned from the AIP for the South West which show the fast growth in the amount of archaeological work across the region (Figure 1.1 on page 2) during the 1990s and a decrease since the turn of the millennium.

The data can also be presented as a distribution map (Figure 1.13 on the next page) showing the types of activity across the region. This appears to show some

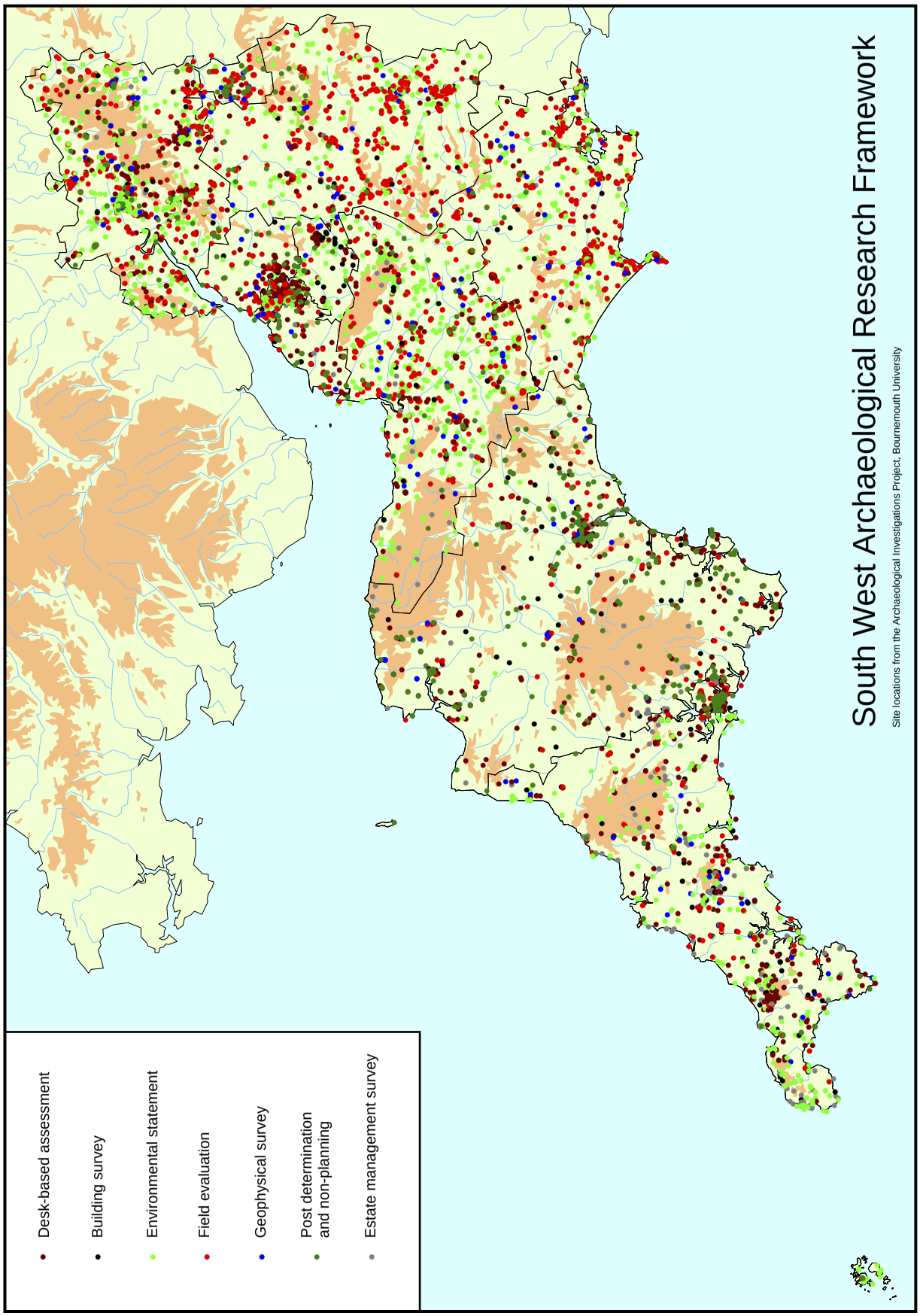

Figure 1.13: *Distribution of archaeological activity across the region. Note that "Environmental Statement" includes what would usually be called monitoring during development (or "watching brief"). Data from the Archaeological Investigations Project, Bournemouth University.*

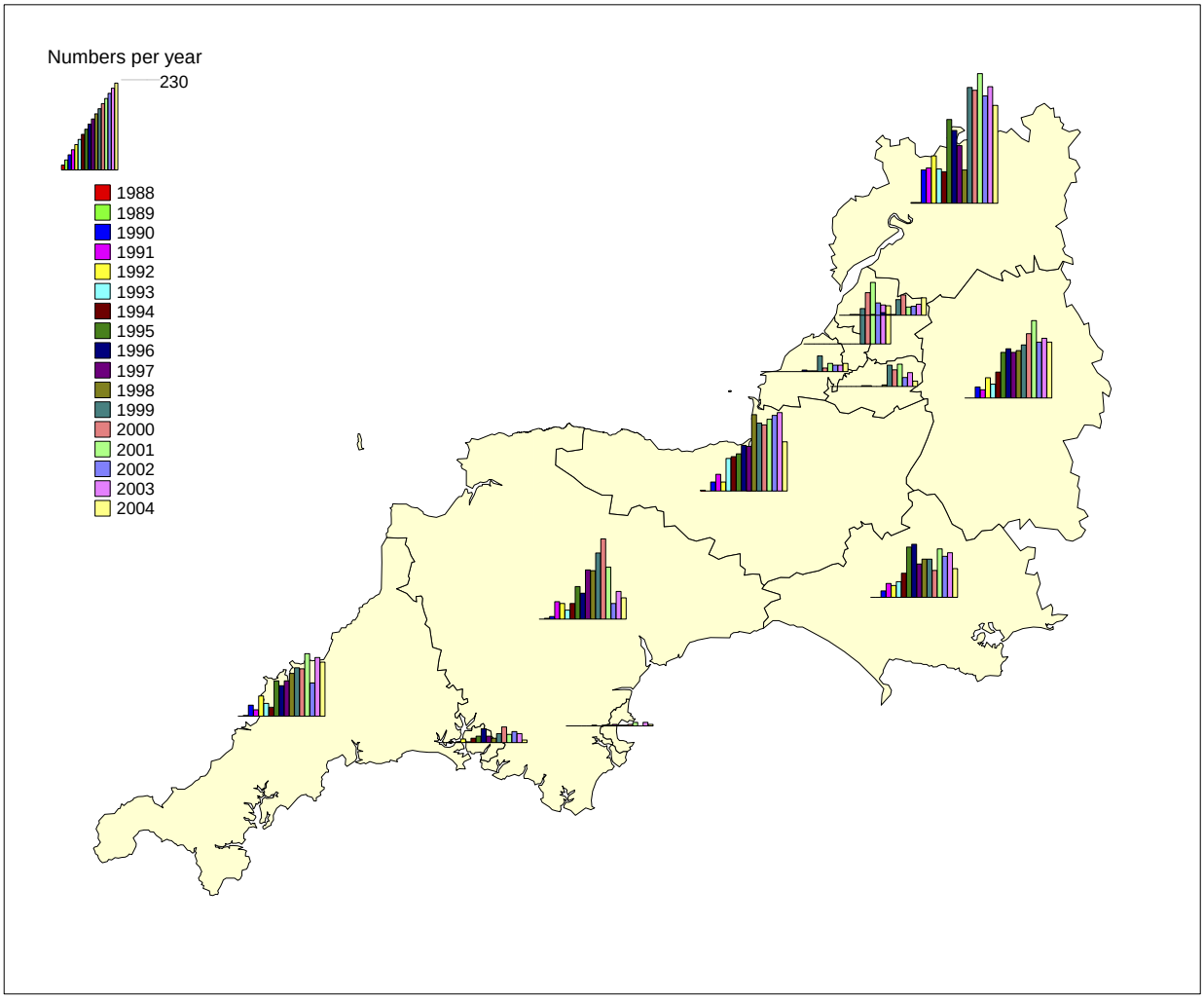

Figure 1.14: *Archaeological activity through time across local authorities. Note that the authorities in the former Avon area, Plymouth and Torbay did not come into being until the mid 1990s. Data from the Archaeological Investigations Project, Bournemouth University.*

sharp differences in curatorial practice, for example the relatively low numbers of "Environmental Statements" (which appears to include "watching briefs" in AIP terminology) in Devon compared to adjacent areas. Whereas "post-determination and non-planning" appears to show the opposite. It is possible that this is due to differences in recording practice (the same AIP recorder tended to go to each HER) but this seems less likely than differences in approach by the local authority archaeologists. Curiously a similar pattern is observable in Swindon which (apart from a short period) is covered by Wiltshire County Council and might be expected to show an identical pattern to the surrounding area.

Otherwise the distribution across local authorities is similar to others presented here; there is more work in the urban authorities because of the concentration of archaeological deposits and the amount of development. The breakdown is shown in Table 1.12 on the facing page and is shown as density in Table 1.13. The average density for the region is 0.33 per km^2 and shown as a dotted line in the figure. The final illustration (Figure 1.14) shows the number of activities through time in the various local authorities which again shows some interesting differences, presumably reflecting development pressures.

1.2.7 Museums

There are 88 archaeological collections in the South West containing over 6.3 million items. For historical reasons, the major collections – those that would almost certainly comprise the dispersed national archaeological collection in the South West – are held in the county, city and town museums founded by philosophical, archaeological and natural history societies in the early to mid-19th century. They comprise the Royal Institution of Cornwall (Truro), Plymouth City Museum, the Museum of Barnstaple and North

	Total	Building Survey	Assess-ment	Environ-mental Statement	Estate Plan	Evaluation	Geo-physical Survey	Other
Gloucestershire	1933	13	262	886	21	638	37	76
Somerset	1246	18	80	683	19	373	29	44
Wiltshire	1105	20	102	384	4	502	35	58
Cornwall	884	73	233	303	122	90	32	31
Devon	839	64	264	22	29	142	23	295
Dorset	832	10	151	282	6	328	24	31
Bristol	462	51	170	116	1	98	8	18
Plymouth	174	16	38		6	63		51
BaNES	162	28	29	56	5	37	3	4
S Gloucestershire	153	14	38	10	2	46	10	33
North Somerset	94	4	30	1	4	29	3	23
Torbay	31	5	11			5		10

Table 1.12: *Numbers of archaeological activities recorded by the Archaeological Investigations Project (to the end of 2004). "Other" includes post-determination and non-planning work.*

	Total	Building Survey	Assess-ment	Environ-mental Statement	Estate Plan	Evaluation	Geo-physical Survey	Other
Bristol	4.32	0.48	1.59	1.08	0.01	0.92	0.07	0.17
Plymouth	2.29	0.21	0.50		0.08	0.83		0.67
Gloucestershire	0.72		0.10	0.33	0.01	0.24	0.01	0.03
Torbay	0.48	0.08	0.17			0.08		0.16
BaNES	0.45	0.08	0.08	0.15	0.01	0.10	0.01	0.01
Somerset	0.36	0.01	0.02	0.20	0.01	0.11	0.01	0.01
Wiltshire	0.32	0.01	0.03	0.11		0.14	0.01	0.02
S Gloucestershire	0.32	0.03	0.08	0.02		0.09	0.02	0.07
Dorset	0.31		0.06	0.11		0.12	0.01	0.01
North Somerset	0.26	0.01	0.08		0.01	0.08	0.01	0.06
Cornwall	0.25	0.02	0.07	0.09	0.03	0.03	0.01	0.01
Devon	0.13	0.01	0.04			0.02		0.05

Table 1.13: *Density of archaeological activities per km^2 recorded by the Archaeological Investigations Project (to the end of 2004).*

Devon, Torquay Museum, Exeter City Museum, Dorset County Museum (Dorchester), Somerset County Museum (Taunton), Bristol City Museum, Gloucester City Museum, Wiltshire Heritage Museum (Devizes) and Salisbury and South Wiltshire Museum. Other significant excavated collections are held at the Corinium Museum (Cirencester), Roman Baths Museum (Bath), University of Bristol Spelaeological Society, Glastonbury Abbey, Wells Cathedral and Wells Museum with smaller collections of local significance held by a scatter of local museums all over the region.

Many, those with dedicated archaeological staff, were designated archaeological repositories under the late-lamented, English Heritage/Museums and Galleries Commission scheme. Only the archaeological collections *per se* of the Roman Baths Museum and the two Wiltshire museums designated as of national significance in the Museums, Libraries and Archives Council (MLA) scheme. All are still collecting and are participating in the Portable Antiquities Recording Scheme.

Taken together, they care for a major archaeological resource which has limitless potential for informing future research:

- cited archives of previous fieldwork and excavation are important points of reference
- unpublished material also has enormous potential both for publication in its own right and for selective publication and reference.

The kinds of outcome can be seen in:

1. informing interpretation and publication of new fieldwork (see Coleman-Smith and Pearson 1988)
2. reinterpreting former fieldwork (see Coles and Minnitt 1995 and Shell 2000 as a good examples,

widely different in scope and scale, of the elucidation derived from reinterpreting old data and the assemblages of artefacts preserved in a museum collection)
3. the publication of corpuses of key reference material (see Annable and Simpson 1964 or Saunders 2001, one of the recent series published by the Salisbury and South Wiltshire Museum)
4. continuing research programmes such as that of the South West Implement Petrology Committee with its contributions to stone axe studies
5. the foundation of a strategy for regional studies (see Mellor 1994)
6. the exhibition and other interpretation of archaeological assemblages and reference material for the immediate benefit of the public

Collections also exist outside museums. Some are in the care of other types of heritage organisation and, as such, in many cases adhere to the minimum standards of care and accessibility of the Accreditation Scheme of the MLA. Others are awaiting possible transfer to museums. The value of museum collections is highly dependent on continuing public funding, general support and use by the archaeological community as well as adherence to the guidance, subscribed to by all archaeological organisations, which is intended to ensure archives are preserved and made accessible to the public for study, education and enjoyment.

To illustrate these points in further detail, the significance of this resource to the Post-Medieval and Modern periods can be summarised as follows:

Bristol City Museum and Art Gallery contains significant Post-Medieval and Modern, particularly industrial and maritime, collections. The three other major archaeological Post-Medieval and numismatic collections of both excavated assemblages and type reference material are held by the Royal Albert Memorial Museum, Exeter, Somerset County Museums Service, Taunton, and the Museum of North Devon, Barnstaple. There are smaller but significant collections in Plymouth and all the main county and a number of smaller museums such as Glastonbury Abbey, Poole Museum and Wells Museum. Whilst there is significant amount of material published (see Section 14.1 on page 214), there is a substantial amount that remains either unprocessed or only partially processed and unpublished. A particular embarrassment of international proportions is the material excavated from pottery production sites in North Devon where so far only one, at Great Torrington, is being addressed.

For the Modern period, material is scattered over the region although there are relatively few systematic collections such as the Pitt-Rivers collection at Salisbury, the Devon life collections at Torquay and the industrial and maritime collections at Bristol. Military history and technology is well represented by a network of museums across the region of which the Tank Museum at Bovington and the Fleet Air Arm Museum are quasi-national institutions. Again, apart from military hardware, relatively few systematic studies have been published. For this period, there is a number of assemblages of artefacts that have been consciously preserved in situ. Most are domestic in character – almost all associated with the great houses of the wealthy in the care of a number of organisations, principally the National Trust. Some are working environments such as Geevor Mine in Cornwall and Sticklepath Foundry in Devon where not only machinery but the paraphernalia of working life have been kept.

Whilst for both periods publication is rare – Peter Brears' study of the Devon life collections at Torquay is an outstanding exception – the development of the internet offers greater scope for publication, both in terms of checklists of excavation and fieldwork archives and in provision of listings of type reference collections, such as the Barton collection of European vernacular pottery (Brears 1998; Dawson 2005).

Acknowledgements Section 1.2.7 on museums was prepared by David Dawson and draws upon information from SWMC (2000) and SWMC (2002).

2

Palaeolithic and Mesolithic

Robert Hosfield, Vanessa Straker and Paula Gardiner with contributions from Anthony Brown, Paul Davies, Ralph Fyfe, Julie Jones and Heather Tinsley

2.1 Introduction

The South West contains a diverse variety of Palaeolithic and Mesolithic archaeology of differing degrees of significance. This reflects the nature of the archaeological material itself, the histories of research in different parts of the region and, with regard to the Palaeolithic period, the differential preservation of Pleistocene landforms and deposits throughout the region. One of the key features of the Palaeolithic archaeology is the presence of a significant cave-based resource in south Devon and northern Somerset, which is unquestionably of national significance (see for example, Campbell and Sampson 1971; Tratman *et al.* 1971; Bishop 1975; Harrison 1977; Straw 1995; 1996; Andrews *et al.* 1999).

In terms of an open-landscape Palaeolithic record, there is an inevitable bias towards those areas with both appropriate deposits and a history of active research and collection. For example, the Pleistocene river deposits of the upper reaches of the now extinct Solent River and its western tributaries (Allen and Gibbard 1993; Bridgland 2001) in Dorset and Wiltshire provide a key (albeit secondary) context for Lower and Middle Palaeolithic archaeology and collection in these areas has been extensive (Wymer 1999; Hosfield 1999). In contrast, the Pleistocene deposits from the west of the region (river valleys such as those of the Exe, the Otter and the Avon) have received relatively little attention (but see Bates 2003; Hosfield *et al.* 2005).

The Mesolithic archaeology of the region is also geographically variable, with a particularly rich record in the Somerset area (reflecting a strong research focus upon both the Mendip caves and Somerset Levels) when compared to the more minor record from the west of the region (Devon and Cornwall).

For the Palaeolithic periods the open-landscape archaeology is dominated by lithic scatters (predominantly of deeply buried artefacts, frequently in fluvial deposits, and particularly true in the Lower and Middle Palaeolithic), although occupation sites such as Hengistbury Head (Barton 1992) and Kent's Cavern (Campbell and Sampson 1971) are also present. For the Mesolithic, there are greater numbers of excavated sites (especially from Somerset), although surface or shallow sub-surface lithic scatters are still common, especially in the west.

Overall, the Palaeolithic and Mesolithic archaeology of this region is generally rather poorly known, reflecting an absence of robust geochronological frameworks, the predominance of research into a handful of cave and open sites over the lithic scatter resource (whether located on the surface or deeply buried) and the absence of any major syntheses. It is hoped that this resource assessment will go some way towards addressing the last of these issues. The report is divided into period-based sections (Lower and Middle Palaeolithic, Upper Palaeolithic and Mesolithic), each of which provides an overview of the archaeology of the period and a summary of the key characteristics of the archaeological resource for the South West region. Preceding these is a short summary of the geochronologies of the Palaeolithic and Mesolithic and a review of the palaeoenvironments of the South West region, as currently known.

2.2 Chronology

The Palaeolithic and Mesolithic fall within the Quaternary Period, the most recent subdivision of the geological record. The Quaternary is divided into the Pleistocene and Holocene epochs, and the Late Upper Palaeolithic to Early Mesolithic transi-

tion at *c.*10,000 BP broadly marks the start of the Holocene. The chronology of the British Palaeolithic and Mesolithic is discussed here in terms of oxygen isotope stages (OIS, also known as marine isotope stages, MIS) for the Lower and Middle Palaeolithic (*c.*700,000–40,000 BP), while the Upper Palaeolithic and Mesolithic periods (*c.*40,000–5500 BP) are discussed with reference to named sub-stages of the Devensian and the Holocene, reflecting the nature of existing geochronological schemes.

The earliest occupation of Britain has typically been considered to date to *c.*500,000 BP, primarily reflecting the accepted chronology from Boxgrove (Roberts and Parfitt 1999). However, recent discoveries from the Cromer Forest-bed formation at Pakefield on the Suffolk coast (Parfitt *et al.* 2005) have indicated that the earliest hominin presence dates back to either *c.*680,000 BP (OIS 17) or *c.*750,000 BP (OIS 19). A date of *c.*700,000 BP is therefore accepted as the beginning of the British Lower Palaeolithic for the purposes of this resource assessment. The beginning of the British Middle Palaeolithic (and end of the Lower Palaeolithic) remains uncertain (reflecting dating difficulties and the varying criteria, including a decline in handaxes and the increasing frequency of Levallois technique, used for defining the start of the Middle Palaeolithic) but is taken here as *c.*250–200,000 BP (after Stringer and Gamble 1993, 148). The key periods can therefore be defined as follows:

Lower Palaeolithic	700,000–250/200,000 BP
Middle Palaeolithic	250/200,000–40,000 BP
Upper Palaeolithic	40,000–10,000 BP
Early Mesolithic	10,000–8500 BP
Later Mesolithic	8500–5500 BP

Table 2.1 on the next page outlines the OIS chronology for the Lower and Middle Palaeolithic periods, while Table 2.2 on page 26 outlines the substage chronology for the Upper Palaeolithic and the Mesolithic. The tables also outline the main episodes of environmental change during these periods, with regard to the broad climatic and vegetational characteristics of the oxygen isotope stages and the substages of the Middle and Late Pleistocene, and the Holocene. The major climatic fluctuations which characterise the Quaternary resulted in a series of warm and cold periods. Global sea levels were lowered during the coldest phases (dominated by glacial and periglacial conditions) when water was "locked up" in terrestrial ice-sheets, whereas the increases in melt-water during the warmer periods (interstadials and interglacials) caused the global sea levels to rise (eustatic sea level rise). These fluctuations continue to be the focus of research, particularly for the Holocene where they provide a time dimension for current predictions of the effects of global warming.

The Middle Pleistocene (*c.*780–125,000 BP) is characterised by a series of glacials (even-numbered OIS) and interglacials (odd-numbered OIS) with conditions generally alternating between wooded environments (associated with full interglacial conditions), open-steppe grasslands (associated with early glacial conditions) and glacial tundra (associated with full glacial conditions). The Late Pleistocene (*c.*125–10,000 BP) is slightly more complicated, reflecting the higher resolution records available for this period, as demonstrated by the recent Stage Three Project (van Andel and Davies 2004). In general the Late Pleistocene can be summarised as follows (after Stringer and Gamble 1993; Barton 1997):

Stage 5e (128–117,000 BP) Full interglacial conditions (oak/elm woodland, hot summers and mild winters).

Stages 5d–5a (117–71,000 BP) Generally cool temperate conditions with oscillations between warm interstadial (5c and 5a with forest habitats) and cool stadial environments (5d and 5b with tundra-type habitats).

Stage 4 (71–59,000 BP) Very cold conditions (although Britain was predominantly ice-free, open tundra habitats were dominant, with short, mild summers and long, cold winters).

Stage 3 (59–24,000 BP) Generally cold and dry conditions, although the period is characterised by sharply oscillating climates (indicated by ice-core records: see below), ranging between milder periods (featuring woodland development, although on a reduced scale compared to OIS-5c and 5a) and short cooling episodes, in which dry, grassland "mammoth-steppe" environments were dominant.

Stage 2 (24-13,000 BP) Full glacial conditions, with extensive ice sheets in northern England, Wales and Scotland, and barren, polar-desert type environments.

The glacial and interglacial cycles of both the Middle and Late Pleistocene resulted in dramatically fluctuating sea levels. For example, at the height of the last Late Pleistocene cold stage (the Devensian) around 21,000–18,000 BP (the Last Glacial Maximum or LGM), during which glacial conditions existed over much of Northern Europe (though not most of southern England), mean sea level was in the order of 130–140m lower than present (Heyworth and Kidson 1982). With specific regard to the South West, however, it is likely that there would always have been a significant barrier to the south, whether a sea barrier as in the present day, or a substantial Channel River system (including the tributaries that

OIS	Years BP	British Quaternary Stages	Climate	Archaeological Period (approximate)
2	24,000–13,000	Devensian	Predominantly Cold	Upper Palaeolithic
3	59,000–24,000			
4	71,000–59,000			Middle Palaeolithic
5a–d	117,000–71,000			
5e	128,000–117,000	Ipswichian	Warm	
6	186,000–128,000	Wolstonian	Cold	
7	245,000–186,000		Warm	
8	303,000–245,000		Cold	Lower Palaeolithic
9	339,000–303,000		Warm	
10	362,000–339,000		Cold	
11	423,000–362,000	Hoxnian	Warm	
12	478,000–423,000	Anglian	Cold	
13	524,000–478,000	Cromerian	Warm	

Table 2.1: *Chronology for the Lower, Middle and Upper Palaeolithic (Middle and Late Pleistocene), after Wymer (1999, table 2), Barton (1997, figs 15, 35–37) and Gamble (1999, fig 4.2).*

would have extended current rivers such as the Exe and the Axe out onto the coastal plain: see Antoine *et al.* 2003 for further details of the palaeogeography of the Channel River). Recent ice-core research (for example Meese *et al.* 1997; Stuiver and Grootes 2000; Johnsen *et al.* 2001) has also indicated that there were considerable short-term climatic fluctuations within the glacial/interglacial cycle of the Late Pleistocene, with dramatic shifts in temperature occurring over relatively short time-spans (centennial and perhaps even decadal). Other ice-core research (for example Petit *et al.* 1999) has also indicated that these short-term fluctuations probably occurred during the earlier Middle Pleistocene as well.

The Late Glacial period (after the Last Glacial Maximum at *c.*18,000 BP and the end of the full glacial conditions associated with OIS 2) is characterised overall by a dramatic warming. The period, however, is divided into several phases of climatic fluctuations prior to the onset of the Holocene. The north-western European tradition is to undertake this division on the basis of characteristic pollen zones (Zones I–III) but in Britain the Late Glacial is often more simply described using named biozones, principally the Windermere interstadial from *c.*13,000 BP to *c.*10,800 BP and the Loch Lomond stadial from *c.*10,800 BP to 10,000 BP, the approximate start of the Holocene. Reconstruction of high resolution climatic fluctuations during the Late Glacial is often based on beetle faunas (rather than plants), reflecting the generaly greater sensitivity of insects to climate change (due to their short generations, dispersal over large distances and colonisation of simple habitats, Robinson 2002). Insect (and other organic) remains are often recovered from organic sediments in cut-off and abandoned river channels (associated with migrating, braided rivers flowing within broad gravel floodplains), which provide suitable preservation conditions (Robinson 2002).

The initial Late Glacial warming at *c.*13,000 BP was very rapid (temperatures peak shortly after *c.*13,000 BP), with mean July temperatures thought to have risen by 9–10°C to a maximum of 17°C (Barton 1999; Atkinson *et al.* 1987). Winter temperatures may have remained low however, reflecting a more continental-style climate than those of the following Holocene. The second part of the Windermere interstadial, between *c.*12,000–10,800 BP, sees a decline in temperatures and often shows an increase in birch and willow woodland with continued open grassland and scrub species such as Juniper. It is at this period that the largest of the open-steppe mammals, the mammoth, disappears from the record; however, other large vertebrates such as elk, red deer, aurochs, horse (although to a lesser extent than previously, Barton 1999) and, possibly, roe deer continued.

The final stage of the Late Glacial period (Zone III, the Loch Lomond stadial, *c.*10,800–10,000 BP) was seasonally very cold with a partial thaw in summer. This zone marks a temporary return to cold conditions, with a glacial re-advance in northern England and Scotland. There was an estimated fall of 5–7°C in mean sea temperatures (Barton 1999). During the stadial, the vegetation was characterised by open tundra species and dwarf shrubs, with an absence of woodland trees. Several writers have also suggested that this stage (also known as the Younger Dryas) was very arid, which favoured the growth of steppe-type grasses, providing favourable grazing conditions for large mammals such as wild horses and reindeer. With regard to animal communities during this period it is perhaps significant that many radiocarbon dates on wild horse bones from the Upper Palaeolithic date to this period (Barton 1999). As with the

Radiocarbon years BP	British Sub-stage	Chronozone	Pollen zone	Archaeological Period
6900–6000	Holocene (Early Temperate)	Atlantic	VIIa	Late Mesolithic
9200–6900	Holocene (Early Temperate)	Boreal	V–VI	Early and Late Mesolithic
10,000–9200	Holocene (Pre-Temperate)	Pre-Boreal	IV	Early Mesolithic
10,800–10,000	Late-Glacial	Loch Lomond stadial	III	Late Upper Palaeolithic
13,000–10,800	Late-Glacial	Windermere interstadial	II	

Table 2.2: *Chronology for the British Late Glacial and Holocene (after Barton 1997, table 7).*

Palaeolithic and the Early Mesolithic in general, the evidence for the exploitation of plant foods during the Late Glacial is largely conjectural. Discussion of this issue is typically based on knowledge of the vegetation rather than on the finding of food remains. Barton (1999) has commented that boreal woodland ecosystems produce less biomass than steppe-grasslands, and the demise of the latter environments is thought to have played a major part in the reduction of the large mammal fauna in the Early Holocene.

The end of the stadial (indicated by temperature increases) occurred very rapidly around *c.*10,000 BP, and conditions continued to improve gradually over the course of the early Holocene: shifting from cool and dry conditions in the Pre-Boreal, through warm and dry conditions in the Boreal, to warm and wet conditions in the Atlantic stage (Barton 1997, 117–8).

Direct dates for the Middle and Late Pleistocene are relatively scarce in the South West, especially for river terrace and open-landscape deposits. This situation has however begun to change recently. Toms *et al.* (2005) produced a series of Optically Stimulated Luminescence (OSL) dates for the river terrace deposits (gravels, sands and organic clays) at Broom on the River Axe, spanning late OIS 9 and OIS 8. Two dates have also been obtained from terrace deposits associated with the River Exe (although these have not yet been published). At Five Fords by the River Culm (a tributary of the River Exe), an OSL sample on a river terrace sand deposit has yielded a date of 39,450±2930 BP (work by Tony Brown, University of Exeter). The geological map sheet associated with the terrace unit is currently being remapped by the British Geological Service (BGS), so the terrace remains undifferentiated at the time of writing. However it is likely to be a degraded remnant of Terrace 3 (Richard Scrivener, pers. comm. to Jenny Bennett, University of Exeter). At Washfield, by the River Exe, OSL dating on a bulk terrace sample has yielded a date of 27,500±240 BP (the work was conducted by Jenny Bennett, University of Exeter, as part of her doctoral research). The site lies on the Exeter map sheet, recently re-mapped in great detail by the BGS, and the terrace has been identified as Terrace 3. Further OSL dating of river deposits in the South West region is currently being undertaken as part of the Palaeolithic Rivers of South-West Britain project run through the Universities of Exeter (Tony Brown and Laura Basell) and Reading (Rob Hosfield). Finally, dates have also been obtained for the late Lower Palaeolithic site at Harnham, near Salisbury, where the application of OSL and Amino Acid dating has yielded dates for a buried tributary valley (of the Avon) of *c.*250,000 BP (Whittaker *et al.* 2004).

Dates for the cave deposits of the region are more widespread however, principally reflecting the presence of dateable materials, such as humanly modified animal bone. There is a radiocarbon date of 40,400±1600 BP from the Hyaena Den, Wookey Hole (OxA-4782), and there are 17 radiocarbon dates from Gough's Cave, ranging from 13,850–12,950 cal BP (OxA-3413) to 12,000–11,450 cal BP (OxA-2795, Jacobi 2000, 51). There is also a wide range of other Late Upper Palaeolithic radiocarbon dates for various cave sites in the South West, including Gough's Old Cave, Soldier's Hole and Sun Hole in the Cheddar region, and Kent's Cavern, Three Holes, and Pixies' Hole in Devon (see Section 2.5 on page 35 for further details). Recent work by Currant (2000) has also suggested non-absolute ages for the Banwell Bone Cave (OIS 4, the early Devensian), Hutton Cavern (late OIS 7), and Bleadon Cavern (OIS 7) on the basis of their faunas. Analysis of the artefact-bearing breccia at Kent's Cavern has suggested an age of OIS-10 or earlier (Proctor *et al.* 2005).

Assemblages have also been dated on the basis of the presence of diagnostic artefacts and comparisons with absolutely dated assemblages in other parts of Britain and the continent: for example, the presence of distinctive Creswellian (Cheddar points) or Final Upper Palaeolithic (penknife points and/or "long blades") assemblage artefacts (Barton 1997).

In general however, there is a clear need for further development of geochronological frameworks in the South West, especially with regard to the more widespread river terrace deposits that have the poten-

tial to yield both Palaeolithic and Mesolithic archaeology, and palaeoenvironmental and sedimentological data relevant to the understanding of palaeo-landscape evolution.

2.3 The Palaeolithic Environment

Scope and Methodology

It is not intended to review in detail all the environmental evidence that covers the Palaeolithic (below) and Mesolithic (on pages 40–48) periods in the region as this is being done as part of the English Heritage reviews of environmental archaeology, with individual specialists reviewing the different lines of evidence, in a period-based approach similar to this Research Framework. Instead, this Resource Assessment draws partly on past and current reviews that are published or available in draft form, to provide a general summary of past environments and environmental change for the region. The major sources are Bell (1984), Robinson (2002) and Scaife (forthcoming). In addition, new information has been added from unpublished specialist reports from recent projects and publications. Compared with later periods, there is less of a distinction between mainly "natural" and "cultural" datasets for the Palaeolithic and Mesolithic (especially the former) and consequently there is also much relevant introductory information in Section 2.2 on page 23 that is not repeated here. For the Palaeolithic, there are other useful references on Quaternary sequences in the region, such as Campbell *et al.* (1998).

Introduction

The general evidence for Palaeolithic environments during the Pleistocene is drawn from biostratigraphic studies relying mainly on analyses of molluscs, ostracods, insects and occasionally pollen (see also Section 2.2 on page 23). Some of the source data and specific evidence for the South West is summarised in more detail in this section.

The geology and geomorphology of the region is extremely varied and, as a result, the survival of sediments suitable for the preservation of biological remains varies considerably throughout the region. Much of the Middle Pleistocene evidence is from reworked chalk or limestone-derived fluvial deposits which favour the survival of molluscs, ostracods and bone, but limit the extent of interpretation possible. The *in situ* evidence from sites such as Harnham, Salisbury (chalk) or Twyford House in Bristol (limestone) is very valuable for understanding local environmental conditions but not the wider area. If pollen survives at all in largely calcareous deposits, differential preservation can limit its usefulness. In contrast, the Late Pleistocene record benefits from pollen data from waterlogged deposits.

Marine palaeogeography

Changes in sea level have resulted in major changes in the extent of the landmass and the character of its drainage. The history of earlier Pleistocene sea level fluctuations is extremely complex and will not be addressed here. As noted in Section 2.2 on page 23, mean sea level has risen some 130–140m since the Last Glacial Maximum (LGM) *c.*18,000 years ago, but understanding the change has to take account of a complex interaction of regional and local factors.

The palaeogeography of the submarine area around much of the South West is not as well understood as for the south and east coasts of England. However, as far as the Late Pleistocene/Early Holocene is concerned, in some areas a substantial portion of the land available to the Late Upper Palaeolithic population that recolonised England after *c.* 12,600 BP was flooded by the sea by *c.* 7000 BP (*c.*5990–5750 cal BC). Marine charts and core data give an idea of the bathymetry around the coast and offshore, though they cannot take account of offshore erosion processes or any isostatic effects. The coastline of South West England provides a rich resource for the study of sea level change, particularly for the Holocene. In the South West, mean sea level has risen 30–40m in the last 10,000 years. The rate of rise was greatest in the first four millennia, the shape of the present coastline being roughly accomplished by *c.*7–6000 BP, with mean sea level in the order of 4–6m lower than at present.

The main group of present-day offshore islands in the region is the Isles of Scilly, 45km west-south-west of Land's End. The sub-surface ace bathymetry between the Isles of Scilly and West Penwith suggests that the archipelago may have been surrounded by the sea as early as *c.*12,000 BP (*c.*13,130–12,700 cal BC). Rocks, such as the Seven Stones and one or two others, that are currently largely submerged, would have remained as islands for some millennia. This hypothesis has to be tested, but a possible Late Glacial or Early Postglacial separation raises interesting questions related to island biogeography. The unusual small mammal fauna goes some way to support early island status. Pernetta and Hanford (1970) and Turk (in Butcher 1978, 99) discussed the apparently relict Postglacial survival of the root vole (*Microtus oeconomus*) and the presence of the Scilly Shrew (*Crocidura suaveolens*), which is only found on the islands.

There are numerous remains of the Early to Mid-Holocene landscape and shoreline, in the form of forest beds and peat or organic saltmarsh deposits around the coast of South West England which are visible at low tide. In some areas, such as in the Isles

of Scilly and Lyme Bay, fully submarine deposits have been reported by divers and are the subject of current research. Further reference is made to examples of intertidal exposures in relation to the Mesolithic environment on pages 41–43.

Pleistocene interglacials

Scaife (forthcoming) comments that there are few pollen data relating to Pleistocene interglacial or cold stages. He cites ongoing studies of palaeo-alluvial sediments from a terrace of the Axe at Broom which is showing evidence of pine woodland with a smaller component of oak, alder, hazel and ash, and some floodplain grassland. These results are similar to those from work on an earlier exposure of the Broom Railway pit sequence (Scourse in Shakesby and Stephens 1984) and while Scaife is content that these represent interglacial conditions (OIS 8/9), little other detail is currently understood (Scaife forthcoming; Toms *et al.* 2005).

Other evidence for interglacial vegetation comes from the heavily-cemented limestone Chadbrick gravels near Somerton. Hunt (1990) managed to extract well-preserved, though sparse, pollen from the sediments that is dominated by deciduous trees and shrubs. The pollen and mollusc evidence from the gravels is interpreted as indicating a meandering river flowing through a mainly wooded landscape. Alder and willow thickets and sedge marsh would have grown close to the river with herbaceous vegetation in open areas such as the tops of gravel bars in the river bed. Species-rich mixed oak woodland is suggested away from the valley floor. Planktonic algae confirm deposition in a fluvial environment. On the basis of reinterpretation of a previously published amino acid ratio, Hunt considers the deposits to compare with the Stanton Harcourt terrace deposits (dated to OIS 7), rather than Ipswichian interglacial age material.

A final example is from Honiton (summarised in Hosfield *et al.* 2005). During the construction of the Honiton bypass in 1965 a "mossy peat" deposit was revealed which included organic material, and bones thought to have been originally embedded in the peat, but possibly remobilised in mud flow and moved a short distance during the last glaciation (Turner 1975). Mammal remains from 17 individuals included *Hippopotamus amphibious* (which earned the site its name of the "Honiton Hippo Site"), *Palaeoloxodon antiquus* (elephant), *Cervus elaphus* (giant red deer) and *Bos primigenius* (ox). Pollen was analysed from samples of peat taken from both inside the animal bones and surrounding them. Sparse tree pollen from a range of species was present, with a high representation of herb pollen. The interpretation of the local environment based on the plant and mammal remains was of a rich marsh flora and grass landscape, occupied by grazing herbivores. It is now commonly attributed to the OIS 5e Ipswichian interglacial (for instance Edwards and Scrivener 1999).

Devensian

The earliest pollen evidence for vegetation in the Devensian is published by Scourse (1985; 1986; 1991) as part of his research investigating the extension of the Irish Sea glacier. Formerly, it was thought that glacial ice did not spread as far as the south of England in the last glacial episode but his research suggests that it clipped the northern edge of the Isles of Scilly. Scourse carried out pollen analyses on organic lenses thought to have accumulated in small lakes or ponds during the build up of solifluxion of granitic head on the Isles of Scilly. These are exposed in section at Carn Morval, Watermill Cove and Bread and Cheese Cove, and the pollen suggested open, largely grassland dominated herbaceous vegetation. Similar arctic tundra conditions were also identified in deposits from Porth Seal on St Martin's. Radiocarbon dates from Watermill Cove suggest that some of the sediments accumulated around $33{,}050^{+960}_{-860}$ BP (Q-2408), whereas at Carn Morval the sediments dated to $24{,}490^{+960}_{-860}$ BP (Q-2356) and $21{,}500^{+890}_{-800}$ BP (Q-2358). At Porth Seal, dates of $34{,}500^{+885}_{-800}$ BP (Q-2410) and $25{,}670^{+560}_{-530}$ BP (Q-2409) were obtained (Scourse 1986).

A further important record for the far south-west of the region comes from current work on Bodmin Moor. Recent pollen analysis by Kelly (2003) at Dozmary Pool has been supported by an OSL date of 23,900±3500 BP. The results of radiocarbon dating on six samples from this sequence are expected in mid-2006, and they are anticipated to be of Last Glacial Maximum age. The only other results from the Devensian are Campbell's pollen analysis of Upper Palaeolithic deposits from Sun Hole and Wookey Hole on Mendip. The former indicates a cold open environment (Campbell 1977). The Sun Hole deposits are thought to extend into Early Postglacial levels, but Bell (1984) comments that the sampling interval used did not allow much detail to be obtained.

Prior to the Last Glacial Maximum, a number of mammals were exploited for food and raw materials (Barton 1999). The fauna included large mammals such as reindeer, horse, mammoth and aurochs.

Late Glacial (Zones I–III, *c.*13,000–11,300 BP)

In the Late Glacial period, small braided channels migrated across broad river floodplains (Robinson 2002) and rganic sediments accumulated in cut-off and abandoned river channels, which provided conditions suitable for the preservation of insect and other organic remains. Research on the lower Exe by Fyfe (2000) and Bennett (2005) has demonstrated channel patterns through the Late Glacial–Holocene transi-

tion. At the same time, freeze-thaw action on slopes created solifluxion debris resulting in extensive accumulation of deposits in many areas, although as noted above for the Isles of Scilly, the effects of solifluxion can also date to earlier in the Devensian. Examples include the fringes of Exmoor, where cemented sandstone head-deposits extend down slopes and on the northern side, into the Bristol Channel. At Brean Down, the exposure known as the sand-cliff, which preserves the extensive Holocene archaeological sequence, has accumulated above a thick cemented limestone breccia (ApSimon *et al.* 1961). Solifluxion deposits could preserve organic material beneath them in areas of impermeable bedrock. In the South West, for the Late Pleistocene/Early Holocene (Late Upper Palaeolithic and Early Mesolithic periods), the most detailed environmental information comes from insects and plant macrofossils, but pollen, which has been studied more often, is of major importance in providing a more general picture.

In Cornwall, insect assemblages typical of arctic/alpine conditions were found at Hawks Tor, Bodmin Moor (Coope in AP Brown 1977, 330). The staphylinid beetle *Olophrum boreale* which has an arctic distribution today was present on Bodmin Moor between 11,300–10,200 cal BC (Q-1016) and 9700–8400 cal BC (Q-1017). AP Brown (1977) reported on the vegetation history from the peats at Hawks Tor. Scaife (forthcoming) reports on this and earlier work by Connolly *et al.* (1950) at Dozmary Pool and Stannon clay pit, which reported on Late Glacial environmental history.

At Hawks Tor, the earliest date (stratigraphically) is 14,500–12,500 cal BC (Q-979). The sequence includes arctic tundra conditions at the end of the Devensian cold stage, the Windermere interstadial (Zone II) and the arctic conditions of the subsequent Loch Lomond stadial, with a reduction in tree cover after the warmer conditions allowing Juniper scrub and *Empetrum* heath to develop. These shrubs returned at the final transition to a Holocene sequence followed by an increase in tree birch (Scaife forthcoming). Thus, all three stages of the Late Glacial are represented, making this a very important sequence.

On Dartmoor, although there is as yet no full Late Glacial vegetation sequence, the Late Glacial/Holocene boundary is present at the base of a number of sites, the best example being at Black Ridge Brook in north Dartmoor (Caseldine and Maguire 1986; Caseldine and Hatton 1996). The open vegetation dominated by low-growing herbs and shrubs such as willow, juniper and crowberry is considered to date to the Loch Lomond stadial, *c.*11,000–10,000 BP, though it has not been radiocarbon dated.

The first evidence for the Late Glacial environment on Exmoor was identified in a recent study by Ralph Fyfe. Organic deposits in a spring mire at Exebridge on Exmoor's southern fringe show the Late Glacial/Holocene transition (Fyfe *et al.* 2003a).

Away from the main upland massifs of the west of the region, there are several further studies of the Late Glacial environment. In Devon, Fyfe *et al.* (2003a) published pollen evidence spanning the Late Glacial/Holocene transition from a palaeochannel at Lower Chitterley in the lower Exe valley, to the north of Exeter, thought to have started to accumulate at *c.*10,600 BP. A more complete section was re-sampled in 2003 and the stratigraphy suggests that the interstadial is also present. Work continues on this and includes some insect analysis as well as pollen. The full Late Glacial sequence is the subject of an undergraduate dissertation (Ralph Fyfe, pers. comm.).

The longest sequence is from the Gordano valley in north Somerset (Gilbertson *et al.* 1990) where the earliest radiocarbon date is 11,350–10,700 cal BC (SRR-3203). The pollen flora is of sub-arctic herbaceous vegetation, most likely related to the end of the Devensian cold stage. The long vegetation sequence charts the silting up of a freshwater lake.

Recent research in Dorset (The Cranborne Chase project, directed by Dr Charles French at Cambridge University) has identified some areas of floodplain peat and palaeochannels in the Allen valley. Pollen, molluscs and other techniques have been used to study landscape change dating from the Late Devensian/Upper Palaeolithic (French *et al.* 2003). Scaife's pollen analyses (in French *et al.* 2003) have identified open herb communities with scattered juniper and possibly birch scrub sometime before 11,360–10,870 cal BC (Beta-168611). This sequence continues in a second profile showing Early Mesolithic expansion of juniper, then birch and subsequent arrival of pine, oak, elm and hazel which is typical of the early woodland succession in central southern England. However, Scaife (forthcoming and in French and Lewis 2005) comments that the herb and scrub woodland percentages remained higher in this part of Dorset than elsewhere in southern England at a similar time. This is the only direct evidence for the Late Devensian prehistoric flora of the Dorset chalklands, so how rare this situation is for the Dorset landscape is not yet known. Further studies remain a high priority.

Although there is good insect evidence from the upper Thames valley, most is from Oxfordshire, outside the scope of this assessment, with the only evidence for Gloucestershire from Claydon Pike, near Lechlade (Robinson 2007). Robinson is of the view that the Thames valley landscape in the Gloucestershire/Oxfordshire border was tundra in the Late Glacial period. It was open, with sparse herb cover with dwarf birch (which can grow to 1m in height) in some areas. Sedges fringed the smaller pools, and the deeper pools supported algae such as Stoneworts (*Chara sp.*). Warming up of the climate, assumed to be

at *c.*10,000 BP, is shown by the replacement of dwarf birch shrubs by a species of tree birch.

Further to the south in the Thames valley in Wiltshire, floodplain peat in gravels at Ashton Keynes has been dated to the Windermere interstadial (Zone II). The radiocarbon date from the lower part of the peat was 11,460–11,160 cal BC (Beta-115384, Lewis *et al.* 2001). The profile includes the transition to the cold conditions of the Zone III Loch Lomond stadial.

Finally, a stratigraphic sequence from Great Rissington in the Windrush valley in the Cotswolds gives further evidence for the Late Glacial landscape in Gloucestershire (Morton 1992; Wilkinson 1993). The general stratigraphic sequence comprised, from the base upwards, fluvial gravels which contained well-preserved large mammal bones including red deer and horse, overlain by organic deposits which in turn were overlain by alluvial silts. The sequence appears to have been laterally variable with tufaceous and other units in places. Some initial analysis (pollen, plant macrofossils, molluscs and sedimentology) and radiocarbon dating was funded by the developer Thames Water. Although limited in scope by funding, this work demonstrated potential to understand landscape change and vegetation development over possibly as much as 12,000 years. A Late Glacial date (10,940–10,440 cal BC, OxA-4150) was obtained on wood from an organic horizon interdigitated with the basal gravels. Open water, reed swamp and fen carr habitats were suggested by the pollen analysis. The authors suggest that the sequence accumulated between *c.*11,700 and 11,000 BP, in the Windermere interstadial and the early part of the subsequent Younger Dryas (Loch Lomond stadial, Branch and Lowe in Wilkinson 1993). The radiocarbon date was not from precisely the same stratigraphy as that on which pollen analysis was carried out, so the dates suggested are based on the pollen spectra and their similarity with other dated profiles of the period. This is a unique pollen record for the Cotswolds. The most detailed work was done on molluscs which demonstrated that a great variety of microenvironments existed in the sediments overlying the basal gravels and that a younger unit (5, organic silt to fibrous peat) was heterogeneous with different environments existing locally during its formation.

In areas of the region where pollen analysis is not possible due to poor preservation land snails from features such as periglacial involutions and treethrow pits have given some insight into environmental conditions in the Late Devensian and Early Postglacial period. Periglacial involutions dating to the Late Devensian under South Street long barrow contained a typical Late Glacial restricted assemblage largely comprising *Pupilla*, *Abida* and *Helicella* (Ashbee *et al.* 1979). A Late Glacial marl at Cherhill, also in Wiltshire, similarly contained a restricted assemblage indicative of cold and open conditions (Evans and Smith 1983). The nature of the Late Glacial to Early Postglacial landscape development of the Wiltshire chalklands around Avebury has been demonstrated by excavation of the floodplain deposits of the Upper Kennet valley (Evans *et al.* 1993); Late Glacial marls and gravels were overlain by a Mesolithic to Neolithic soil.

To summarise, the South West preserves evidence for all stages of the Late Glacial environmental changes, however, it is thinly spread throughout the region and the resolution of the dating of the events is poor. The dated sequences are those summarised above from Cornwall (Hawks Tor), North Somerset (Gordano valley), Gloucestershire (Great Rissington), Dorset (upper Allen valley near Wimborne St Giles) and Ashton Keynes (Wiltshire). Most of the dates were obtained some years ago and greater resolution could be obtained by current methods. However there is potential to better understand the nature of this important period in landscape change across the region, a time when human recolonisation was taking place as climate ameliorated. Insect evidence demonstrates that there was very rapid climate warming around 10,000 BP (*c.*9660–9380 cal BC; pollen zone IV, pre Boreal) with a change from arctic conditions to mean summer temperatures similar to those of today in possibly as little as 50 years. This marks the onset of the Holocene. However, as with Zone III, the final stage of the Late Glacial period, the insect evidence for this rapid change is largely from the Oxfordshire part of the upper Thames valley gravels and not from the South West.

2.4 Lower and Middle Palaeolithic Archaeology (*c.*700,000–40,000 BP)

2.4.1 Summary

The Lower and Middle Palaeolithic archaeological record for the South West is, as is the case for the rest of the country, dominated by lithic findspots rather than sites, of which the majority are associated with fluvial deposits, typically river gravels. The record is richest in the east of the region, where there is a relatively dense concentration of findspots associated with the terrace landforms and deposits of the now-extinct Solent River and its upper tributaries: the Frome and Piddle, the Wiltshire/Hampshire Avon and the Stour (Wessex Archaeology 1993; Wymer 1999, fig 1). Unlike the Pleistocene Thames (for example, Bridgland 1994) there has been relatively little focus on the geochronology of the Solent River and its tributaries, although this situation is beginning to change (see Allen and Gibbard 1993; Bridgland 1996; 2001; Westaway *et al.* in press).

In the west of the region the Lower and Middle Palaeolithic resource decreases in the number, concentration and richness of findspots (many are single artefact finds), although there remain notable clusters in the Bristol Avon valley (Roe 1974; Bates 2003; Bates and Wenban-Smith 2005) and the Axe valley (Reid Moir 1936; Shakesby and Stephens 1984; Green 1988; Marshall 2001; Hosfield and Chambers 2002; 2004). The first two phases of the Palaeolithic Rivers of South-West Britain project (Hosfield *et al.* 2005) have also indicated that the resource to the west of the Axe valley may also be richer than has previously been claimed, although it is still apparent that the resource generally falls off along an east–west transect across the region.

The South West is of course distinctive for its Lower and Middle Palaeolithic-age caves, including Kent's Cavern (Campbell and Sampson 1971; Straw 1995; 1996), Windmill Cave, Brixham, the Hyaena Den at Wookey Hole (Tratman *et al.* 1971), Uphill Cave (Harrison 1977) and Westbury-sub-Mendip (Bishop 1975). As well as yielding lithic evidence for Palaeolithic occupation, many of these sites have also produced rich faunal assemblages, which have recently been re-examined and re-classified with regard to their potential as chronological indicators (for example by Currant 2000).

The chronology of the Lower and Middle Palaeolithic archaeology of the region is limited, because of a number of inter-connected factors.

- The majority of the lithic record for the Lower Palaeolithic, and some of the lithic record for the Middle Palaeolithic, is undiagnostic in terms of chronological affiliation (for example, handaxes in the UK span the period from the pre-Anglian Cromerian Complex (pre-500,000 BP to *c.*40,0000 BP).
- The number of surface scatters and individual finds in the region, which cannot be associated with a specific, dateable deposit.
- The general lack of absolute geochronologies associated with fluvial terrace deposits and other, dateable, Pleistocene sediments (see also Section 2.2 on page 23).

Nonetheless, there is some chronological evidence, principally relating to the region's cave deposits (based both on sediment dating and classification of faunal assemblages) but also to diagnostic lithic material such as the *bout coupé* handaxes that are associated with the Middle Palaeolithic period (Wymer 1999; White and Jacobi 2002).

Direct evidence for on-site hominin behaviour is very limited (with the principal exception of the Harnham site near Salisbury (Whittaker *et al.* 2004), reflecting the paucity of site-based evidence in the archaeological record. Nonetheless, there is off-site evidence for landscape use with regard to general occupation patterns of specific river valleys, upland/lowland contrasts, and the relationships between cave sites and open-landscape lithic scatters and findspots.

2.4.2 The South West Resource

The two richest areas of Lower and Middle Palaeolithic archaeology in the region are the extreme east of the region (where there is a rich open landscape archaeology associated with the Solent River system, see for example, Hosfield 1999; Wymer 1999; Wenban-Smith and Hosfield 2001) and the north of the region, where there is a rich archaeology associated both with the Somerset caves area (including both cave-based and open-landscape archaeology, Jacobi 2000; Norman 2000) and also the deposits of the Bristol Avon (Bates and Wenban-Smith 2005). To the west and south-west of these areas the archaeological record becomes more modest, although there remain occasional hotspots such as the Axe valley gravels (Green 1988) and the south Devon caves (Wymer 1999).

The region includes the upper reaches of the Solent River (its lower reaches flow through Hampshire), and its major western tributaries: Stour, Wiltshire/Hampshire Avon, Frome and Piddle (Allen and Gibbard 1993; Bridgland 1996; 2001). The archaeology here is characterised by a mixture of single artefact and small findspots, and a number of larger findspots, yielding hundreds of artefacts (for example, the findspots at Corfe Mullen in the Stour valley and Milford Hill in the Avon valley, Wymer 1999).

The Lower and Middle Palaeolithic archaeology of Wiltshire is dominated by open-landscape findspots associated with the Wiltshire Avon and its tributaries. The upper reaches of the Avon valley however are characterised by a general paucity of findspots associated with the gravels, with only sparse discoveries of handaxes from these terrace deposits, although there are also a small number of surface sites (on the chalk or clay-with-flints) fringing the valley. This pattern also characterises the tributary valleys of the Nadder, the Wylye and the Winterbourne, all of which are confluent with the Avon at Salisbury (Wymer 1999, 112). One factor behind this apparent paucity may be the nature of these streams, flowing in relatively steep-sided and narrow chalk valleys and whose long histories of vertical erosion with little or no lateral floodplain expansion would have resulted in little or no long-term preservation of older gravel deposits and their archaeology.

Whatever the explanation however, the paucity of archaeology above Salisbury is in marked contrast with

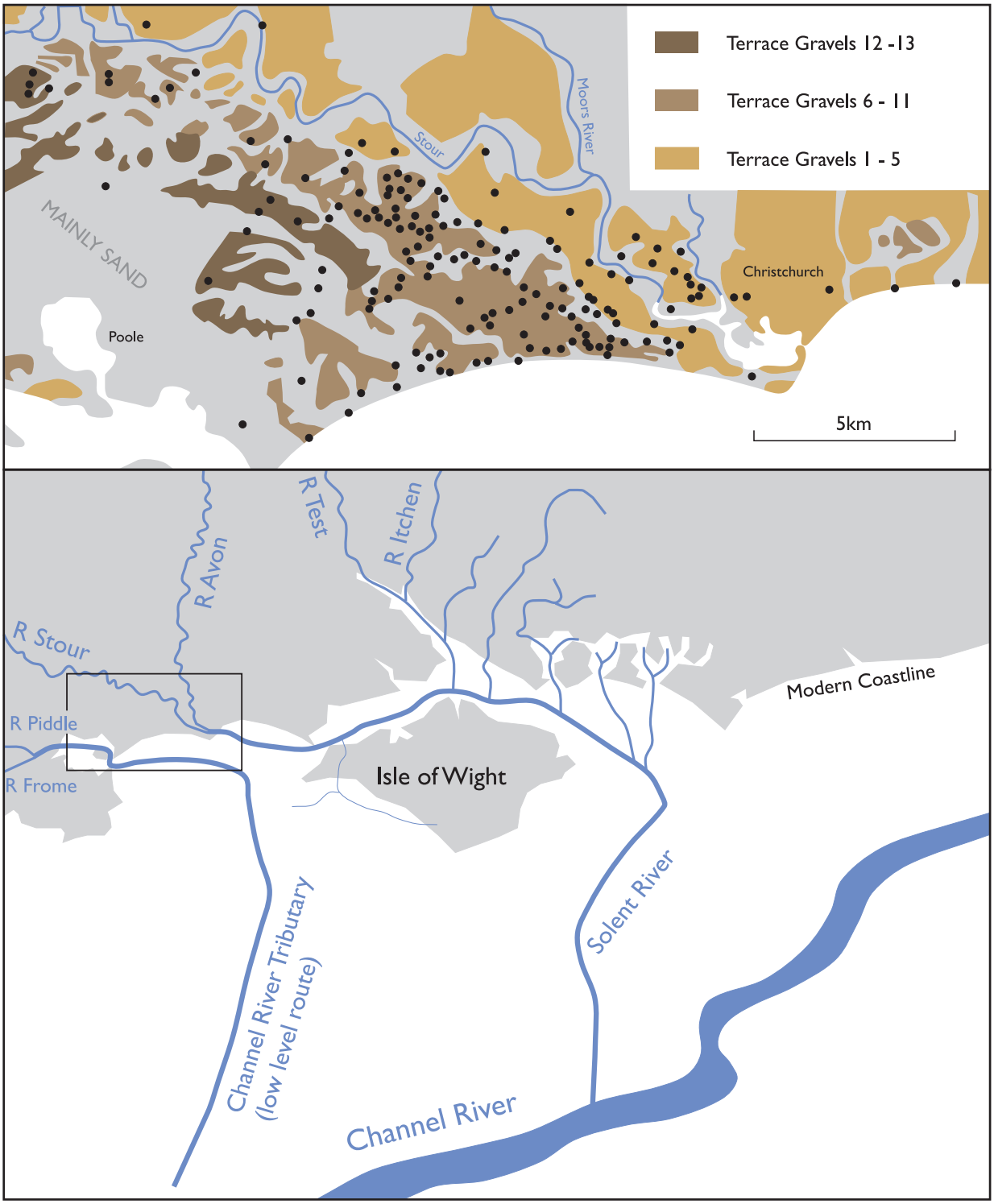

Figure 2.1: *Top: Lower and Middle Palaeolithic findspots associated with the terrace deposits of the Avon, Stour and Solent Rivers, in the Bournemouth region. Bottom: reconstruction of the Solent River and its tributaries, representing an "eastern" and "western" Solent River. After (Bridgland 1996, fig 3.8) and (Wymer 1999, map 23).*

the concentrations of findspots and artefacts within the city. The two key zones are Bemerton (between the Avon and the Nadder) and Milford Hill (between the Avon and the Winterbourne). In both areas the artefacts (*c.*500 from Milford Hill) were found in gravels *c.*20m above the current floodplain, and recent investigations (Harding and Bridgland 1998) indicated that the Milford Hill gravels were fluviatile and represent a former course of the Avon, although there was also a significant element of chalky, soliflucted material derived from the now-eroded valley sides (Wymer 1999, 112–113). The age of the gravels is still uncertain, and although Wymer (1999, 113) links them with the terrace 7 site at Wood Green, Hampshire, this terrace can also only be attributed with confidence to the Middle Pleistocene. To the south of Salisbury, the recent development of the Harnham relief road exposed buried river-valley deposits (up to 750m^2 of buried land surface), which have yielded animal bones and re-fitting lithic artefacts (Whittaker *et al.* 2004). Molluscan, mammalian and ostracod evidence all suggest an open, wet periglacial landscape, dating to *c.*250,000 BP. The artefacts include 44 handaxes and thousands of waste flakes and microscopic chips; the presence of the latter, along with re-fitting sets indicates the presence of undisturbed material at the site.

Wymer (1999, 113) has interpreted the Salisbury findspots as evidence for a focus of hominin activity, with groups attracted to the confluence of four rivers, and the facility of movement in different directions that it provided with respect to the river valleys and the chalk downland. There seems little cause to doubt this interpretation, although examination of some of the artefacts from Milford Hill (Hosfield 1999) suggests that they have been fluvially transported downstream and that valley locations upstream of Salisbury may also have been a target for hominin activity. Below Salisbury the vast majority of the Avon valley lies in Hampshire and is therefore beyond the scope of this resource assessment (the majority of the few findspots associated with it are also found on the eastern, Hampshire, side of the valley).

To the south of Salisbury on the modern south coast there is a series of relatively rich findspots (Figure 2.1 on the facing page), all associated with the fluvial deposits of the Stour (such as the Railway Ballast Pit at Corfe Mullen, producing nearly 200 handaxes) and the Solent River. In the Bournemouth region, where the gravels of the two river meet, there are rich findspots, yielding at least 50 handaxes, and occasional Levallois flakes in some cases, at Moordown, Kings Park, Queens Park and Winton, amongst other locations. All of this material is suggested by Wymer (1999, 106–11) to date between OIS 11 (i.e. post-Anglian) and OIS 8. The majority of the Bournemouth finds were casual discoveries, related to building developments and drainage work, although some of the larger findspots were related to aggregates extraction activity. The age of this material, and that of the Bournemouth region's terraces in general, remain uncertain, although continued applications of OSL dating to the Solent terrace deposits (Briant *et al.* in press) should help to resolve the problem. In the interim, detailed models have been suggested by Allen and Gibbard (1993), Bridgland (1996; 2001) and Westaway *et al.* (in press), although for the purposes of this assessment the simple division proposed by the British Geological Survey (Bristow *et al.* 1991) for the Bournemouth terraces is adopted.

Terraces 11–14: Older Terrace Gravels to the south and east of the Proto-Solent, higher than those which can be related to the present day drainage system.

Terraces 9–10: Terrace Gravels dating to the time of the establishment of the Rivers Avon and Stour.

Terraces 1–8: Terrace Gravels related to the present day River Avon.

At the estuary of the combined Avon and Stour (in the extreme south-east of the South West region), there are also Levallois flakes, cores and *bout coupé* handaxes associated with low-level terraces. The terrace sequence and age is controversial, but the material alone seems to be a clear indicator of a Middle Palaeolithic occupation (Wymer 1999, 106–7, 110). To the west of Bournemouth, the terrace deposits of the Frome and the Piddle have been commercially exposed and extracted, revealing a relatively rich handaxe assemblage at Moreton, and suggesting an occupation in the upper reaches of the Solent (unfortunately, the terrace deposits in the upstream reaches of the Frome and Piddle are poorly preserved and the age of all of these terraces is again uncertain, Wymer 1999, 107–8, 110).

The major concentration of artefacts in the Bristol area is at Shirehampton and Abbots Leigh, at the northern end of Clifton Gorge (Wymer 1999; Bates and Wenban-Smith 2005, fig 4). The artefacts have been recovered from terrace 2 of the Bristol Avon, on head gravels which overlie river terrace gravels. Although the Shirehampton findspots have only yielded small numbers of handaxes, this is likely to be due to the nature of the individual exposures (drainage ditches, building sites etc.) rather than the overall richness (or not) of the buried deposits (this is a common problem when evaluating the richness of the Lower and Middle Palaeolithic record, since archaeology from river terrace deposits is too often recovered via the aggregates industry and development projects rather than through controlled collection and/or excavation). This is confirmed by the

methodical collecting at Abbots Pill and Ham Green, which has produced a minimum of 230 handaxes, 46 cores, 340 flakes, 3 Levallois cores and a Levallois flake. The age of the material is uncertain, although Wymer (1999, 185–6) suggests that is likely to date somewhere between OIS 11 and OIS 8. Small numbers of handaxes have also been recovered from head deposits at the St Anne's estate on the east side of the city, while there is a small number of handaxes from the lower Terrace 1 at Portbury to the south of the Avon, and a small number of scattered surface finds in the Clevedon area along the south side of the Bristol Channel (Wymer 1999, 186).

In Gloucestershire, the record is a very modest one, perhaps reflecting a paucity of research focus in this area, rather than a genuine absence of archaeology in the terraces of the Severn. It would certainly be interesting to know whether the small numbers of findspots and artefacts associated with the terraces of the Severn genuinely reflect the full extents of pre-Upper Palaeolithic occupation in the region. These include: two handaxes from Lillies Field pit, 11 flakes from the Forty Acre Field pit and a handaxe from Wellspring Road (all of which are associated with the gravels of the No. 3 (Main) terrace), and finds from the Upper Thames between Lechlade and Latton (Saville 1984c). The small number of finds from the Cotswolds (Saville 1984c;b; Hart and McSloy 2004, fig 3) and the Severn Estuary (Green 1989, 16) are also potentially significant in this respect.

To the south of Bristol is the key area of the Somerset caves (Figure 2.2 on page 38). These sites have yielded both lithics and rich faunal records, for example the Mousterian artefacts (including *bout coupé handaxes*) and distinctive Devensian faunas from Rhinoceros Hole and the Hyaena Den at Wookey Hole (Wymer 1999, 91; Jacobi 2000, 45–46), and also (to the west of this area) the Devensian Stage fauna and Late Middle Palaeolithic artefacts from Uphill Quarry. Also of critical importance to British Quaternary Studies is the site of Westbury-sub-Mendip, with its distinctive Cromerian fauna, found in association with a sparse assemblage of artefacts (Andrews *et al.* 1999).

Other parts of Somerset have also yielded a rich Lower Palaeolithic archaeology, with a series of important surface findspots identified in the Vale of Taunton at Kibbear, Norton Fitzwarren hillfort, and Cotlake Hill (Norman 2000). Nineteen greensand chert handaxes (from a total of *c.*100 artefacts) have been recovered from Norton Fitzwarren, and may be associated with the remnant of terrace 2 gravel which caps the hilltop and is thought to be of later Middle Pleistocene age (Norman 2000, 55). Cotlake Hill has yielded several hundred Lower Palaeolithic artefacts made in greensand chert, including at least 100 whole and broken handaxes (Norman 2000, 56–7). The artefacts were all recovered from head deposits, and weathering and frost damage suggests that the artefacts have been exposed at or near the surface for a considerable period. There is little evidence of fluvial transport, and while battering from downslope movement is evident, Norman (2000, 57) suggests that at least some of the assemblage may represent activity in the immediate area. Small numbers of artefacts have also been recovered from the alluvial deposits in the Tone valley at Bradford-on-Tone (Wymer 1999, 187). The only other major findspot of significance in Somerset is at Watchet, where the Doniford Gravels have yielded *c.*200 artefacts (including one Levallois flake and at least 24 handaxes and 29 cores), recovered from the beach and foreshore below the cliff exposures of the gravels (Wymer 1999, 186–7). Single handaxes have also been recovered inshore at Watchet and Williton, also from the Doniford Gravels.

The Lower and Middle Palaeolithic archaeology of Devon is perhaps best known because of the cave sites of Kent's Cavern, Torquay and Windmill Cave, Brixham (Figure 2.2 on page 38). Kent's Cavern has produced evidence of both Lower and Middle Palaeolithic occupation. Although the complex stratigraphy and the nature of the records deriving from William Pengelly's 19th-century excavations make interpretation difficult, it is likely that the handaxes recovered from the cave (a minimum of 14) originate from a breccia deposit in the lower part of the sequence which has also yielded a Cromerian-stage fauna (Wymer 1999, 190). The archaeology would therefore be *c.*500,000 years old, and represent part of the pre-Anglian-glaciation Palaeolithic occupation of Britain. This is also broadly supported by recent redating work, where re-examination of the sequence suggested correlation of the artefact-bearing breccia with OIS 10 (*c.*362–339,000 BP) or earlier (Proctor *et al.* 2005). In a cave-earth overlying the breccia, Mousterian (Middle Palaeolithic) artefacts have been found. Although Campbell and Sampson (1971) reduced the number of artefacts (to 45) that could be confidently assigned to the cave-earth, these artefacts include three cordiform and two *bout coupé* handaxes, strongly suggesting a Mousterian/Middle Palaeolithic age (Wymer 1999, 191). A handaxe with parallels to the Lower Palaeolithic examples at Kent's Cavern has also been recovered from Windmill Cave at Brixham.

A small number of Levallois artefacts have been recovered from Cow Cave, Chudleigh. This material has been suggested to be of early Middle Palaeolithic age, although there are also claims of Upper Palaeolithic material from the site (Section 2.5 on the next page), and a handaxe tip of probable Lower Palaeolithic age (Roger Jacobi pers. comm.). A wide range of faunal remains have also been recovered, but unfortunately none of the remains appear to have come from a known stratigraphical context.

In comparison with the county's cave archaeology, the open-landscape findspots in Devon generally reflect a relatively minor resource. Of these, the majority are associated with the Exe and Otter rivers, reflecting the preservation of the Pleistocene-age terrace deposits of these rivers. Little is known of the age of these deposits, although recent work by Jenny Bennett (Exeter University) has produced Devensian ages for terrace deposits of the River Culm and the River Exe (see also page 26). The artefacts are predominantly single artefact surface finds, either associated with terrace gravels (for example at Wigginton, and Tidwell Mount, Budleigh Salterton in the Otter valley, and at Tiverton in the Exe valley) or with pre-Quaternary bedrock (such as the handaxe finds on Palaeozoic rocks at Halberton, Newton Poppleford and Harpford, Woodbury). Artefacts recovered from within the gravels are rarer, with the handaxe at Magdalen Street, Exeter one of the few examples. To the west of the Exe, river gravels are relatively poorly preserved (due to the steep river gradients and the tendency of rivers such as the Teign and the Dart to cut narrow, gorge-like valleys) and artefacts are correspondingly sparse. Where they do occur it is most usually as derived handaxes, either at the base of coombes (as at Thorverton) or within modern floodplain alluvium (for example at Kingsteignton, Haccombe with Combe and Teignmouth in the Teign valley, Wymer 1999, 187).

The one exception to the above rule is the rich Lower Palaeolithic archaeology found in the east of Devon, on the River Axe and the border with Dorset. The key findspots here are located at Broom (Pratt's Old and New Pits in Dorset, and the Railway Ballast Pit in Devon). These pits yielded *c.*1800 artefacts, the majority of them handaxes. It has been suggested that there is a land surface at Broom and that at least some of the artefacts are in primary context (Wymer 1999, 183), although analysis of the artefacts by Hosfield and Chambers (2004; Chambers 2004) has led them to suggest that the assemblage was transported by the river, although perhaps only over relatively short distances. Recent OSL dating (Toms *et al.* 2005) suggests an age of *c.*300–250,000 BP for the Broom gravels, while pollen analysis by Rob Scaife (from the organic clays that are sandwiched by gravels at Broom) suggested a boreal, floodplain environment with stands of pine woodland (Hosfield and Chambers 2004, 44). There are other findspots in the Axe valley (such as at Kilmington and Chard Junction), although these have only yielded handfuls of artefacts.

In general, the Lower and Middle Palaeolithic archaeological evidence further west is characterised by a background scatter of single artefact and small (fewer than ten artefacts) findspots. These low-level background scatters are dominant in the extreme west of the region, where there is little other evidence for Lower and/or Middle Palaeolithic occupation. In Cornwall for example, Wymer (1999, 187–88) documents 11 findspots, dominated by single-artefact finds of handaxes and handaxe fragments, with one Levallois core. The majority of the artefacts are highly worn and stained, enabling similarly stained/worn (and non-diagnostic) flakes and a bifacial fragment from St Keverne to be identified as Palaeolithic. A key contribution to the Palaeolithic archaeology of Cornwall has been made by the Lizard Research Project (G Smith 1987) which has identified a number of finds in the St Keverne and Landewednack areas. With the exception of the Levallois core (probably Middle Palaeolithic in age), the material could be of any age within the Lower and Middle Palaeolithic periods.

Overall, the Lower and Middle Palaeolithic archaeological record of the South West is a diverse one, varying between rich deposits and findspot concentrations in some areas, to very poorly represented zones, particularly in the far west. There is however considerable scope for improved understanding of the record and the resource, including the integration of cave and open landscape archaeology, landscape-orientated approaches to the relative use and occupation of the region's lowland and upland areas, the development of robust geochronological frameworks (especially for river terrace sequences and deposits), and explicit evaluations of the "an absence of evidence or a genuine evidence of absence" issue.

2.5 Upper Palaeolithic Archaeology (*c.*40–10,000 BP)

2.5.1 Summary

The Upper Palaeolithic archaeology of Britain can be effectively divided into an Early Upper Palaeolithic phase (EUP, prior to the Last Glacial Maximum at *c.*18,000 BP) and a Late Upper Palaeolithic phase (LUP, post-Last Glacial Maximum), and this approach is adopted here. While there is clear artefact and fossil evidence for an Early Upper Palaeolithic occupation of the South West (i.e. prior to the Last Glacial Maximum), as with the remainder of the country detailed information on the dating and sequences of the three artefact based sub-divisions that have been identified to date is generally lacking.

The first of the technologies is characterised by bifacial and unifacial leaf points, which were probably hafted as spear tips: some of the British examples have impact fractures. Leaf points have been found at both cave and open-air sites. All those from the South West are from caves – for example Soldier's Hole, Badger Hole, Kent's Cavern, Windmill Cave and Bench Tunnel Cavern. The last of these sites is important for the reported discovery of a unifacial leaf point beneath a

mandible of spotted hyaena. The mandible has been radiocarbon dated to 36,800±450 BP (OxA-13512). This determination agrees reasonably well with a date on wood charcoal from the cave of Nietoperzowa at Jerzmanowice (Poland), the type-site for this technology in northern Europe. It is not known whether leaf points were produced by the last Neanderthals to have occupied the British Isles or by the earliest anatomically modern humans – or possibly by both.

The oldest human fossil from the South West consists of fragments of a maxilla found in March 1927 in the vestibule of Kent's Cavern. Recent radiocarbon dating of bones from this excavation suggests an age for it of between 37–35,000 BP, which is significantly older than previously suspected (Jacobi *et al.* 2006). Unfortunately, not enough remains to attribute the maxilla to a human type, and likewise there are insufficient artefacts found with it to assign these to a specific technology, although it is clear that they are Upper Palaeolithic.

The Aurignacian is probably the Upper Palaeolithic technology which follows that with leaf points and it is believed by many to have been the oldest European technology made exclusively by anatomically modern humans. Intriguingly, it is found only in western Britain within the UK and is best represented in the South West at Kent's Cavern. The lithic industry associated with this technology includes nosed and shouldered scrapers, and beaked burins (*burins busqués*). A partial lozenge-shaped bone or antler point from Uphill Quarry, near Weston-super-Mare, is important as the only clearly Aurignacian organic artefact from the British Isles. It has been directly radiocarbon dated to 31,730±250 BP (OxA-13716). A bone or antler point from the Hyaena Den at Wookey Hole has a very similar age (31,550±340 BP, OxA-13803) and together the two determinations, both from the Axe valley, document a human presence contemporary with the Aurignacian of western Europe – a correlation supported by the typology of the stone tools.

The third of the typologically distinctive Early Upper Palaeolithic technologies to be found in the British Isles is the Gravettian. This is represented by stray finds of stemmed points (Font Robert points), the earliest examples of which may have appeared about 29,000 years ago. Only a small number have been found in Britain, the examples from the South West coming from Kent's Cavern and from the Severn valley at Forty Acre Field, Barnwood on the outskirts of Gloucester (Clifford *et al.* 1954).

Britain appears to have been wholly abandoned during the Last Glacial Maximum (LGM). When humans ceased to visit Britain remains contentious, but the most recent uncontroversial radiocarbon date for such a presence is from a human humerus from Eel Point on Caldey: 24,470±110 BP (OxA-14164, Schulting *et al.* 2005). Re-colonisation after the Last Glacial Maximum appears to correlate closely in time with the beginning of the Windermere interstadial at about 13,000 BP. Housley *et al.* (1997) argued that this Late Upper Palaeolithic (LUP) re-settlement of northern Europe was staggered, involving pioneer and residential phases, but there is no clear evidence from the British Isles for such a pattern.

There are probably over 200 findspots in the British Isles which fall within the Windermere interstadial and this is the earliest period from which evidence of a human presence in Scotland survives (Saville 2004b). The majority of findspots are identified by a presence of distinctive, abruptly modified (backed) lithic tool forms and it is clear that these changed during the interstadial. During the first half of the interstadial they take the form of Cheddar, Creswellian and shouldered points and these are sometimes associated with bone, antler and ivory artefacts identical to those of the contemporary continental Magdalenian. This technology is sometimes referred to as the "Creswellian" and is well-represented in the cave sites of the region such as Kent's Cavern, Three Holes Cave, Gough's Cave, Soldier's Hole and Sun Hole. There are numerous radiocarbon determinations on human remains, butchered animal bones and organic artefacts which date the Creswellian to between 13,000–11,800 BP (Jacobi 2004). The technologies of the second half of the interstadial are less easy to define, but the abruptly modified component includes curve- and straight-backed blades and points. Most distinctive amongst these are "penknife points", curve-backed points with additional basal retouch. Lithic material likely to belong to the most recent part of the interstadial comes from caves in the Torbryan and Chudleigh valleys in Devon (Barton and Roberts 1996) and from Aveline's Hole. The richest open-air Late Upper Palaeolithic site in the region, at Hengistbury Head, also clearly belongs somewhere in the second half of the interstadial and its tool assemblage is unusual with the presence of a small group of tanged points (Barton 1992).

The Late Glacial archaeological record for Britain was probably interrupted by a short period of abandonment during the extreme cold of the Younger Dryas (Loch Lomond) stadial. Humans appear to have returned to Britain at about 10,200 BP, and evidence for their activity during the closing centuries of the Pleistocene and the very beginning of the Holocene comes almost exclusively from south-eastern and eastern England. A characteristic of the lithic industries of this time is the production of long straight blades (frequently over 12cm in length) from alternately worked opposed platform cores, themselves often abandoned when still of large size (Barton 1997). Blades from knapping scatters often have battered margins (so-called "bruised blades": *lames mâchurées*). This bruising may be a result of flint-on-flint contact,

perhaps from the blades being used to adjust the edges of the striking platforms of cores (Froom 1965). As yet, evidence of a human presence in the South West during those centuries remains to be identified.

Key themes for the archaeology of this period (after Barton 1997) include raw material use and issues of mobility. Flint from Gough's Cave has been shown from its microstructural fabric to have been transported over 70km from the northern part of Salisbury Plain (Jacobi 2004). The source of the high quality flint used at sites in Devon to produce the long slender blades characteristic of the Creswellian is unknown, but is unlikely to be local. The absence of the early stages of the blade core reduction process from Three Holes Cave also indicates pre-transportation processing of the raw materials (Barton 1997, 124–5). Trace element analysis of flint used in the Creswellian at Robin Hood Cave at Creswell Crags appears to demonstrate an origin in south-western England (Rockman 2003) suggesting surprisingly large-scale movements of people during the earlier part of the Lateglacial interstadial. North Sea (Baltic) amber found at Gough's Cave (Beck 1965) has further highlighted the potential mobility of the hunter-gatherers of the time.

Assemblages from the more recent part of the interstadial are characterised by the use of local raw materials, as at Pixies' Hole where an entire river cobble reduction sequence is represented. In general Final Upper Palaeolithic retouched tools are made on smaller, thicker blades than those used in the Creswellian, perhaps reflecting the habitual use of local (and often poorer quality) raw materials. Barton (1997, 126) suggests that this may reflect changes in the Lateglacial landscape (such as increased forest growth) which reduced the ease of mobility (and perhaps also the ease of raw material availability and extraction). However the South West region does provide a possible exception to this rule, since at the site of Hengistbury Head artefacts were produced on relatively long blades (although the evidence for the entire *chaîne opératoire* suggests that they were still using local raw materials, albeit ones that were better than average for this period, Barton 1997, 126).

Horse remains at Gough's Cave (Parkin *et al.* 1986) have also indicated the intensity of carcass processing and usage during the Creswellian, with cut mark evidence indicating meat filleting, the removal of marrow and soft tissues (the tongue and the brain), skinning (for hides), and the removal of tendons (to produce sinews) and hooves (for producing glue). Tooth eruption data also provide seasonality evidence, with the red deer at Gough's Cave killed in winter or early spring, perhaps suggesting seasonal occupation and use of sites (possibly in-keeping with the suggestions of considerable mobility during this period). Cut marks and breakage of human bones, and their disposal amongst the remains of other species interpreted as food debris, strongly suggest that cannibalism took place at Gough's Cave (Andrews and Fernández-Jalvo 2003).

There is relatively little evidence for Upper Palaeolithic art in Britain although, recently, art in the form of engravings of animals and stylised females has been found on the walls of Church Hole at Creswell Crags (Ripoll *et al.* 2004). Similar evidence from the South West is being keenly sought. Groups of incisions, of an unknown significance, exist on a hare-tibia awl, a length of rib bone and what may be fragments of mammoth ivory from Gough's Cave. The Upper Palaeolithic site at Hengistbury Head has yielded a refitted flint core with abstract engravings on the cortex (this has parallels with identically incised flints on contemporary sites in the Netherlands and France). Hengistbury Head has also yielded red ochre in association with end scrapers and other tools, perhaps reflecting the use of ochre in hide-working activities (the ethnographic record documents the practical uses of ochre in leather working as a vermicide). It is also worth recording here that the forepart of a horse on a fragment of bone from Sherborne is a forgery (Stringer *et al.* 1995).

2.5.2 The South West Resource

In general the region is dominated by its cave sites in terms of the quality of its Upper Palaeolithic archaeology (for example, evidence for raw material usage and subsistence strategies), although numerically the open-air findspots represent (as with the Lower and Middle Palaeolithic) the majority of the record and are of particular significance where diagnostic artefacts can be identified at these sites. Unlike the distribution for the Lower and Middle Palaeolithic, the east of the region has a relatively minor Upper Palaeolithic record (with the obvious exception of the Hengistbury Head site), and in that respect is similar to both the extreme west and the extreme north of the region which also show a minor archaeological presence for this period. The key zones are instead those of south Devon and central Somerset (Jacobi 2000; 2004), and in both of these areas it is the cave archaeology which is predominant.

The Upper Palaeolithic record in Devon is dominated by cave sites, of which the majority have been formally excavated at various different times. The recovered assemblages indicate occupation during both the Early Upper Palaeolithic (for example, the Aurignacian assemblage from Kent's Cavern) and the Late Upper Palaeolithic (the Creswellian assemblages from Kent's Cavern and Three Holes Cave). Late Upper Palaeolithic deposits (including human remains, charcoal fragments, fauna and a single flint core) have also been, controversially, claimed from Worth's

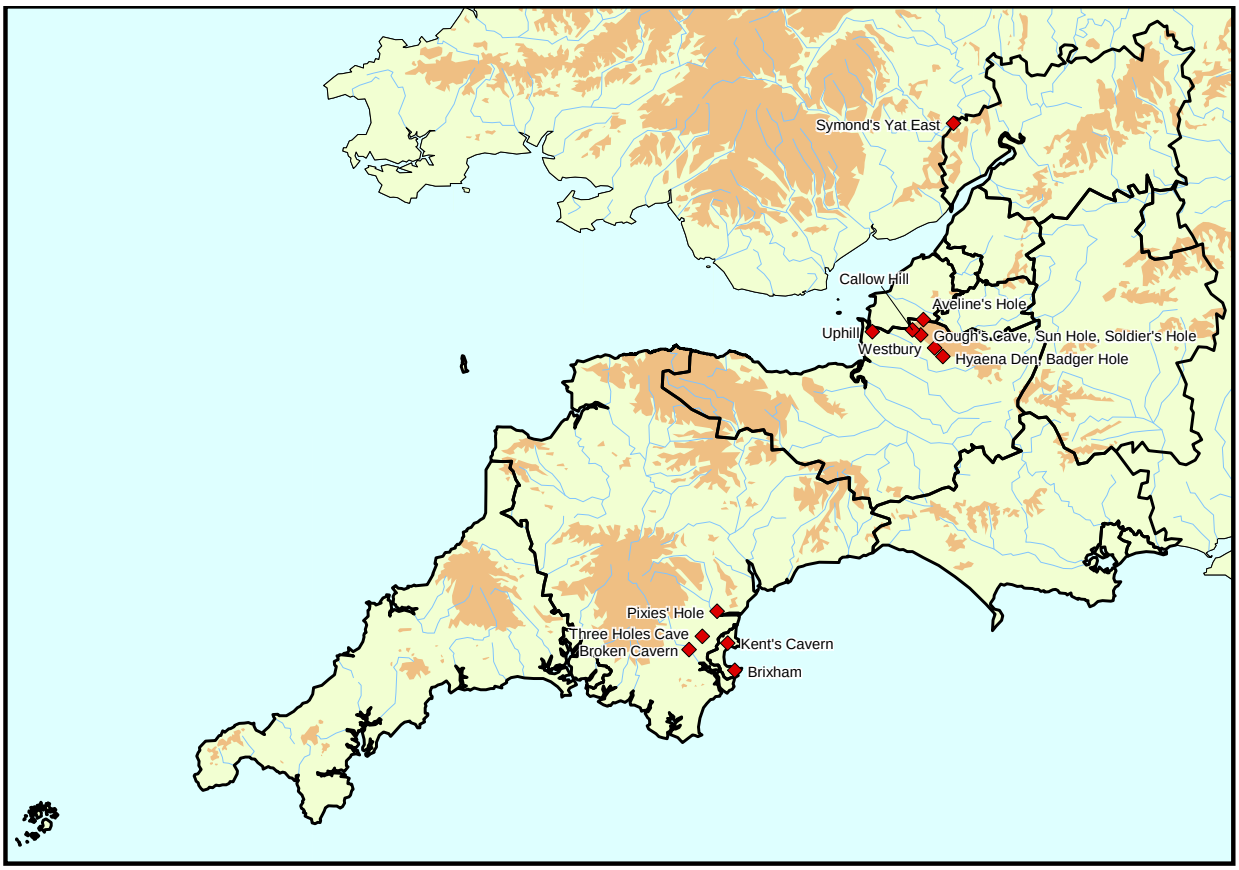

Figure 2.2: *Lower and Middle Palaeolithic caves sites, and Upper Palaeolithic findspots from the second half of the Lateglacial interstadial (after Barton 1997, fig 100; Wymer 1999, fig 67).*

Cattedown Bone Cave (Vanessa Straker pers. comm.). Although human fossil material was collected in the 19th century, the cave's real age and significance is impossible to assess today, and there are similar problems with the species' identifications claimed for the faunal material (Roger Jacobi pers. comm.).

With regards to the Early Upper Palaeolithic, Jerzmanowice leaf blade points have been found at both Bench Tunnel Cavern and Kent's Cavern, with the latter site also producing a large Aurignacian assemblage and a Gravettian Font Robert point. Post-dating the Last Glacial Maximum, Creswellian assemblages have been recovered from Kent's Cavern (radiocarbon dates for Late Upper Palaeolithic activity at this site range from 13,000 to 11,850 cal BP, OxA-1789, 5692, 7994, 8002, Jacobi 2004, 53) and Three Holes Cave (radiocarbon dates associated with the Creswellian artefacts range from 12,900 to 11,680 cal BP, OxA-3890, 3891, 3208, 3209, Jacobi 2004, 51). Penknife points have also been recovered from the Devon caves, specifically Pixies' Hole, Broken Cavern and Three Holes Caves. This area also includes a small number of open landscape findspots, all of which are characterised by fewer than ten artefacts. The Upper Palaeolithic caves are predominantly distributed in the south of Devon, although it is perhaps noticeable that the open-landscape findspots are distributed in the centre and north of the county.

As with Devon, the Upper Palaeolithic record in Somerset is characterised by a small number of both cave sites and open findspots. Amongst the cave sites (all of which have been excavated at different periods), many have yielded multiple assemblages from different phases of the Upper Palaeolithic (such as at Soldier's Hole), with some also yielding Middle Palaeolithic age assemblages and faunal remains (see also page 34).

The Somerset caves have yielded fully bifacial (for example at Soldier's Hole) and part-bifacial, blade-based (such as from Uphill Cave and the Hyaena Den and Badger Hole in the Wookey Hole ravine) leaf-shaped points from the Middle to Upper Palaeolithic transition. The significance of the typological difference remains uncertain, although it is possible that the fully bifacial leaf points are older than the blade-based points. The makers are also unidentified at present, although it is possible that the leaf points actually relate to the terminal Neanderthal occupations of Britain (Jacobi 2000, 47). Such Early Upper Palaeolithic leaf point assemblages include the artefact assemblage at Badger Hole (at just 21 artefacts this

is the largest sample of Early Upper Palaeolithic artefacts in Somerset). It is worth stating here that the bone fragments thought to identify a hearth in front of the cave are stained and not charred, and that the human bones previously thought to be of Early Upper Palaeolithic age are actually (on the basis of radiocarbon dating) Mesolithic (Jacobi 2000, 47). Unambiguous modern human occupations in the Somerset caves region are indicated by the Aurignacian bone point from Uphill Cave/Quarry.

Following the short occupation hiatus associated with the Last Glacial Maximum, the Somerset caves were again widely occupied during the Late Upper Palaeolithic (see Jacobi 2004, appendix, for a recent summary). The most significant is the Creswellian assemblage at Gough's Cave, comprising over 1000 artefacts, while there is also evidence for a Creswellian occupation at Sun Hole and Soldier's Hole (at both of which there is evidence for the *en éperon* technique of butt preparation, apparently associated with the Creswellian, while a human ulna from Sun Hole has yielded an age of 12,900–11,800 cal BC (OxA-535), extremely similar to the dates from Kent's Cavern and Three Holes Cave), Aveline's Hole and Badger Hole. As indicated above, Gough's Cave has produced evidence for a wide range of activities including raw material procurement and usage, organic tools (including needles, awls and *bâtons*), and animal processing (Jacobi 2000, 49 and see also Jacobi 2004 for further details). During the final stages of the Late Upper Palaeolithic, the distinctive backed blades (known as Azilian points or *Federmesser*, which initially occur as bi-points, before changing into "penknife points") occur in Somerset, both in cave sites (there are bi-points and penknife points from Aveline's Hole and bi-points from Gough's Cave), and also from the open findspots: there are two penknife points from Callow Hill near Axbridge (Jacobi 2000, 51; Jacobi 2004, 83). These open findspots are both small in number and tend to be characterised by single or small numbers (fewer than 10) of artefacts. The majority of the open findspots are distributed around the Cheddar region (reinforcing the apparent significance of this area during the Late Upper Palaeolithic occupations), although there is also one very minor find at Doniford on the north Somerset coast.

The geographical extremes of the region are all characterised by an apparently minor Upper Palaeolithic presence, although a key question for future research should address the issue of whether this simply represents an absence of research. Cornwall for example is represented by just a handful of small findspots (some of which are controversial), although it is perhaps noticeable that the majority of these are distributed in the extreme south-west (for example the Lizard, St Buryan, and Gwithian – a possible Final Upper Palaeolithic flint working site), suggesting that an Upper Palaeolithic presence in central and eastern Cornwall could be expected (and whose demonstrated absence might indicate the importance of now-submerged coastal routes of access into the far west). A second question of specific relevance to Cornwall relates to the apparent association of backed blades with Mesolithic assemblages in this county, despite the fact that elsewhere in the country they are a significant element of Late Upper Palaeolithic assemblages (Berridge and Roberts 1986; Steele 1988). Finally with respect to taphonomic issues it is worth noting that: (i) the large scale of past tin streaming activity in many of Cornwall's river systems complicates the interpretation of finds from riverine contexts (this also applies to Lower and Middle Palaeolithic artefacts) and (ii) while no Palaeolithic cave/rockshelter sites are known from Cornwall, this may reflect a combination of factors including sea level rise, the limited potential for early deposits in present sea caves (Rose 2000) and the absence of archaeological investigation of those upland natural outcrops that could have served as rock shelters.

The Upper Palaeolithic record in the north of the region is also very minor, although diagnostic Upper Palaeolithic artefacts have been recovered from Forty Acre Field pit, Barnwood (a Gravettian Font Robert point), and Symond's Yat East (a Final Upper Palaeolithic penknife point) in Gloucestershire (Barton 1997, figs 83, 88, 99 and 100). The association of other Gloucestershire findspots with gravel pits (such as Lillies Field, Barnwood, and Hatherop Castle), also re-emphasises the link between the aggregates industry (which has a generally minor presence in the south-western part of the region) and the recovery of Palaeolithic archaeology.

The east of the region is of course dominated by the key Late Upper Palaeolithic site of Hengistbury Head, interpreted as a well sheltered and concealed residential hunting location, with excellent views over the flat landscapes to the south. The site has yielded a major Late Upper Palaeolithic assemblage, characterised by straight-backed blades, bladelets and large tanged points; an association that interestingly has no parallels in Britain's Creswellian assemblages (Barton 1997, 124; 1992, 273). Thermoluminescence dating together with lithic distribution and re-fitting evidence has indicated that there is only a single Late Upper Palaeolithic occupation at Hengistbury Head, while the lithic materials have provided evidence for the spatial separation of activities (such as the primary production of tool blanks in a peripheral zone away from the hearths), knapping and blade production sequences, and raw material procurement and use (Barton 1992, 273). It is notable, however, that away from this site the area is relatively poorly represented. Five single artefact findspots, all around Bournemouth, have yielded Upper Palaeolithic blade

technology, including a *Grossklinge* blade core from Queen's Park Avenue, while the principle findspot of interest in Wiltshire is Churchfields, Salisbury, which has yielded a very small Final Upper Palaeolithic "long blade" industry of seven blades and retouched flakes.

In general the Upper Palaeolithic record in the South West is dominated by its cave sites, with the obvious exception of Hengistbury Head. There is however again scope for developing understanding of the records of both the Early and Late Upper Palaeolithic occupations of the region. This might include evaluation of the apparent current absence in the South West record of open-air Creswellian sites which are needed to complete the picture of Late Glacial settlement patterns and lifestyles (for the remainder of the country, these form approximately 30% of all Creswellian sites, Roger Jacobi pers. comm.). It might also involve the re-examination of open-landscape findspot assemblages with regards to the possible presence of diagnostic Upper Palaeolithic artefacts from all periods, an assessment of the spatial relationships between cave and open sites during different periods of the Upper Palaeolithic, and a re-consideration of the chronology and routes associated with both the pre-Last Glacial Maximum abandonment, and post-Last Glacial Maximum recolonisation(s) of Late Pleistocene Britain.

2.6 The Mesolithic Environment

See note on scope and methodology on page 27.

Introduction

The Early and Late Mesolithic are defined here as:

- Early Mesolithic: 10,000–8500 BP (*c.*9660–*c.*7500 cal BC). Pollen zones IV (pre boreal) and V (boreal).
- Late Mesolithic: 8500–6000 BP (*c.*7500 to *c.*4000 cal BC). Pollen zones V; VI (boreal) and VIIa (Atlantic).

There are many locations where evidence for Mesolithic vegetation is preserved, though it is rare to find a complete sequence for the period. Most information comes from the acidic soils developed on the granite of Bodmin Moor and Dartmoor and the sandstones and shales of Exmoor. The other areas with particular potential are the lowland wetlands of the region, notably the Somerset Moors and Severn Estuary Levels, but small basins and palaeochannels in other river valleys such as the Exe also preserve sequences of Mesolithic date. However, the most complete Mesolithic sequences are to be found only in relatively few basin peats in both the lowlands and uplands, such as at Hawks Tor on Bodmin Moor (AP Brown 1977) and the Gordano valley in north Somerset (Gilbertson *et al.* 1990).

Much of the pollen analysis carried out between *c.*1960–1985 was focused on the uplands and established the general character of the Mesolithic vegetation. In the last twenty years, much research has been carried out in areas not previously studied, and includes sampling sites where the interpretation of local environments is relatively detailed, in contrast with earlier studies where more regional information was obtained. These new areas include the Blackdown Hills (Hawkins 2005), Exe valley (Fyfe 2000; Fyfe *et al.* 2003a) and the intertidal zone where peat and forest beds are exposed between high and low tide.

The best studied stretch of coastline is the Severn Estuary and Bristol Channel with studies, listed from north-east to south-west, from Oldbury, South Gloucestershire (Druce 2000), Gravel Banks, Bristol (Druce 2000), Brean Down (Bell 1990), Burnham-on-Sea (Druce 1998; 2000), Stolford (Heyworth 1985), Minehead (J Jones *et al.* 2004), Porlock (Canti *et al.* 1995; Jennings *et al.* 1998; Straker *et al.* 2004) and Westward Ho! (Balaam *et al.* 1987). There has also been some important detailed work on the inland coastal clay belt in Somerset which has for the first time allowed an understanding of the development of saltmarsh communities in the Late Mesolithic period (Cameron *et al.* 2004). Further west, several locations have been studied in Cornwall for postgraduate research (Healey 1993), development, Crooklets Beach near Bude (Cole 2001) and Porthleven (Lawson-Jones 1999), and through the English Heritage-funded coastal assessment survey on the Isles of Scilly (Ratcliffe and Straker 1996).

In the chalk and limestone parts of the region, Early to Mid-Postglacial tufa deposits preserving molluscs offer considerable potential for landscape reconstruction. Such deposits accumulate as a result of calcium carbonate deposition from groundwater (in river valleys) or around spring issue points. For the region detailed sequences are available from Blashenwell (Preece 1980) and from Cherhill (Evans and Smith 1983). Parker and Goudie (1998) have also mapped tufas in the Upper Thames/Cotswold areas.

In the first book published that specifically addressed issues of environmental changes in prehistory, Simmons and Tooley (1981) remarked that, in environmental terms, the Mesolithic covers two differing "epochs", the first a period of rapid environmental change and the second, after *c.*7500 BP (*c.*6450–6240 cal BC), much more stable with a relatively warm and oceanic climate and developed woodland flora over much of the present UK.

The Early Mesolithic (as defined for present purposes) covers most of the first "epoch". In the Late Glacial and Early Holocene, the ameliorating

climate was reflected by a rapid rise in sea level of *c.*1cm per year, with a drop in this rate after *c.*7000–6500 BP (*c.*5990–5350 cal BC). Sea level rose from *c.*35m below present mean sea level (MSL) at *c.*9500 BP (*c.*9130–8630 cal BC), reaching *c.*5m below MSL in the Bristol Channel by *c.*4000–3800 cal BC (the rate of rise having slowed by *c.*4000 cal BC). Interpretation of sea level change in the South West has to take account of local coastal variables such as spits, dunes systems and compaction of sediments. In addition, recent estimates show negative isostatic effects in the South West (subsidence), which are most pronounced for Cornwall, with figures of -1.0 to -1.2mm per year (UKCIP 2005).

The final flooding of the low-lying land between southern England, France and the Netherlands took place by *c.*7500 BP. By this date, most of the plants and animals that are regarded as "native" had reached the UK. There were however subsequent additions in the later prehistoric period, such as crops and their associated herb flora, with the introduction and development of farming technology.

Soil development and the warmer conditions of the Early Mesolithic saw a rapid establishment of temperate vegetation, with the arctic grassland, dwarf shrub communities (typically dwarf birch, juniper and crowberry), and plants tolerant of ground disturbance such as *Artemisa* (mugwort), replaced. The incomers were trees such as birch, willow and then pine that tolerate cool conditions. These were succeeded in many areas by warmth loving or thermophilous species, notably hazel, elm, oak, alder and lime. The transformation took place in less than four thousand years. The forest composition was variable locally and developed largely due to competition (for soil nutrients, light and other resources) and succession between species. Regional differences are evident, with the uplands of the west of the region dominated by oak/hazel woodland in the Late Mesolithic, whereas lime (*Tilia sp.*) is a more frequent component from the Bristol area northwards, as shown by Jefferies *et al.* (1968) for the Gordano valley and recent work at Deanery Road, Bristol (Tinsley and Wilkinson 2005). In 1981, Simmons and Tooley commented that there was possibly less distinction between upland and lowland forest than we see today. However, recent work in the Exe valley (Fyfe *et al.* 2003b), has started to challenge this by showing that lime was also an important component of the Late Mesolithic woodland in the lowlands of south Devon.

The following 1500 or so years of the Late Mesolithic saw marginal increases in sea level compared with earlier millennia, and fewer major changes to the composition of the boreal forest. However, other changes, notably increased soil acidification and the onset of blanket mire formation in parts of the uplands, are evident.

Coasts and estuaries

Coastal locations where waterlogged, often organic deposits survive, provide evidence for both the development of shorelines in response to sea level change and the dryland vegetation in the hinterland. The waterlogged sediments preserve a range of biological remains (such as wood, pollen, plant macrofossils, insects, diatoms and foraminifera), so that it is usually possible to employ multidisciplinary studies of the organic and inorganic sediments.

Cornwall and the Isles of Scilly The granite archipelago of the Isles of Scilly has afforded the opportunity to examine Holocene vegetation development as well as coastal change and land loss on an offshore island. The longest pollen sequence is that at Higher Moors (Scaife 1984; Ratcliffe and Straker 1996) with Late Mesolithic oak-ash and hazel woodland at the base of the sequence (5490–5050 cal BC, HAR-3695). The Late Mesolithic-Early Neolithic intertidal peats at Par Beach on St Martin's and at Porth Mellon on St Mary's indicate mixed deciduous woodland with birch, oak, hazel, lime, holly, alder and willow (Ratcliffe and Straker 1996).

On the Cornish mainland, Healey (1993) examined several coastal sequences for his PhD research. Two of these, Marazion Marsh in Mounts Bay and Trewornan on the River Amble in the Camel Estuary, cover parts of the Mesolithic. Healey (1999) describes Marazion as a typical sequence with basal organic sediments resting on bedrock and overlain by a long sequence of marine sand. This is then overlain by a further organic deposit and then sand. He interprets these changes to be the result of coastal evolution linked to barrier dynamics, coastal sedimentation and the movement of relative sea level. The earliest organic horizon dates to 4370–4050 cal BC (Q-2779). Healy's analysis is based on pollen and diatom stratigraphy.

Trewornan (Healey 1999) produced a sequence extending to over 9m below OD with organic sediment resting on a basal soil. The single radiocarbon date, presumably from the organic layer, is 5610–5290 cal BC (Q-2781). Reed swamp at the base was succeeded by alder carr woodland, which was then overtaken by sands containing marine molluscs.

The Bristol Channel, Severn Estuary and Somerset Levels and Moors

Westward Ho! The extensive area exposed between tides at Westward Ho! on the north Devon coast has revealed Late Mesolithic forest and peat beds and a midden containing plant macrofossils, flints, bones and shells. There are also wooden stake alignments, but these are of various, more recent dates. This site is of particular importance as it is the only

surviving remnant of a wetland occupation site of the 6th millennium BC in the South West. Other intertidal peat and forest beds have produced flints and occasionally charcoal, but none also preserved a discrete midden, overlain by peat. The site was first studied by Rogers (1946) and Churchill and Wymer (1965) but was subsequently reinvestigated by Balaam *et al.* (1987) following concern after exposure by storms in the early 1980s; recent work by Martin Bell (pers. comm.) has suggested that the original midden is now completely eroded away. Multidisciplinary scientific work followed, which included pollen, plant macrofossil, insect, mollusc, animal bone and diatom analyses as well as palaeomagnetic dating of silts. In 2004, the site was resurveyed by Hazel Riley of English Heritage and further sampling of the exposures was undertaken by Reading University (Martin Bell) and Exeter University (Linda Hurcombe). The Reading project was directed at the submerged forest and upper peat remains and the Mesolithic/Neolithic transition. Selected radiocarbon dates from Balaam *et al.*'s (1987) research are given in Table 2.3 on page 60.

Pollen and plant macrofossils demonstrated that the peats derived from freshwater fen woodland with oak and hazel growing in the drier areas and willow in the woodland pools. The insect communities from the midden and overlying fen peat supported these conclusions and added further detail. Robinson (2002) describes the presence of a full range of "tree-dependant" Coleoptera (beetles). Some species were plant-specific, such as *Ramphus pulicarius*, indicating willow growth in the woodland pools, whereas *Curculio nucum* and *Rhynchaenus quercus* fed on hazel and oak in the drier parts of the woodland. There was also a small group of beetles probably representing exposed sand dunes to seaward of the fen woodland. Robinson (2002, 44) comments "that no evidence has yet been found of any human influence on the insect population of the region during the Mesolithic".

Mammal remains (bone and antler) from the midden and adjacent peat showed that red and roe deer, aurochs and wild pig had been available to the hunters. A range of wild species included slow worm, bank vole and frog, and occasional fish bones of the Gobiiidae, a shallow-water coastal group, which could have been caught on the shoreline (Balaam *et al.* 1987).

The freshwater habitats at Westward Ho! are of a rather different character from the exposures further up the estuary at Porlock and Minehead, for example, where reed beds, sedge swamp and alder carr woodland are more typical, as summarised below.

Severn Estuary A descriptive stratigraphy for the sediments of the Severn Estuary was published by Allen and Rae (1987) and provides a useful terminology for the main stratigraphic units in the Estuary levels. A full review of the Mesolithic environments of the Severn is not presented here, but further information is published in the journal *Archaeology in the Severn Estuary*, particularly volume 11 (2000). The examples below are drawn from the lower estuary and Somerset Levels and Moors, but early sequences have also been described further up the estuary at Gravel Banks, Bristol and Oldbury (Druce 2000).

Porlock Bay and Marsh Extensive coring on Porlock Marsh in 1995 revealed up to 10 metres of sediments (silts, sands and peats), dating from *c.*6700 cal BC when mean sea level may have been around 8m lower than the present day. Biostratigraphic analyses (pollen, diatoms, foraminifera and plant macrofossils) and radiocarbon dating revealed episodes of saltmarsh and lagoonal environments alternating with wet alder and willow woodland and sedge swamp as the influence of the sea fluctuated (Canti *et al.* 1995; Jennings *et al.* 1998). At the end of the Mesolithic period, freshwater alder carr woodland was established under what became Porlock Marsh. This was flooded, early in the Neolithic period (*c.*3550 cal BC or before), by estuarine water resulting in the development of saltmarsh and the accumulation of silts. The environmental changes at Porlock were influenced by the presence, at least intermittently, of a shingle barrier. This breached during a gale in 1996 and has not fully re-established. Substantial erosion has taken place revealing palaeochannels and land surfaces beneath the former pasture (now saltmarsh and lagoon) of Porlock Marsh. Recent findings are summarised by Straker *et al.* (2004). One of the channels (palaeochannel A) appears to have opened and closed on a similar alignment over a long time period, as the basal dates are Late Mesolithic (4600–4340 cal BC, Wk-10878), whereas at the surviving top an alder cone gave a radiocarbon date of 1900–1530 cal BC (Wk-10876).

Minehead Detailed multidisciplinary palaeoenvironmental analyses were carried out in advance of sea defences and beach re-profiling at Minehead. This work has provided the most detailed spatial analysis of the palaeoecology of a later Mesolithic coastal landscape anywhere in the South West. J Jones *et al.* (2004) studied insects (Smith), pollen (Tinsley), diatoms (Cameron), foraminifera (Haslett) and plant macrofossils (Jones) from peats and silty clays at eight locations. The evidence from intertidal peat and forest beds revealed that between *c.*5670 and 4360 cal BC a mosaic of upper saltmarsh, reed beds and alder carr woodland grew at different altitudes on what is now the present intertidal area. The gently shelving topography allowed a true saltmarsh community to develop. Saltmarshes provide a valuable grazing resource. Coastal areas such as Minehead and Porlock

with a mosaic of habitats on a gently sloping shore would have been very important food sources for large mammals such as red deer and aurochs as well as habitats for wildfowl and fish, and so would have been ideal hunting grounds for Mesolithic communities. Burning of the reed beds, possibly to assist hunting, is suggested by Graminoid charcoal fragments; further evidence for burning is noted in the summary for Pawlett on page 44.

As in the Somerset Moors (see below) the insect analysis revealed several freshwater reed bed species that are rare or extinct in Britain today. These include *Oodes gracilis*, *Hydroporus scalesianus*, *Odacantha melanura*, *Dromus longiceps*, and *Silis ruficornis*. There are also two beetle species (*Dirhagus pygmaeus* and *Dryocoetes alni*) typical of decaying timber in woodland, the latter particularly associated with alder carr, that are rare in Britain today (Smith unpublished). This could be because of climate change, but it is more probable that habitat loss is the dominating factor.

Somerset Levels and Moors The following summary draws upon the publications of many specialists, starting with Sir Harry Godwin in the 1940s who established the basic sequence of vegetation change in the Brue valley with publications from 1941 (Godwin 1941; Clapham and Godwin 1948) until the 1960s. Subsequent specialists A Alderton (pollen), S Beckett (pollen), A Caseldine (pollen and plant macrofossils), M Girling (insects), F Hibbert (pollen), R Housley (pollen and plant macrofossils) and R Morgan (tree rings) worked under the auspices of the Somerset Levels Project, directed by John and Bryony Coles between 1974 and 1989. Much of the work was related to site-specific investigations of tracks and settlements and is published in the *Somerset Levels Papers* volumes 1–15, with useful lists of radiocarbon dates and publications (Coles and Dobson 1989). Caseldine (1984b) published a useful summary of environmental work in the Somerset Levels and Moors in Martin Bell's review of environmental archaeology in the South West (Bell 1984). Subsequent research and development-led work by N Cameron (diatoms), S Haslett (foraminifera), P Davies (stratigraphy), D Druce (pollen and foraminifera), R Housley (pollen and stratigraphy), H Kenward (insects), J Jones (plant macrofossils), M Robinson (insects), H Tinsley (pollen), D Smith (insects), V Straker (pollen and stratigraphy), K Wilkinson (geoarchaeology and stratigraphy) and others has continued since 1989. Most studies are again related to specific site investigations. Examples include evaluations in advance of development, reed bed creation (Ham Walls, J Jones *et al.* 1998), erosion (the Huntspill saltern at Woolavington Bridge, Tinsley 2003; J Jones 2003), landfill excavation (Walpole, Cameron *et al.* 2004) and university research (The Shapwick project, Wilkinson 1998a; Tinsley 2002).

The Somerset Levels and Moors occupy a broad sediment-filled valley or inlet which is up to 30 metres deep in places. This drains north-westwards into the main valley of the Severn Estuary. The present-day rivers Parrett, Brue, Axe and Huntspill flow into the Severn through the area. The Brue and Axe valleys are confined between the largely Carboniferous limestone of Mendip to the north and the Lias limestone of the Polden Hills to the south. A smaller Lias limestone outcrop, the Wedmore ridge, separates the Brue and Axe valleys. The Parrett and its tributary the Cary flow largely between the Polden Hills and the Devonian sandstones and slates of the Quantock Hills.

The vegetation of the Somerset Levels and Moors over the last 10,000 years or so owes its character to geology and geomorphology, climate, sea level changes, drainage patterns and human interaction with the landscape. There were considerable variations in wetland vegetation development in the different parts of the Levels and Moors. While sediments in the coastal Levels are similar to the general sequence for the Severn Estuary, the inland Moors differ in some respects.

The earliest (lowest) fills were studied from boreholes in the coastal area. The earliest dated deposits are from wood fen peat in deep channels (to *c.*20m below OD) at Highbridge. These peats formed between about 7000 and 7900 cal BC (Heyworth and Kidson 1982). Younger peat beds dating from around 4–5000 cal BC, can be seen at low tide at Burnham-on-Sea (Druce 1998), Stolford (Heyworth 1985) and Brean Down (Bell 1990). The best examples of the oak fen woodland that grew during episodes free from marine flooding are visible in the intertidal zone at Stolford, to the west of the present-day mouth of the Parrett. Housley *et al.* (1999) and Straker (2006b) provide general summaries of the varied stratigraphy and environments in the Levels and Moors.

The full central Brue valley sequence (as seen on Shapwick and Meare Heaths) comprises laminated muds and tufas or Lias gravel overlain by a lower peat, above which accumulated a layer of estuarine silty clay with a regressive contact at approximately OD, overlain by an upper peat. The upper peat contains the wooden trackways of Neolithic and later date.

As part of the Shapwick project, Wilkinson (1998a) published stratigraphic work between Shapwick Burtle and the edge of the Polden Hills. A 7m core (borehole A) has provided a date of 5710–5530 BC (OxA-11230) for the base of the lower peat. Borehole A is the first long Holocene pollen sequence to be dated for Shapwick Heath (Tinsley 2002), though it does not extend as far back as those for Minehead and Porlock on the west Somerset coast (see above on pages 42–43). An earlier undated core from the central Brue

valley was analysed by Hibbert from the Sweet Track Factory site, to the north of Shapwick Burtle (Coles *et al.* 1973).

The lower peat-forming vegetation was wet woodland, mainly alder carr with some birch, willow, hazel and oak, but there were also open water and swamp habitats supporting plants such as common reed, bur reeds, sedges and bulrushes. The alder declined somewhat before estuarine flooding deposited silty clays, as conditions probably became too brackish (the result of a positive sea level tendency) for alder to continue to grow, but before the peat stopped forming (Tinsley 2002). This observation was first made by Caseldine (1988b) on the undated Factory site diagram. More recently, others have noted a change in environment identified by the macro and microfossil records, before a clear stratigraphic change is evident (Haslett *et al.* 1997a; Druce 1998 at Burnham-on-Sea, and J Jones *et al.* 2004 at Minehead).

Radiocarbon dates suggest that this period of wet woodland and swamp may only have lasted for a few hundred years. A major marine inundation occurred in the late 6th–early 5th millennium cal BC. This clay deposition (the Lower Wentlooge formation, Allen and Rae 1987) represents an extensive Late Mesolithic saltmarsh development which extended inland round Glastonbury, to Queen's Sedgemoor and Street and northwards to the foot of Mendip, north-east of Godney (Housley *et al.* 1999).

Sometime around 4600–4200 cal BC, a change from estuarine silts to largely freshwater peat (the upper peat) took place due to reduced marine influence (negative sea level tendency). The age range given above is based on a variety of radiocarbon dates for the peat/clay junction, at several places in the central Brue valley. This major change was caused by several possible factors. These include a slow-down in the rate of sea level rise, a fall in relative sea level, protection of inland areas from the sea by coastal dunes or other barriers, or a combination of some of these.

In the central Brue valley (Shapwick Heath and Meare Heath) the general vegetation sequence from the base of the upper peat is a classic hydroseral succession and the earlier stages are summarised from the base upwards as follows:

- Bulrushes (*Typha sp.*) and common reed (*Phragmites communis*) were early colonisers of the saltmarsh clays. *Phragmites* reedswamp (fen) communities established, with some shallowing of the water suggested by *Cladium* (great fen sedge) growth, suggesting base-rich water conditions.

- Above this, fen carr developed when peat growth raised the bog surface high enough for better drainage, or the groundwater levels dropped slightly. The onset of the fen carr and the species composition varied locally, with dominance of alder, birch or willow. The early Neolithic Sweet Track (3807–6 BC) lies mainly below the fenwood, in the reedswamp peat.

- The later stages of the vegetation succession are omitted here as they post date the Mesolithic period.

Insects of Mesolithic date were studied on samples from the Abbots Way and Rowlands Track sequences where monoliths were taken through the upper peat to the top of the underlying clay. In the fauna from the peat/clay interface, dated at Rowlands to 4690–4350 cal BC (HAR-1831), salt-loving species were absent, but *Bembidion fumigatum*, which feeds on vegetation such as reed debris in brackish swamps, was present. The pollen, plant macrofossils and insects all describe a reed swamp environment. Robinson (2002) and Girling (1977) identified a range of insects characteristic of deep water and open areas within the reedswamp. The eutrophic nature of the water is demonstrated by the presence of three species of beetle, *Chlaenius sulcicollis*, *C. tristis* and *Oodes gracilis*, which are extinct in the British Isles today. At the same time as the saltmarsh and freshwater wetlands were developing, mixed deciduous woodland colonised the higher ground. The woodland trees included oak, elm, lime, hazel, birch, alder, holly and willow.

The most detailed study of a Late Mesolithic saltmarsh is by Cameron *et al.* (2004) on the Pawlett Level an opportunity afforded by extensive excavation to create the new Walpole landfill site. Multidisciplinary analysis at site L demonstrated that *Chenopodiaceae* (sea blite, glassworts, oraches or sea beets) alternated with reed or other grass-dominated communities as water tables fluctuated around a Lias island. The Late Mesolithic (between *c.*4800–4200 cal BC) was a relatively dry period of saltmarsh emergence associated with a slow-down in the rate of sea level rise or reduced marine influence as a result of a temporary coastal barrier. Freshwater seepage from the dry land allowed development of freshwater communities around spring flushes or small streams. The steeply sloping bedrock around the island resulted in a sharp transition between dryland and marsh and restricted the development of upper saltmarsh. This contrasts with the mosaic of upper saltmarsh communities, reed beds and alder carr woodland that flourished between *c.*5500 and 4360 cal BC on the gently shelving surface at Minehead (J Jones *et al.* 2004).

Druce (1998) reported on broadly similar conditions for the peats and silts at Burnham-on-Sea, laid down between *c.*5500 BC and *c.*3370 cal BC. At Pawlett the dry land vegetation was oak-hazel woodland, with a little elm, lime and ash present throughout

the time the saltmarsh deposits were accumulating. This would have existed on the lias island, Pawlett Burtle, and probably also Brent Knoll. Broadly similar woods also existed on the dryland around Woolavington Bridge (Tinsley 2003) and further inland in the Ham Walls area and on the Polden Hills (J Jones *et al.* 1998; Tinsley 2002). Small-scale clearances followed by regeneration were identified on the Pawlett Level. Elm was not a major feature of the maritime woods but initial opening of the dryland woods does appear to predate the Elm decline of the Early Neolithic. Microscopic charcoal fragments indicate Later Mesolithic burning of the reed swamps at Walpole, Ham Walls, Minehead and Woolavington Bridge. Bell *et al.* (2003) suggest that this could be a hunting strategy to encourage large herbivores. It would also have a similar effect on wildfowl. Additionally, or alternatively, the microscopic charcoal could result from temporary camps of wildfowlers and hunters. The issue of burning of vegetation is also relevant to Mesolithic lifestyles on the uplands, as noted below. By *c.*4350–4040 cal BC saltmarshes had receded some distance to the west of Woolavington Bridge, though there may have been occasional incursions of brackish water at high tides.

The uplands: Bodmin Moor, Dartmoor, Exmoor, Blackdown Hills, Cotswolds, Mendip

The three principal upland areas are Bodmin Moor, Dartmoor and Exmoor. Granite-derived soils and sediments on Bodmin Moor and Dartmoor provide excellent conditions for pollen preservation, and pollen also survives well on the predominantly Middle and Upper Devonian sandstones, grits and slates of Exmoor. Dartmoor is the largest at *c.*500km^2 and has a maximum summit height of 619m. Bodmin Moor's maximum summit is 572m and Exmoor's is 520m, but with a summit accordance on the central "plateau" of 400–480m. The moors were formerly wooded; oak-hazel dominated woodland was established by *c.*7500 cal BC in places on all the moors. The extent of the other main woodland trees (such as elm, pine, willow, lime, alder and especially birch) was variable.

Other uplands of lower altitude include the Quantock Hills, Blackdown Hills and Mendip. No pollen record has yet been published for the Quantocks, but work has started recently on the Blackdowns under the auspices of Exeter University's Community Landscapes project (Hawkins 2005). Pollen preservation is poor on the limestone soils of Mendip and there are no results for the Mesolithic period.

Bodmin Moor Caseldine (1980) published a useful review of previous work on Bodmin Moor, notably that of the pioneering work of Connolly *et al.* (1950), AP Brown (1977) and Dimbleby's work on soil pollen sequences of later prehistoric date. Bell (1984) also included Bodmin Moor in his review of environmental archaeology in the region.

The important sequence from Hawks Tor has already been noted on page 29. Scaife (forthcoming) notes that Connolly *et al.* (1950) also studied Dozmary Pool and Stannon clay pit and all these sites included data that extended throughout much of the Holocene. In Caseldine's review of 1980, he noted the lack of major pine peaks in the pollen record, which contrasts with the east of the region. The possibility remains that on Bodmin Moor (as on Dartmoor), the most exposed locations may have retained an open moorland vegetation, rather than assuming forest cover.

Simmons *et al.* (1987) reinvestigated the Dozmary Pool sequence, known to be important for the Mesolithic period, and published a dated sequence extending to 6640–6240 cal BC (HAR-5083). However, the depth of interpretation was limited as the sequence had been disturbed and some of the dates are out of sequence.

Walker and Austin (1985) published Late Devensian/Early Holocene pollen data for Redhill Marsh with radiocarbon dates of 8710–8280 cal BC and 7960–7530 cal BC (both quoted as GU-1739), providing a chronology for a change from birch scrub and juniper to oak, elm and hazel. Scaife (forthcoming) comments that there was "enigmatic" evidence for Mesolithic activity shown by a woody layer with birch overlain by willow, which provided the samples for the radiocarbon dates.

The most detailed work for Bodmin Moor is from Rough Tor, which formed the focus for some of the PhD research by Gearey (Gearey 1996; Gearey and Charman 1996; Gearey *et al.* 2000a). He sampled five locations and obtained data covering most of the Holocene including the Mesolithic, though as evidence for human activity was limited, most of his detailed interpretation concerned changes associated with later periods. Tinsley (2004) has also studied vegetation change at Stannon clay pit, in association with the excavation of prehistoric sites before their destruction by china clay extraction.

These studies showed that in the Stannon area, peat began to accumulate in the 6th millennium cal BC (Late Mesolithic) and preserves a history of environmental change to the early medieval period. The earliest woodlands which were oak and hazel dominated were established from *c.*6100-5800 cal BC (Wk-8500) and grew when there was very little open ground. But by 4320–3970 cal BC (Wk-8501) the wetter valley floor between Stannon and Rough Tor supported alder woodland. At Stannon there is also evidence for some birch, but elm and lime may have been restricted to lower altitudes. Rough Tor South (Gearey and Charman 1996; Gearey *et al.* 2000a) presents a similar picture. The expansion of alder onto suitable wetland

habitats in the South West is suggested by Bennett and Birks (1990) to be between 7–6000 BP and the evidence from Bodmin Moor broadly fits this picture. Tinsley (2004) comments that the ground flora of the alder carr included royal fern, polypody fern with ivy and honeysuckle as climbers on the alder trunks. She also notes the presence of microscopic charcoal fragments and some small-scale opening of the canopy by flowering of ribwort plantain and *Asteraceae* pollen. There is some circumstantial evidence for early disturbance to local woodland cover in Gearey and Charman's Rough Tor South diagram, with a slight drop in hazel-type pollen and increases in herbs and shrubs such as *Potentilla*, *Calluna* and *Lactuceae*. There is also some increase in ivy, which does not flower in heavily shaded conditions. A fall in oak pollen values at 4800–4550 cal BC on East Moor at 1m depth in the profile (GU-5615), coupled with a slight increase in grasses and appearance of Potentilla-type pollen, might suggest some disturbance. However, it was not accompanied by microscopic charcoal fragments.

Dartmoor Dartmoor has benefited from a lot of research by pollen analysts and the work prior to the early 1980s was summarised by Caseldine and Maguire (1981) and in Bell (1984). Since then there has been some further work, and frank reappraisal of the state of knowledge, by Caseldine and Hatton (1993; 1994) and Caseldine (1999). Late Devensian herb communities extend into the Early Holocene and altitude and climate limit the establishment of birch woodland over possibly 500 years. Other woodland trees establish, firstly hazel from 8800 BP (*c*.7880 cal BC), followed by oak and elm, with alder by 6500–6300 BP (*c*.5470 cal BC).

Scaife (forthcoming) notes the potential importance of the 6m long sequence at Tor Royal (West *et al.* 1996). The earliest of 6 radiocarbon dates on peat was Late Mesolithic (4940–4580 cal BC, Beta-93824), at 574–589cm depth. This site was recently the focus of an MSc dissertation (Amesbury 2004) undertaking proxy climate reconstruction by examining testate amoebae and peat humification. The results of 8 AMS dates are awaited and a paper for publication is in preparation (Ralph Fyfe pers. comm.).

Simmons *et al.*'s (1983) detailed pollen and microscopic charcoal studies at Blacklane were the basis for much later and continuing debate about the effects and scale of burning and the role of Mesolithic communities in using manipulation of their environment to assist hunting strategies. The possible role of humans in the onset of peat accumulation is also important. Simmons published extensively with reference to the uplands of the South West and elsewhere on these interrelated topics (for example, Simmons *et al.* 1983; Simmons 1996). Caseldine and Hatton (1993) have continued the debate and examined the effects of Mesolithic burning in detail at Black Ridge Brook between 7700 and 6300 BP (*c*.6300 and 5270 cal BC). The role of burning at the upper woodland edge, woodland reduction and prevention of regeneration by acidification and grazing is explored in connection with the development of blanket peat. Caseldine and Hatton's (1994) paper presents a model to show possible routes for vegetation change from woodland to blanket peat on the high moorland at Pinswell.

The Dartmoor evidence for microscopic charcoal fragments indicating burning is widespread, especially in the Late Mesolithic between *c*.5700–4100 cal BC, though the duration and extent of each episode is unknown. In contrast, on Bodmin Moor most evidence is circumstantial, inferred from increases in pollen of those plants preferring open conditions, with only very occasional charcoal fragments. On Exmoor there is little evidence of microscopic charcoal on the upland, but it is present in the coastal sediments at Minehead (J Jones *et al.* 2004), which adjoin the upland. On the northern fringe of Dartmoor the building of the A30 dual carriageway at Sourton Down provided useful information from on-site soil pollen analyses and an adjacent springhead mire which started to form a little before 6400–6100 cal BC (GU-5387) providing an environmental context for the archaeological evidence from the Mesolithic onwards (Straker in Weddell and Reed 1997, 95–115).

Exmoor The first studies of Exmoor's palaeoenvironmental history were carried out as PhD research by David Merryfield (Merryfield 1977; Merryfield and Moore 1974; Moore *et al.* 1984) using pollen analysis and peat depth mapping. Pollen was analysed from several areas of blanket mire, the most extensive sequences published for The Chains and Hoar Moor. Straker and Crabtree (1995) also published an undated diagram for the Chains in their review of palaeoenvironmental work and potential on Exmoor prior to 1995. Merryfield and colleagues' Chains profile has few radiocarbon dates. The earliest, which was not at the base of the peat, was *c*.3025 cal BC, so the onset of the 3m of blanket mire formation cannot be assumed to extend back to the Mesolithic. Merryfield and colleagues debated whether blanket mire development is linked with human activity, considering whether deforestation led to a reduction in evapotranspiration resulting in waterlogging and soil deterioration, in an already fragile ecosystem. The part played by climatic deterioration was also considered. Francis and Slater (1990) carried out further work on blanket mire at Hoar Moor and Codsend Moor.

Since the mid-1990s Exmoor has benefited from further PhD and post-doctoral research by Ralph Fyfe who concentrated not on blanket mires, but spring

sites. The advantage of these is that they give a more detailed local picture and often provide a longer chronology of vegetation development.

In broad terms, the vegetation record from both the earlier studies and more recent work by Jennings *et al.* (1998) on Porlock Marsh and Bay and Fyfe (2000; Fyfe *et al.* 2003a;b) shows that oak-hazel woodland with some pine, alder, elm and particularly birch was established by *c.*7500–7000 cal BC.

Fyfe *et al.* (2003b) reported on studies from three spring mires on Exmoor's southern fringe spanning the Middle to Late Holocene, two of which, Long Breach, Molland and Gourt Mires, date back to the Late Mesolithic period. At Long Breach, an open landscape with damp heath species existed, while on drier ground oak-hazel woodland predominated. Woodland was in evidence in the Late Mesolithic/Early Neolithic at Gourt Mires. Scaife (forthcoming) comments that these studies demonstrate the scale of variation around the fringes of the upland zone.

Francis and Slater (1990) obtained a Late Mesolithic/Early Neolithic date for the base of their Hoar Moor sequence. The result of 4460–3980 cal BC (I-15549), showed that the Late Mesolithic forest prior to the onset of blanket mire included a variety of trees and shrubs such as birch, oak, hazel, pine, alder, elm and lime.

There have also been student projects on an eroding springhead mire at Halscombe Allotment on Exmoor, carried out at both Bristol and Exeter Universities. The Exeter study included two radiocarbon dates, the lowest in the sequence being 6070–5830 cal BC (Wk-10647, Ralph Fyfe pers. comm.). The fallen oak trunk seen protruding from the section was sampled for dendrochronology and when a match could not be obtained, the outer 10 rings were radiocarbon dated, giving a result in the Neolithic of 3640–3360 cal BC (GU-8220).

The signals for early human impact, such as charcoal fragments and early clearance episodes showing the reduced tree pollen levels and increased plant pollen levels of disturbed ground and pasture, are limited compared with Dartmoor. Such changes were noted on Exmoor's southern fringe at Exebridge at *c.*6500 cal BC and *c.*5000 BC (Fyfe *et al.* 2003a), and in some of the Late Mesolithic/Early Neolithic peat/clay interfaces at Minehead (J Jones *et al.* 2004).

Blackdown Hills So far, evidence for the Mesolithic environment in the Blackdown Hills rests on a single pollen analysis from Bolham, where dates of 6780–6650 cal BC and 4230–4040 cal BC have been obtained. The profiles show some open grassland and oak-hazel woodland in the middle Mesolithic with lime forming a major component of the Late Mesolithic-Neolithic woodland. Small scale woodland clearances from the Late Mesolithic onwards are noted (AG Brown pers. comm.; Hawkins 2005).

The lowlands

(Scaife forthcoming) comments that the three pollen sequences in the lower Exe valley published by Fyfe *et al.* (2003a) provide the most complete vegetation sequences from a lowland river in South West England. The Exebridge sequence covers *c.*9000–5500 cal BC; Lower Chitterley *c.*10,600–3500 cal BC; and Brightworthy *c.*7500–2000 cal BC. As noted above, Late Mesolithic burning of vegetation from *c.*6500 cal BC onwards was identified at Exebridge and some woodland clearance is seen from *c.*5500 cal BC onwards. At Brightworthy, there is evidence for a first early "elm decline" prior to the Neolithic around 5500–5300 cal BC. At both sites, the local vegetation is tall fen with meadowsweet, bedstraws, devils bit scabious, sedges and grasses with some willow and birch.

Two locations in the Clyst valley in Devon give further evidence for long term vegetation change in Devon river valleys (AG Brown pers. comm.). At Helling's Park, floodplain mire proved to span the Late Glacial to medieval periods, making it a very valuable sequence. At Broadclyst Moor, the sequences extended from the Mesolithic to the Late Bronze Age. Summary information is available, but clearly both sites will benefit from detailed analysis and dating. Late Glacial vegetation at Helling's Park included sedges and grasses with some willow, whereas the Early Mesolithic vegetation on the floodplain was a patchwork of grasses and sedges, with pine and birch woodland. Alder was established at *c.*5000 cal BC which is similar to the lower Exe but somewhat earlier than in the upper Exe. Lime was a relatively significant component of the Mid Holocene woodland, which also contained hazel, elm, oak and birch. The Clyst valley sites show multiple elm declines, the first noted at *c.*5500 cal BC, as also observed in the Lower Exe valley. The Clyst profiles show a second decline in the Early Neolithic at *c.*3700–3200 cal BC, but no coincident changes to the curves for cereal pollen were observed (AG Brown, pers. comm.).

Chalk and limestone landscapes: Dorset, Wiltshire and Gloucestershire

There are few studies of landscape change involving pollen analysis in the east of the region as the geology, where not modified by acid drift deposits, gives rise to biologically active soils where pollen preservation is usually very poor. Exceptions are some valley sediments and subsoil features as summarised below. Mollusc preservation, in contrast is very good, but the strength of interpretation is in its local detail.

The sequence from the Upper Allen valley, Cranborne Chase, Dorset (noted for its Late Glacial pollen

assemblage) continues into the Mesolithic. However, Scaife (forthcoming) notes that unlike other sites in southern Britain, herb and scrub communities persist into the Early Holocene (Early Mesolithic) at a time when elsewhere woodland has become dominant. He attributes this to survival of refugia of the Late Devensian chalk flora, from which the herbaceous species were able to expand in the late prehistoric period.

A further location in Dorset affording pollen analysis is the floodplain of the Allenborne at Wimborne Minster where peat deposits accumulated. Scaife (1994) identified alder and willow carr on the Mid-Holocene floodplain, dated to 5990–5780 cal BC (Beta-189166) with oak, elm, lime and hazel woodland on drier ground. He also notes high values of pine in the Mid-Holocene, suggesting survival of stands for longer than usually observed. However, as there are so few pollen studies from this period in Dorset and Wiltshire, possibly this is not such an unusual event as it appears.

There is very little other palaeoenvironmental evidence from Mesolithic Dorset. Reconsideration of the mollusc data from the Dorset Cursus has led Allen (in French *et al.* 2003) to suggest that the assemblage may be intrusive, with some flint and bone, originating in the Mesolithic soil through which the cursus ditch was cut, eroding into the ditch. He also suggests that the snails provide a rare example of a Mesolithic chalkland environment of deciduous woodland with some clearings.

There are similarly few studies from Wiltshire. Pollen and molluscs were examined from a Mesolithic pit at Stonehenge where, despite poor and differential preservation which was not unexpected given the chalk soils, two pollen zones were determined. The greater concentration of trees and shrubs (birch, elm, pine, oak and hazel) was in the lower profile with an increase in herbaceous plants and improved preservation, including of pine and fir, indicating some downwashing of recent pollen (Scaife in Cleal *et al.* 1995). The lower pollen assemblage is considered to be earlier Mesolithic on the basis of species composition and a radiocarbon date on pine charcoal of 8300–7650 cal BC (GU-5109). Molluscan sampling of earlier Postglacial tree-throw pits at Avebury (Evans *et al.* 1985), Easton Down (Whittle *et al.* 1993) and South Street (Ashbee *et al.* 1979) have consistently shown the development of woodland conditions during the Mesolithic period.

In the upper Kennet valley (Evans *et al.* 1993) Late Glacial marls and gravels were overlain by a Mesolithic to Neolithic soil. Molluscan sampling demonstrated that in the Early Mesolithic (Early Postglacial) open ground and marshy conditions were succeeded by the development of full woodland, with a date of 8500 BP (*c.*7500 cal BC) obtained from an associated tree-throw pit.

Scaife (in Cleal and Pollard 2004) reported on pollen analysis of peat and alluvium floodplain sediments in the Avon valley, *c.*300m to the east of Durrington Walls. A basal radiocarbon date of 8300–7200 cal BC (GU-3239) was obtained. The flora contained Late Devensian/Early Holocene largely herbaceous vegetation with some birch and juniper. A subsequent reduction in herbs is matched by expansion of pine and hazel and there are early records for oak and elm.

As noted above, in the chalk and limestone parts of the region Early to Mid- Postglacial tufa deposits offer considerable potential for landscape reconstruction. At both Blashenwell (Preece 1980) and Cherhill (Evans and Smith 1983) Early Postglacial open-ground marshy environments were succeeded by full woodland conditions. Unpublished sequences are also available for the Mendip and Cotswold areas (Willing 1985) with the same general trends apparent.

Significantly, many of the tufa deposits contain, seal, or are associated with Mesolithic archaeology, as at Blashenwell and Cherhill. In part such associations are due to the fact that there are few other sealed Mesolithic contexts available where artefacts might be found, although there may be a wider significance in the siting of activity at such locations (Davies and Robb 2002; Evans 2003). Of significance too is that many tufa deposits also span the Mesolithic-Neolithic transition. On-going work on Mendip has also established Mesolithic activity associated with tufa deposition in that area (Davies and Lewis 2005), and the presence of extensive early Postglacial palaeosols beneath the tufa. Tufa deposits are undoubtedly under-recorded for the Mendip region, and given the lack of pollen preservation in the area, offer the only real opportunity for establishing its landscape history. Altitudinally the deposits recognised so far range from *c.*10m OD at Rodney Stoke, to *c.*130m OD near Ston Easton (Paul Davies pers. comm.). Similar potential undoubtedly exists for the Cotswolds and Wessex chalklands.

2.7 Mesolithic Archaeology (*c.*10–6000 BP)

2.7.1 Introduction

The British Mesolithic has typically been divided into two phases (e.g. Mithen 1999): an Early Mesolithic (*c.*10,000–8500 BP), and a Late Mesolithic (*c.*8500–6000 BP). However, recent workers (e.g. Barton and Roberts 2004; Reynier 2005) have emphasised the non-uniform nature of the Early Mesolithic and the fact that, in lithic terms, it is not represented by a single, monolithic assemblage type.

The Early Mesolithic is generally characterised by "broad blade assemblages" (featuring obliquely blunted points), which show clear links with the

Maglemosian industries that occur across northern Europe (Mithen 1999). Reynier (2005, 11) highlights three major typological units within this period: the "Star Carr", "Deepcar", and "Horsham" assemblage-types. These variants essentially reflect differences in tool types and proportions (see Reynier 2005, Chapter 2; Jacobi 1978a;b for further details). Of these assemblage-types the "Star Carr" and "Deepcar" are thought to be the oldest, and roughly contemporary, at around 9500 BP, while the "Horsham" assemblage type appears to date to nearer 9000 BP (Reynier 2005, 14–15). These Early Mesolithic assemblages are succeeded by the "narrow blade assemblages" (featuring relatively small microlith forms such as needle points and scalene triangles) of the Late Mesolithic after 8500 BP which Mithen (1999, 38) suggests may reflect new hunting strategies. This may be as a result of environmental change or it may reflect new cultural traditions of artefact production. Although microliths dominate the majority of Late Mesolithic assemblages in the region, other tool types were also significant, including scrapers, burins, awls, and flint axes/adzes and axe/adze re-sharpening flakes. Coastal locations also yield tools made from minimally altered beach pebbles. These might possibly be linked with the acquisition and processing of shellfish, although the pebble tools found at Butterstor on Bodmin Moor, 13km from the present coast and even further from the Mesolithic coast, were probably not for shellfish processing (Herring and Lewis 1992). Overall, stone tools and manufacturing debris provide the largest body of evidence for the Mesolithic, with the simple presence of microliths often being taken as evidence for Mesolithic affiliations.

Organic tools (probably due to issues of preservation quality) and non-utilitarian artefacts are rare from this period, as are substantial site features such as postholes and dwellings (although small pits, usually of unknown purpose, are relatively common). Animal bones are also found at few sites, although they were present at Aveline's Hole (Davies 1921; 1922; 1923; 1924) and abundant at Totty Pot (Chris Hawkes pers. comm.). New work at the tufa spring site of Langley's Lane (Davies and Lewis 2005) has also revealed substantial quantities of Later Mesolithic faunal remains.

Although a relatively neglected topic in the British Mesolithic, the issue of death and mortuary practice can be approached through the currently available evidence, particularly in light of recent studies addressing issues of chronology and the re-assessment of old accounts (Schulting and Wysocki 2002a; Schulting 2005). The South West boasts a significant component of the available material, most notably from the cemetery at Aveline's Hole, but also from other, smaller collections such as the remains from Totty Pot and Gough's Cave.

A key issue is the use of coastal zones during the Mesolithic, not least since much of this evidence has been lost to rising sea levels. However, the site at Culverwell on the Isle of Portland (Palmer 1999) provides an indication of Mesolithic coastal activity; the 300m^2 shell-midden documents the exploitation of a wide range of marine molluscs, although fish bones are absent. The site also includes several hearths, a possible cooking pit and a floor of limestone slabs (although doubt has been cast on the status of the latter). The picks found on the site (made from local Portland chert) may have been used to remove limpets from rocks or were perhaps for extracting chert from outcrops (Mithen 1999, 49). Other midden sites in the South West (for example, Westward Ho! and Blashenwell) also highlight the importance of coastal resources during the Mesolithic period.

There are several other key themes in Mesolithic archaeology, to which the archaeology of the South West can potentially contribute. With regard to the interpretation of Mesolithic assemblages, both Mellars (1976) and Barton (1992) have provided models, exploring the implications of microlith and scraper percentages for understanding site function, and the relationships between artefact frequencies, topographic locations, geology, and site function. Raw material source data can also highlight mobility patterns and/or exchange networks, while site locations and topography highlight patterns in Mesolithic land-use, economy and subsistence strategies. Finally, shell-middens indicate elements of Mesolithic economy with regard to the coastal zone.

2.7.2 The South West Resource

The recovery of data for the Mesolithic period is uneven in the South West, with Somerset having the most comprehensive assemblages, together with a greater number of excavated sites. In Devon, the evidence is variable and fragmentary and much of the Cornish evidence comes from surface finds with only a few excavated sites. There are few radiocarbon dates available for either Devon or Cornwall. The records in Gloucestershire and Wiltshire are relatively minor, in terms of quantity, although there are occasional significant sites and findspots. Most notable of these is the lithic material sealed below Hazleton North long barrow (Saville 1990), but also worthy of note are Tog Hill (Sykes and Whittle 1965) and Castle Meadow, Downton (Higgs 1959; Radley 1969). The Mesolithic of Dorset is of course better known, principally (although not exclusively) because of the key sites at Hengistbury Head and Culverwell. In general however, Somerset has better documentation than the other counties and is an area where more extensive archaeological research has taken place both in the past and more recently. For this reason the

following discussion focuses strongly on the Somerset material, although the Mesolithic resources in the other counties are also reviewed.

It is of course recognised that much of the current knowledge of the Mesolithic in the South West stems from recent and current (multi-period) fieldwalking and excavation projects. While the references deal primarily with published sources, the importance of the "grey literature" in our understanding of the period is also acknowledged, as is the need for re-assessment of much of the "grey collections" where, in many cases, surface material from fieldwalking has potentially been mis-identified as Mesolithic.

Somerset

The University of Bristol Spelaeological Society (UBSS) has been an active research group on Mendip throughout the last century and in the 1970s the Somerset Levels Project was actively involved in collecting, recording, excavating and monitoring the wetlands of the Somerset Levels. Many amateur workers have fieldwalked and collected flint from Mendip and Exmoor and elsewhere.

In North Somerset, excavation has been carried out at Lower Court Farm, Long Ashton (Saville 1986), Freeman's Farm, Felton (fieldwalking and trial trenching by the University of Birmingham Field Unit in 1992), Hay Wood Cave, Hutton (Everton and Everton 1972), Sandford Hill, Winscombe (UBSS unpublished) and Birdcombe, Wraxall (Sykes and Whittle 1960). Most of these sites have only a small component of Mesolithic material and in some cases the stratification is not secure. Birdcombe was re-excavated in 1997 when large quantities of early, and particularly, later Mesolithic flintwork was recovered. The flint appeared to have been obtained from the Marlborough Downs as small nodules and knapped on site. Radiocarbon dates of 3640–3360 cal BC (Beta-147105) and 4370–4050 cal BC (Beta-147106) were obtained from sealed contexts but are later than the flintwork might suggest (PJ Gardiner 2001).

Joan Taylor carried out extensive fieldwalking as part of the Priddy Plateau Survey (Taylor and Smart 1983) and also undertook excavations at Lower Pitts Farm (Taylor 1975–6; 1976–7; 1977–8; Taylor in Aston 1977, 109–110; Taylor in Aston and Murless 1978, 120; Taylor 1979–80; Taylor in Minnitt and Murless 1979, 85; Taylor in Burrow *et al.* 1980, 118–9). Excavation and fieldwork showed a Mesolithic element within a mixed assemblage; however, the flintwork is believed to have been lost (Joan Taylor, pers. comm.). The excavation was interpreted as a "burnt Mesolithic structure" although the published radiocarbon date of 3950–3660 cal BC (labcode unknown) obtained from burnt material relating to the hut, would appear to suggest a Neolithic date. The excavation of the burnt structure was published in 2001 (Taylor 2001a), but there is uncertainty over the feature's interpretation, because there was considerable disturbance around the site by ploughing and much of the flint from the excavations and surface collection was rolled. Elsewhere museum collections show other concentrations of material around Charterhouse-on-Mendip and Ebbor Gorge (Lewis 1998).

The Mendip Caves Mesolithic flint has also been recovered from Mendip caves and rock shelters such as Rowberrow Cavern (Taylor 1926) and Hay Wood Cave (Everton and Everton 1972). There is also more unusual burial evidence from Aveline's Hole, Burrington Combe (Davies 1921), Gough's Cave (Davies 1904; Tratman 1975; Stringer 1986), Badger Hole at Wookey Hole and Totty Pot (Barrington and Stanton 1970; PJ Gardiner in press a). These sites are particularly important for our understanding of Mesolithic mortuary practice.

Aveline's Hole, Burrington Combe, was excavated in the late 19th century, in 1914 and from 1919 to 1933 (Davies 1921; 1922; 1923; 1924; Fawcett 1919–20; 1920–21; 1924; Tratman 1922–3; 1975; 1977). This work recovered an estimated 50–100 skeletons from the cave floor (Davies 1921): the largest collection of Mesolithic human remains in Britain. Unfortunately, most of the collection was destroyed during the Second World War but 800 surviving specimens have been re-assessed by Schulting and Wysocki (2002b), representing a minumum of 21 individuals. This re-assessment has also identified infants, thus confirming the older accounts of the cave (such as Tratman 1922–3) and providing an interesting contrast with continental cemeteries, where adolescents and children tend to be under-represented (Conneller 2006).

Schulting (2005) has re-assessed the history of the discoveries and the lithic assemblage and has undertaken new research on the human and animal remains. This has included analyses of the stable isotopes, palaeodiet, pollen and the palaeoenvironment. Bayesian analysis of radiocarbon dates on the human bone (for example, Q-1458, BM-471, OxA-799, GrN-5393) confirms a Mesolithic age of *c.*8400–8200 cal BC for the burials (Tratman 1977; Jacobi 1982; Schulting 2005; Marshall *et al.* 2005), while the short date span that is indicated suggests the possibility that a significant proportion of a community is represented here (Conneller 2006). The nature of the early accounts has made it difficult to assess the character of the mortuary treatment, but there would appear to be a mixture of inhumation (assuming that the double burial is not Late Upper Palaeolithic in age) and the laying out of human remains on the cave floor (Conneller 2006). There is also evidence of grave goods, including unmodified red deer teeth. Conneller

(2006) has reviewed the evidence from Aveline's Hole within a wider discussion of death and mortuary practice in the Mesolithic of Britain and Ireland.

Rock art has recently been identified in Aveline's Hole by members of the UBSS (Mullan and Wilson 2004). It consists of three incised rows of 3 crosses and has been sealed by a layer of stalagmite. Although it has not been possible to accurately date the art by scientific means, a close analogy with rock art from Scandinavia suggests a Mesolithic date. A further discovery of an incised square by Wilson and Mullan in Long Hole (above Gough's Cave) may also be of Mesolithic date (Linda Wilson, pers. comm.).

Human bone was recovered from the swallet hole at Totty Pot, Cheddar in the 1960s when the cave was discovered by Chris Hawkes. There is an estimated minimum number of four individuals, including a child (PJ Gardiner 2001). Little of this bone survives, but a radiocarbon date of 7450–7040 cal BC (BM-2973) places it in the Late Mesolithic (Schulting 2005, 231). Excavation by the University of Bristol in 1998 around the mouth of the swallet hole suggests that there was no occupation evidence outside the cave and that the flint débitage from Totty Pot is likely to have resulted from re-sharpening hunting tools, with the finished tools being hunting losses (PJ Gardiner 2001).

The most complete Mesolithic human skeleton in Britain is "Cheddar Man" from Gough's Cave with a date of 8700–7750 cal BC (BM-525, Davies 1904; Stringer 1986). Anecdotal evidence from a workman involved in the digging at Richard Gough's show-cave suggests that many human skeletons were found, with the crouched "Cheddar Man" kept because of its completeness (Roger Jacobi pers. comm.). Chantal Conneller (pers. comm.) has noted that this highlights a possibility that Gough's Cave was, like Aveline's Hole, a Mesolithic cemetery, but it is not certain due to the late Palaeolithic dates associated with scattered, cut-marked skeletal material from Parry's 1920s excavations (Parry 1928; 1930) and the recent British Museum excavations (Currant *et al.* 1989).

The dates from the three cave sites suggest that Aveline's Hole and Gough's Cave were in use at around the same period of the Early Mesolithic (although Gough's Cave was also occupied in the Later Upper Palaeolithic) with Totty Pot having a later occupation phase in the Late Mesolithic.

Apart from the burial evidence, there are relatively few open sites that suggest permanent or even temporary occupation in the Mesolithic period on the Mendip Hills. However the recent work by Davies and Lewis (2005) at Langley's Lane is of key importance here as it shows a range of activities taking place at an open site on the lower Mendip plateau. Large quantities of Later Mesolithic lithics have been recovered, together with animal bone and a buried soil, on and around a natural tufa deposit. Contemporary with this activity is a series of small pits along the edge of the tufa mound into which were placed lithics, different coloured stones and fossils. The excavators have suggested that this open-air site was a focus for formal, ritual deposition possibly linked to the unusual properties of the white tufa mound. The tufa has yielded excellently preserved environmental material, including molluscs, the analysis of which will improve current understanding of spatio-temporal changes in the local vegetation record.

More generally however the uplands appear, on the basis of the lithic evidence, to have been used for hunting rather than settlement. Yet, although a large quantity of flint has been recovered, either through fieldwalking or isolated finds, it can frequently only tell us that hunter-gatherers were using the landscape on a temporary basis, and that it was probably part of a seasonal territory that had links to sites on the lowlands. The poor preservation of palaeoenvironmental evidence for Mendip (apart from in the caves) also makes it difficult to reconstruct the local environment in the Mesolithic period, although the animal bone recovered from caves can help interpretation (Jacobi 1982).

Early Mesolithic flint has been recovered from the Somerset Levels, where the higher ground of the Burtle Beds provided access to the rich wetland resources that were available to hunter-gatherer groups. Wainwright's assessment of two sites at Shapwick and Middlezoy indicates a non-geometric industry with obliquely blunted points of the Early Mesolithic period (Wainwright 1960). Norman's work at Greylake, Chedzoy and North Petherton also suggests an early Mesolithic presence (Norman 1975; 1982; 2002). The recovery of hollow-based points from the Chedzoy site suggests a link with the Horsham industry in the south-east of England (Chris Norman pers. comm.).

Analysis of the flintwork from the large-scale fieldwork of the Shapwick Project by Clive Bond (in Gerrard and Aston forthcoming) suggested only a slight Late Mesolithic presence, although the results of test-pitting from the Burtle Beds (Bond in Gerrard and Aston forthcoming), indicate that the area around Shapwick was extensively used in the Early Mesolithic period, as had been suggested by earlier, unsystematic fieldwalking (Clark 1933; Wainwright 1960; Norman 1975; 1982). There was some later material from Shapwick Burtle (Chris Norman pers. comm.; Bond 2006) however, and Clive Bond's current research on the lithic industries of the area may shed further light on this (Bond in press a; in press b).

There is little evidence for Early Mesolithic activity on Exmoor; the material is restricted to isolated finds or small flint scatters from the Later Mesolithic period. This material has been found predominantly on the coastline around Porlock, including finds from behind

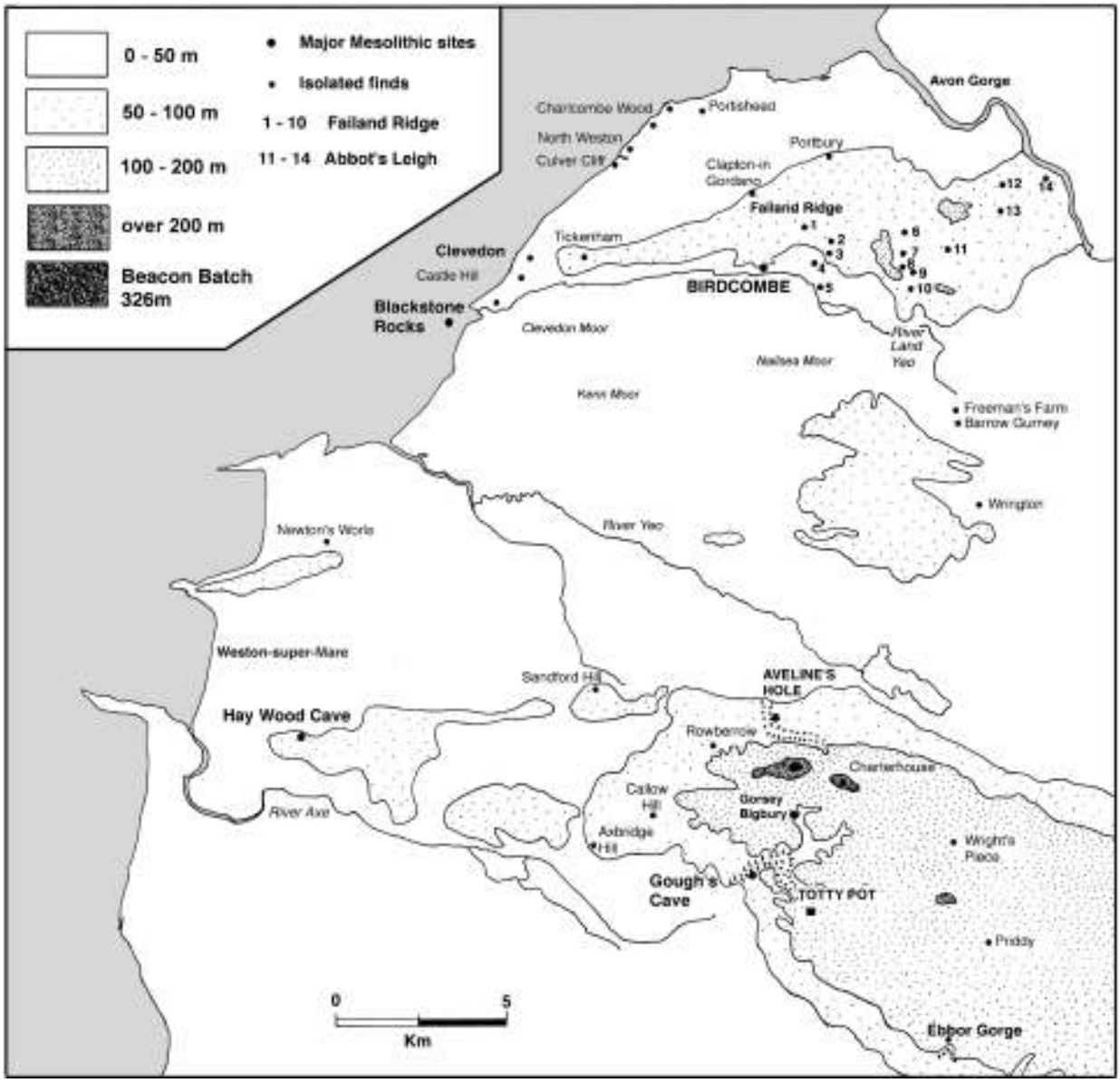

Figure 2.3: *Mesolithic finds in North Somerset (PJ Gardiner 2001; in press a)*

the shingle ridge at Porlock Marsh, from the cliffs at Hurlstone Point, Bossington Hill and North Hill, Minehead (Riley and Wilson-North 2001). The fame of AL Wedlake's discovery of Mesolithic flint at Hawkcombe Head in 1942 meant that subsequent visitors often removed surface finds. Many of these are permanently lost, but the Wedlake collection includes the largest assemblage of microliths from Exmoor (Riley and Wilson-North 2001) and is diagnostic of the Late Mesolithic period (Norman 1982).

Excavations by the University of Bristol and the Exmoor National Park Authority (PJ Gardiner in press b) have revealed a series of features and structures on the site, including a temporary structure consisting of a deliberately laid clay floor surrounded by postholes. Hearths were also located and radiocarbon dates of 6390–6220 cal BC (GU-11979) and 6770–6510 cal BC (GU-11978) obtained. The flint appears to be beach material, probably from further west at Baggy Point or Croyde Bay (Chris Norman pers. comm.).

There are submerged forests at Minehead (Dawkins 1872) and Porlock Weir (Wymer 1977) where flint from the Mesolithic period has been found. These forests would have been in a dry-land location at the beginning of the Mesolithic period, but became submerged when sea level rose at the beginning of the Holocene. The submerged forest at Porlock is on the seaward side of the present shingle ridge and consists of trunks and stumps of alder and oak that rooted into the "head" and blue mud. The forest and its associated beds are believed to be between 8000 and 5000 years

old (Edwards 2000). The submerged forest at Stolford in Bridgwater Bay (35km to the east) has been dated to around 5000 BC (Heyworth 1978).

Devon

The Mesolithic record for Devon is relatively minor, and is dominated by surface scatters, in which Mesolithic artefacts are usually mixed with later material (Miles 1975c), although there is also a small number of excavated assemblages from cave sites such as Three Holes Cave, Torbryan (Jacobi 1979). Key sites and findspots include the collections at Yelland (Rogers 1946), Baggy Point (Gardner 1955; Miles 1972), East Week (Greig and Rankine 1953), and at Westward Ho! where excavations and extensive collections have been made (see Clark 1955; Churchill and Wymer 1965; Balaam *et al.* 1987). The material from the Torbay and Torbryan caves is most notable for the *in situ* Later Mesolithic occupation level at Three Holes Cave. This is located just outside the cave entrance and has produced dates of 5480–5070 cal BC (OxA-4491) and 5290–4840 cal BC (OxA-4492) on hunted red deer remains (Roberts 1996, 202). As well as being a rare example of an inland, lowland site for the Later Mesolithic in the region, the material also shows evidence of coastal contact with flint artefacts manufactured on beach pebbles, a sandstone beach pebble rubber and perforated marine shell beads (Roberts 1996, 20). The site is another example of the observed pattern that sites of the Later Mesolithic occur (as in Cornwall) both along the cliffs of the Atlantic and English Channel coasts and in the areas of granite upland (Jacobi 1979, 74).

The finds from Westward Ho! numbered nearly 2000 pieces and the shell midden from which the majority of the finds originated was until recently still exposed at low tide (Balaam *et al.* 1987); recent work by Martin Bell (pers. comm.) has suggested that the original midden is now completely eroded away. The Westward Ho! site has yielded a series of Later Mesolithic radiocarbon dates from both the midden and the peat above the forest. Those from the midden centre around *c.*6000–5000 cal BC, while those from the peat mostly date to between 5300 and 3800 radiocarbon years BC; the latest date is 5740-5300 cal BC (Q-672). These dates are particularly significant as with the exception of the Three Holes Cave dates, there are few others from the remainder of Devon for the Mesolithic period. The range of environmental evidence (land mollusca, plant macrofossils, and insects) indicates that the midden was situated within damp woodland with some pools, set a little back from a sandy shore (Balaam *et al.* 1987). The main types of marine molluscs – mussels, cockles, and peppery furrow shells (*Scrobicularia plana*) – also reflect an ecotonal position at the boundary between rocky shore, sandy bay and muddy estuary. Despite an extensive spread of charcoal in the buried landsurface, pollen evidence for human impact on the vegetation during the Mesolithic was slight. The available evidence for subsistence strategies includes vertebrate fauna from the midden (cattle, pig, red deer, roe deer, and fish), marine molluscs (dominated by those species listed above), and plant species likely to have been utilised (including hazelnuts and hawthorn nutlets). This strongly suggests the combined use of a range of terrestrial and marine resources, and the evidence of a mixed economy at Westward Ho! provides support to the observation of Jacobi (1979, 77) that shellfish alone would be unlikely to provide a long-term solution to regular short-falls in resources. More recent work, undertaken in 2002, has discovered two charred trees in the submerged forest, further occupation spreads beyond the original midden, deer footprint tracks in the Mesolithic peats, and further pointed, worked wood stakes driven into the peat. These are in the same area as those which have previously been dated to the Early Neolithic (Martin Bell pers. comm.).

The Three Holes Cave Late Mesolithic assemblage provides evidence for the renovation of tool-kits (shown by the significant quantities of microburins, broken microliths, and retouch chips, and a tranchet axe re-sharpening flake), while the significant number (32) of perforated and/or modified marine shells has parallels with Culverwell (Roberts 1996, 201). The location of the site (approximately halfway between the Dartmoor granite uplands and the contemporary coastline, and on a major watercourse tributary) further reinforces the picture of groups moving between the coast and the uplands (Roberts 1996, 201). The site is also unusual in having a faunal assemblage clearly associated with Late Mesolithic activity. Red deer, wild pig, and roe deer are present, with evidence of human action (fragmentation, burning, and cutmarks), although in general the faunal material is very fragmentary and weathered (Roberts 1996, 202).

There are claims for Mesolithic surface finds from several sites, including Beer Head (MacAlpine Wood 1929–32), Postbridge (Lydford), Fernworthy (Lydford), Bolt Head, Weare Gifford Cross (Worth 1933), Higher Spreacombe (Mortehoe), Mutter's Moor (Sidmouth, E Smith 1948–52), Yalland Farm (South Brent), East Week (South Tawton, Greig and Rankine 1953; Collop 1973) and Collaton (Whitchurch). Unfortunately it is not always possible to use typological approaches with this material, as illustrated at Yelland for example, where the majority of the microliths are broken, making classification difficult (Rogers 1946). Of particular interest are the alleged association of two Mesolithic artefacts and a "dug-out" boat in submerged forest deposits at Bigbury Bay (Winder 1924), and the rich series of

surface sites over an area of two square miles at East Week (Greig and Rankine 1953).

More recently, a gradiometer survey at Handsford Farm, Chawleigh was undertaken following the recovery of Mesolithic flint from fieldwalking by the ACE Archaeology Club in 1999. This survey revealed anomalies similar to those from the geophysical surveys carried out at Hawkcombe Head that later excavations showed to contain hearths and postholes. Although no excavation has taken place at Handsford Farm to test these anomalies, the survey suggests archaeological potential for Mesolithic hunter-gatherer activity (Ross Dean pers. comm.).

Palaeoenvironment studies on Dartmoor (Caseldine and Hatton 1994; Simmons 1996) show that upland areas such as Dartmoor have areas of repeated burning, which suggests that Mesolithic hunter-gatherers might have been manipulating their environment. Although these areas cannot be conclusively linked with Mesolithic flint scatters, it does suggest that hunter-gatherers may have been investing time and energy in areas that were visited frequently throughout the year (PJ Gardiner 2001).

Cornwall

Mesolithic evidence for Cornwall (Figure 2.4 on the facing page) is more identifiable than for Devon, with some sites having been excavated and sampled for radiocarbon dates, although surface collections of lithic scatters are also common. Key site and find-spot concentrations (including some of the largest assemblages of Mesolithic flint from Cornwall) were identified through predominantly surface finds in the Gwithian area, the West Penwith area (including Pednmên-an-mere, Carn Greeb and Rosketal Cliff, all within the parish of St Levan (Figure 2.4: 1–8, Berridge and Roberts 1986), the Constantine Bay area (Trevose Head) (Figure 2.4: 14) and the Lizard (Figure 2.4: 20–22, G Smith 1987). The limpet scoops from West Penwith may benefit from further investigation as would other material in Cornwall. Much of the material from Trevose Head comes from different locations with often uncertain provenance, for example over 8000 pieces of worked flint has been recovered from site TV1 covering both the Early and Late Mesolithic periods (Johnson and David 1982; Cave 1985). Jacobi has suggested that this area would have acted as a permanent occupation area, with coastal and inland resources being available (Jacobi 1979, 76–8).

In the Earlier Mesolithic period the Trevose Head locality would have been inland, only becoming a coastal location with later sea level rise (Johnson and David 1982). At Constantine Island, Norman and Miles (1977) investigated a site containing limpet shells, gravelly sand and hundreds of smashed beach pebbles. The flint assemblage contained many *ecaillé* pieces and may belong to the Obanian/Larnian industries (Norman and Miles 1977; Chris Norman pers. comm.). It should be noted however that the apparently coastal (and marine resource) focus of Mesolithic occupation in Cornwall, as represented by the collections at Stepper Point near Padstow, Penhale Headland near Newquay and North Cliff at Camborne (Jacobi 1979, 54) for example, may at least partly reflect bias in lithics collection, and that recent work (such as development monitoring and fieldwalking on lowland, inland sites) has suggested a significant inland archaeology for this period, perhaps reflecting the exploitation of a variety of environmental and landscape contexts during the Mesolithic (see Berridge and Roberts 1986). This has been specifically suggested for example by fieldwalking on Bodmin Moor, with its estimated 140,000 discrete Mesolithic flint scatters (Peter Herring and Andrew Jones, pers. comm.).

The area of the Lizard at Poldowrian, Croft Pascoe and Windmill Farm (Figure 2.4: 20–22) has been the subject of an extensive landscape survey. Fieldwalking, of an area on the cliff edge at 225m OD, produced large amounts of Late Mesolithic flint (G Smith 1987). Excavation at Poldowrian recovered hundreds of worked flints from the Late Mesolithic, together with pebble tools and quartzite hammer stones (G Smith and Harris 1982). There is also evidence for an Early Neolithic presence on the site and, unfortunately, there is considerable mixing with microliths being found above and below the Neolithic levels.

Further extensive fieldwalking and excavation has been carried out at Gwithian, near St Ives (Figure 2.4: 9) where 16 Mesolithic sites have been found on the Godrevy headland to the north side of the Red River estuary (C Thomas 1958; Roberts 1987a). Palaeogeographical and palaeoenvironmental evidence suggest that the estuary was extensive and tidal, providing a habitat rich in food and lithic raw material resources, to which Mesolithic peoples were repeatedly drawn (Roberts 1987a, 137). The sites (essentially discrete lithic scatters of Late Mesolithic age) have yielded hundreds of flint and chert artefacts (with a small percentage of retouched tools) as well as bevelled greywacke beach pebbles. Although these have traditionally been suggested to be "limpet hammers or scoops", Roberts (1987a, 135) argues convincingly for another, albeit unspecified, function.

On Bodmin Moor, Dozmary Pool has been recognised as an Early Mesolithic site (Figure 2.4: 26), possibly used for hide processing (on the basis of the heavy representation of scrapers), although the collection is loosely provenanced and mixed with later material (Jacobi 1979). Further evidence of Mesolithic activity has been found elsewhere on Bodmin Moor at the Colliford reservoir (Figure 2.4: 27). Fieldwalking from Butterstor (which has yielded bevelled pebbles – unlikey to be "limpet scoops" in this location),

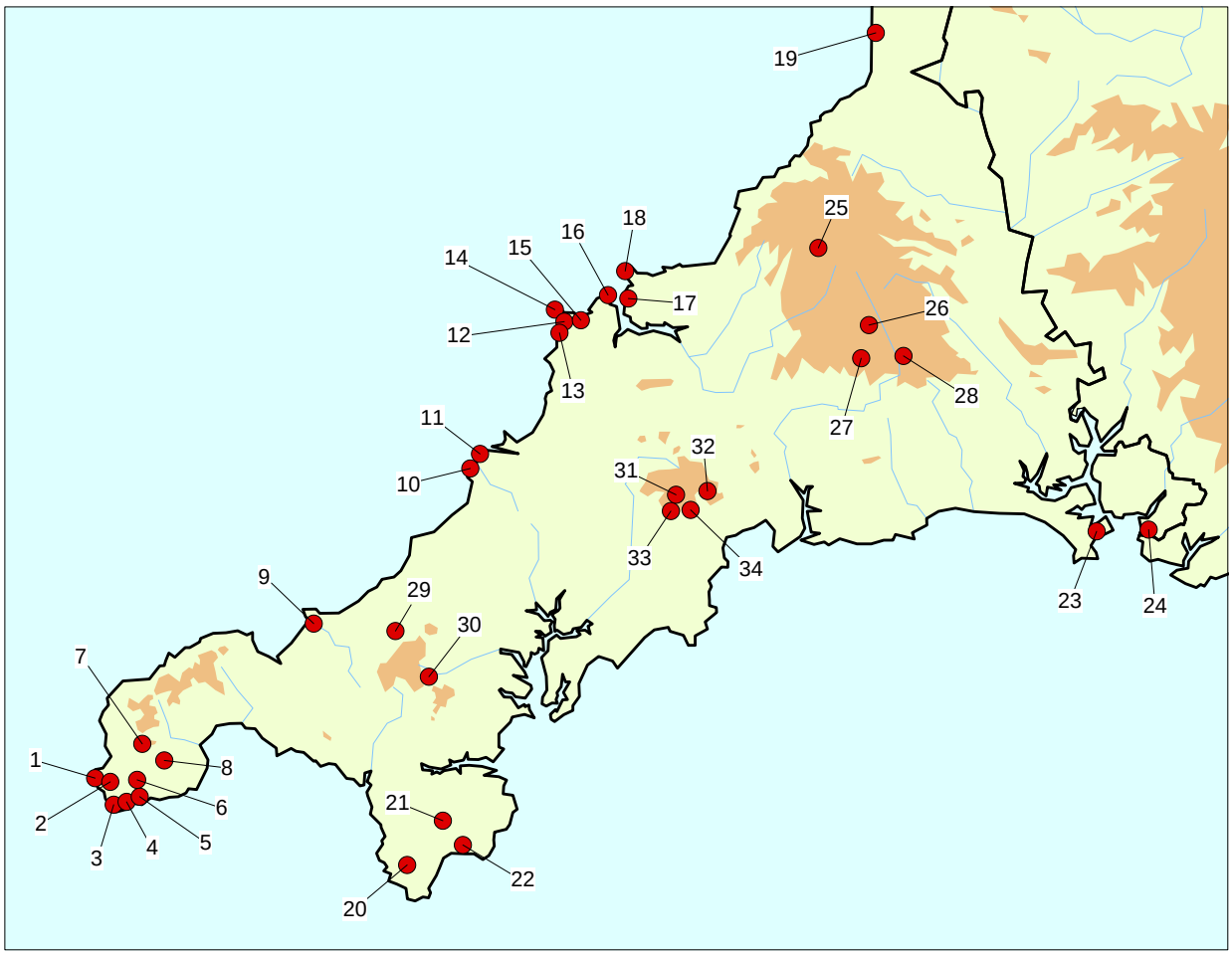

Figure 2.4: *Map of Cornwall showing key Mesolithic sites (after Berridge and Roberts 1986)*
1 Greeb, 2 Stamps, 3 Roskestal, 4 Pedn-mên-an-mere, 5 Treen, 6 Crean and Tressidder, 7 Carn Euny, 8 New Shop, 9 Gwithian, 10 Penhale Head, 11 Kelsey Head, 12 Booby's Bay, 13 Constantine Bay, 14 Trevose Head, 15 Harlyn Bay, 16 Stepper Point, 17 Daymer Bay, 18 Pentire Point, 19 Crooklets, 20 Windmill Farm, 21 Croft Pascoe, 22 Poldowrian, 23 Maker, 24 Staddon, 25 Crowdy Marsh Reservoir, 26 Dozmary Pool, 27 Colliford Reservoir, 28 Siblyback Reservoir, 29 Carn Brea, 30 Stithians Reservoir, 31 Cocksbarrow, 32 Caerloggas I & III, 33 Watch Hill, 34 Trenance Downs.

and elsewhere on the moor, has produced a general scatter of flint from the Later Mesolithic period, but it is believed that these sites do not represent base camps, but semi-permanent sites that were part of the seasonal hunting round (Herring and Lewis 1992).

Ashbee (1986a) has reviewed the evidence for Mesolithic occupation on the Isles of Scilly, noting the paucity of distinctive lithic material but also stressing the impacts of later prehistoric sea level rises and the apparent persistence of an essentially "Mesolithic" lifestyle (the exploitation of marine and seashore resources) into the Neolithic.

Although there appears to be extensive microlith production throughout Cornwall, certain areas appear to have been favoured: the cliff tops of the north coast, together with the lowland sites of Poldowrian and Trevose Head, the granite uplands of Bodmin Moor and the estuarine area around St Ives Bay of the Gwithian sites. Jacobi suggests that it was the same hunter-gatherer groups using these sites, rather than separate social groups (Jacobi 1979, 72). There may, however, be variability in the data collection, with a notable distribution of Mesolithic sites on the north coast of Cornwall and few sites on the south coast between the Helford River and the Tamar. This may be due in part to erosion exposing flint scatters, apparent on the north coast but not so in the south (Berridge and Roberts 1986).

It should also be stressed here that there has been very little opportunity to fieldwalk in upland Cornwall (with instances limited to rare forestry schemes, and searching in disturbed ground at gateways and fords, and around the several reservoirs), so the significant numbers of scatters found at such locations suggests that very large numbers of sites do exist in the uplands (see Herring and Lewis 1992 for further discussion of these points). Furthermore, away from the Lizard area there has still not been very much fieldwalking, and while pipeline work is helping to redress this issue there is still a bias in fieldwork against the enclosed

farmland of Cornwall (Peter Herring and Andrew Jones, pers. comm.). Finally, it would appear that much additional Mesolithic material lies unstudied in private and museum collections, and this resource may help to redress some of the biases discussed above.

Overall, for Cornwall, there is a concentration of material on the north coast. Berridge and Roberts (1986) saw these as predominantly cliff top hunting sites, with Poldowrian and Windmill Farm, on lower ground, being viewed as more long-term base camps, due to the variation in their flint collections. Jacobi (1979, 84–6) argued that the upland and inland finds from Bodmin Moor (and Dartmoor) represent summer (perhaps late summer) hunting, and whilst acknowledging the limitations of the available data also noted that the paucity of unshed red deer antlers and the absence of broken (or broken and carbonised) hazelnut shells and/or fruit stones (indicative of late summer gathering, perhaps for winter consumption) might be suggestive of absent human populations during late summer and the earliest part of the winter.

Gloucestershire

In some contrast to Somerset to the south, the Mesolithic archaeological record in Gloucestershire is a relatively minor one, with a rather patchy distribution, and notably richer for the Late Mesolithic. The Early Mesolithic is mainly characterised by stray finds of broad, obliquely blunted microlithic points (Saville 1984c, 69) but there is a series of Late Mesolithic sites, predominantly from the Cotswold uplands, which include the substantial assemblages from Syreford Mill (Whittington), Troublehouse Covert (Cherington), Boldridge Farm (Long Newton) and Hazleton North, the last of which includes *in situ* material recovered through systematic excavation (Darvill 2006, 11).

Where material is present it is primarily focused in the centre, south and west of the county; there are few collections from the east especially from the area of the Upper Thames valley, although taphonomic issues may be of importance here since changes to river patterns and later sedimentation have sealed large areas of low-lying landscape that would have been available during the Mesolithic (Darvill 2006, 11). The archaeology is generally dominated by surface collections, such as the microliths and cores, with later Neolithic artefacts, recovered from the surfaces at Leonard Stanley and Long Newton (Gracie 1938; 1942). The majority are characterised by relatively small numbers of artefacts and/or mixed collections, including Neolithic and/or Bronze Age material.

The most significant of the findspots in numerical terms are those within the Forest of Dean at Tog Hill, between Cold Ashton and Doynton (Sykes and Whittle 1965) and at Great Larkhill Farm and Boldridge Farm in the parish of Long Newton, with the assemblages dominated by microlithic material (Wymer 1977, 101–2).

The last twenty years has seen an increasing awareness of the Mesolithic resource in the Forest of Dean. Saville (1986) documented Nedge Cop flint scatter (found by Brian Walters) as the first unequivocal Mesolithic site in West Gloucestershire, with its mixture of Mesolithic, Neolithic and Bronze Age material. Walters (1988) expanded on the evidence from the Forest of Dean, covering 28 sites and noting that most of the valleys giving access to the St Briavels–Bream plateau have produced Mesolithic material. It should be noted that the "major Mesolithic camp site" at Briery Hill, Kilcot (Christie *et al.* 1994) contains mixed material, with the Mesolithic elements being the smallest component. Nonetheless, by the early 1990s nine substantial Mesolithic settlement areas had been claimed for the Forest of Dean (and the Lower Wye valley), balancing the material known from the Cotswolds and those lands east of the Severn (Walters 1989; 1991; 1992; Darvill 2006, 13).

Of potentially great interest in the Gloucestershire Mesolithic is the spatial relationship that can be observed between selected Mesolithic findspots and materials from later prehistoric periods. At Beverston, Tog Hill, Frocester, Kingscote, and Tetbury Upton (amongst others) Mesolithic surface material is associated with Neolithic and/or Bronze Age artefacts (Wymer 1977, 100–104). This continuity in landscape use (whether deliberate or accidental) is perhaps best expressed by the Mesolithic assemblage recovered at Hazleton North (characterised by crescent and scalene micro-triangle microlith forms and microburins), which has generated discussion as to possible reasons for the re-use of this location over apparently centennial timescales (Saville 1989). The Late Mesolithic assemblage was collected from a pre-cairn surface, lying beneath the Hazleton North Neolithic chambered tomb.

Also notable is the extensive spatial extents of some of the surface scatters, perhaps best exemplified by the material from Ashley Manor Farm (over 100 acres), Avening (over 40 acres), and Tog Hill (over 20 acres). Snashall (2002) has argued for a sustained and substantial Late Mesolithic occupation at Tog Hill on the southern escarpment, where flint was brought from the chalk, and a more sporadic presence at other sites. At these last sites imported raw materials suggest that some groups coming to the area had connections to both the east and the south (Snashall 2002, 129–131; Frances Healy pers. comm.). The Avening site is also notable for its location, with the artefacts recovered from high land above Nailsworth.

Recent work by Alex Brown and Martin Bell (AD Brown 2005) has identified a Mesolithic land-surface with overlying peat at Oldbury. The deposit includes lithic material and charcoal, the latter

indicating human impact on the coastal woodland during the Mesolithic period. Peats of Mesolithic date have also been identified at Woolaston in the Forest of Dean; the environmental sequence indicates burning episodes, although there is minimal artefactual evidence for human activity. At Hills Flats intertidal peat deposits have been sampled, yielding evidence of reed burning. There are also unstratified lithics from the general area of Hills Flats, although they are not directly associated with the environmental sequence (for further details of all of these sites see AD Brown 2005). This evidence from Gloucestershire shows strong parallels with Martin Bell's work (for example Bell *et al.* 2000; 2003) on the Welsh side of the Bristol Channel, such as at Goldcliff, where charcoal was associated with lithic scatters and evidence for the burning of grasses, probably reeds. On both sides of the estuary it appears that Mesolithic communities were modifying areas of coastal-edge plant communities, and this would appear to be comparable to the much more widely recorded evidence from the upper woodland edge on Dartmoor and Bodmin Moor (Martin Bell pers. comm.).

Wiltshire

The Mesolithic record in Wiltshire is relatively rich with a mixture of minor artefact findspots, recovered through surface collections, and a small number of significant assemblages, recovered both through excavations and surface collections. The archaeology, which shows something of a riverine distribution, is found throughout the county, although there are clusters in south Wiltshire (in the environs of Salisbury), and also in the north-east and north-west of the county (near the borders with West Berkshire and South Gloucestershire respectively).

Principal sites include the excavations at Castle Meadow, Downton (Higgs 1959; Radley 1969) and Cherhill (excavated in 1967, Evans and Smith 1983) and the surface collections from around Knighton (Froom 1965). Deep ploughing at Bapton Water Meadows, Stockton also brought up a small assemblage (32 artefacts) from an area *c.* 30 x 50m in size, perhaps suggesting the presence of a richer, buried assemblage there (Wymer 1977, 344; Rankine 1955).

At Cherhill, a Mesolithic occupation deposit lay on, and in, a contemporary soil and in an overlying tufa deposit, possibly from a nearby spring (Evans and Smith 1983). A Late Mesolithic industry in fresh condition was associated with charcoal, a little sarsen and animal bone including wild pig, aurochs, red deer and roe deer. A deliberately dug hollow contained struck flint, sarsen and animal bone. The occupation took place, on molluscan evidence, in closed woodland which became swampy as the tufa accumulated. There is a radiocarbon date of 4450–3750 cal BC (BM-447) for a bulk sample from a charcoal lens within the tufa, and although the nature of the deposit makes reworking a possibility, Late Mesolithic activity has none the less been demonstrated. The site, which was discovered by chance, is also a pointer to the kinds of location from which a gamut of environmental, behavioural and economic evidence for the period may be recovered (Frances Healy pers. comm.).

The site at Castle Meadow yielded a working floor, with evidence for tool manufacture and distinct divisions into separate activity areas (Higgs 1959, 215–216), and also hearths and probable Mesolithic structures (Higgs 1959, 224–228). The presence of structures was suggested by a series of stake holes, and Higgs (1959, 231) suggested that these represented shelters that may well have been light-weight and associated with summer or temporary camps.

A surface collection near Stonehenge has provided possible evidence of raw material exchange and/or long distance acquisition, in the form of a flake made in "Portland" chert (Wymer 1977, 333). However "Portland" chert can come from numerous sources, including the Carstens series soils of south-west Dorset (PJ Woodward and Bellamy 1991) and the Portland Beds (and other deposits) in north Wiltshire (Pitts in Evans and Smith 1983, 79, 81); the origin of this artefact should therefore be treated cautiously. Moreover, there is relatively little diagnostic Mesolithic material from the Stonehenge area, with only several heavy core tools claimed (Cleal *et al.* 1995, 41–43) although an unambiguously Mesolithic assemblage has been recovered from the Avon valley (Richards 1990, 263; Frances Healy pers. comm.). A suggestion of Mesolithic monumentality is provided by a row of three postholes of Boreal Age spaced at intervals of *c.*10m, and a another feature which may originally have been a further posthole, in what is now the car park at Stonehenge. The evidence of radiocarbon dates, mollusca and pollen places these features in the period 8090–6590 cal BC (HAR-455, HAR-456, GU-5109, OxA-4919, OxA-4920) in light, open woodland including pine, birch and hazel. The massive pine posts would have been 0.60–0.80m in diameter (Cleal *et al.* 1995, 43–56, 470–3). These features, which contained no artefacts, were investigated and identified as Mesolithic almost certainly only because of their location; had it not been for their proximity to Stonehenge there would have been little incentive to date and analyse their contents. It is worth noting also that a ditch buried beneath colluvium at Strawberry Hill in north Wiltshire has been attributed to the Mesolithic on the evidence of radiocarbon dates and mollusca (Allen 1992). At Foxbridge Farm, Wanborough a single microlith was recovered from a bowl-shaped pit filled with soil and ash (Wymer 1977, 345). The probable under-recognition of Mesolithic subsoil features is explored by Allen and Gardiner (2002).

Dorset

The Mesolithic record of Dorset is, in terms of numbers of sites and collections, also a rich one, most notably characterised by the well-publicised sites at Hengistbury Head and Culverwell, although there are a number of other significant Mesolithic assemblages. In general the richest zone for sites and findspots is the south coast area around Lulworth, Weymouth, Portland, and Bournemouth, although there are smaller concentrations in several other parts of the county (Wymer 1977, 67–77).

The principal surface collections are from places such as Penbury Knoll (Green and Lewis 1970), Iwerne Minster (Summers 1941), Fleet, Weymouth and Winterborne Monkton (Bayard's Farm), whilst significant excavations have taken place on Mesolithic habitation sites at Culverwell (and other Portland sites, Palmer 1970; 1990), Hengistbury Head (Barton 1992), Ulwell (Calkin 1952) and Whitcombe Hill (Palmer 1972).

Hengistbury Head has of course provided rich evidence of Early Mesolithic activities. The average thermoluminescence age of 9750±950 years BP indicates an occupation during the Boreal or pre-Boreal, when Hengistbury may have been as much as 20 km inland of the contemporary coastline (Barton 1992, 273). Although the majority of the raw materials (both flint and non-flint) are of probable local origin, there is evidence for the use of sandstone originating from much further into the South West (Barton 1992, 273). In general the narrow range of tool types at Hengistbury (microliths, end-scrapers and micro-denticulates) has been seen as suggesting a specialised activity site, probably associated with game hunting (partly based on the presence of similar tool-kits at other upland locations in the region). The presence of large numbers of proximal microburins has been interpreted by Barton (1992, 274) as evidence that the site was a primary tool production zone and, while microwear analysis was not appropriate due to post-depositional surface modifications, damage to microlith tips has been interpreted as evidence of tool-use and possible re-tooling of projectile equipment. Microlith morphology also suggests comparison with other sites in the general region, including Castle Meadow to the north and Winfrith Heath (Whitcombe Hill) to the west (Barton 1992, 274).

Alongside the key site at Hengistbury is that at Culverwell, near the southern tip of the Isle of Portland (Palmer 1999). Shell midden and hearth charcoal have yielded radiocarbon dates of 5700–6350 cal BC (BM-473) and 6210–5750 cal BC (BM-960), while thermoluminescence samples from the charcoal-yielding hearth have produced a weighted average date of 5400±390/640 BC (OxTL 501 b,m; Palmer 1999, 92). AMS radiocarbon dating of *Monodonta* shells (AA-28213 through AA-28220) has yielded a range of calibrated ages between 6460–6240 and 5480–5300 cal BC (Palmer 1999, 91). The site consists of several important features: including the midden (*c.*20m x 18m x 1m), with mollusc remains dominated by limpet, periwinkle and topshell and a floor associated with hearths, a (cooking?) pit, and possible windbreak and hut structures indicated by a series of postholes (Palmer 1999, 34–35). The lithic assemblage is characterised by the large numbers of pointed picks (the Portland Picks) and Palmer (1999, 57, 148) suggests that the abundance of these artefacts at Culverwell and on Portland in general reflects the distinctive characteristics of the locally-available limestone raw material, and a localised adaptation by the Mesolithic occupants. The region to the west of Portland Bill has also been significant for Mesolithic archaeology, with large numbers of artefacts recovered from the Fleet behind Chesil Beach (Palmer 1990, 87).

Cranborne Chase has long seen intensive investigation, most recently by Martin Green. His collections document a substantial presence throughout the Mesolithic (Arnold *et al.* 1988; Green 2000, 20–28). They are also extensive enough to show a strikingly consistent distribution, concentrated on patches of clay-with-flints (a major flint source then and in later periods) in the north of the Chase, with other sites on the Reading Beds and around the headwaters of the river Allen further south (Barrett *et al.* 1991, 29–30; Green 2000, fig 11). In this last area is the natural swallowhole known as the Fir Tree Field shaft, the deposits in which provide a dated, stratified sequence spanning the fifth, fourth, and third millennia cal BC (Allen and Green 1998; Green 2000, 27–28; Allen 2000, 40–45). Its lower part was filled with naturally accumulated chalk rubble which contained two articulated roe deer skeletons, one nearly 2m above the other, which seem to have fallen to their deaths, respectively in the third and fourth quarters of the fifth millennium (4460–4250 cal BC, OxA-7991 and 4360–4040 cal BC, OxA-7990). The earthy fills of the weathering cone at the top of the shaft contained far more cultural material. Near its base were seven microliths, most of them rod forms, tightly clustered, as if they had been hafted when they entered the shaft and would thus have been deposited there close in time to the last use of the weapon of which they formed a part. They were stratified above short-life charcoal dated to 4340–4040 cal BC (OxA-8011) and below an early fourth millennium hearth with domesticated animal bone and Neolithic artefacts. The implication is that, locally at least, Mesolithic traditions continued to the end of the 5th millennium and that the transition to Neolithic beliefs and practices was relatively rapid (Frances Healy pers. comm.).

2.7.3 Discussion

The evidence for the Mesolithic in the South West is geographically variable, with surface scatter material present across the region (in varying quantities) and particularly rich site-based evidence found predominantly in Somerset and Dorset. Although the surface scatters and isolated finds are almost always undated, it is still possible to explore issues of Mesolithic land-use on the basis of the wide range of topographical and geological locations known. Moreover, the (relatively small) sample of key sites from the South West does permit the asking of a series of key questions with regards to Mesolithic occupation and behaviour, including raw material acquisition and usage, subsistence strategies, site structure and organisation, and hunter-gatherer movement and mobility models. However it must also be stressed that current Mesolithic research across the British Isles is looking beyond purely functional topics and that attention should also paid to issues such as the active role of material culture, concepts of inhabitation, control and manipulation of the environment, cosmology, tasks, routines and social relations.

2.8 Summary

The Palaeolithic and Mesolithic archaeological resource of the region is, while varied in distribution and quality, one of considerable importance, at both a regional and national level. This importance is best summarised by its rich cave-based archaeology (especially for the Late Upper Palaeolithic period, although also for the Middle and Early Upper Palaeolithic, and Mesolithic as well), significant Pleistocene fluvial landscapes and associated archaeology (principally the Solent River and the Bristol Avon), and its wide-ranging evidence for Mesolithic land-use; this includes evidence for seasonal scheduling of activities onto particular landscapes, group mobility and possible exchange systems, specialist site types, environmental manipulation, and the adaptations and subsistence strategies associated with marine resources.

This resource assessment has also sought to highlight possible areas and agendas for future research, including the relationship between cave and open-landscape sites, Mesolithic land-use strategies, the nature of social relations and the role of material culture within those, the development of new, and expansion of existing, geochronological frameworks for all periods and the palaeoenvironmental contextualisation of the archaeological evidence for all periods, with particular emphasis towards human and hominin responses to, and influences upon, environmental change, and an emphasis upon the patterns and processes of hominin and human colonisation and abandonment phases.

Acknowledgements

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Thanks are also due to Roger Jacobi, Abigail Bryant and Julie Gardiner for permission to consult the PAMELA database at Wessex Archaeology, to Neil Holbrook for providing a pre-publication copy of Holbrook and Juřica (2006), and to Talya Bagwell, Ann Dick, Frances Griffith, and John Salvatore for providing HER data and responding to a number of queries. Rob Hosfield would like to thank Vanessa Straker for bringing Worth's Cattedown Bone Cave to his attention and Martin Bell for his comments regarding Westward Ho! and other Mesolithic intertidal sites. Vanessa Straker would like to thank Rob Scaife for allowing access to a draft of his pollen review for southern England.

2.9 Radiocarbon dates

Table 2.3: *Details of radiocarbon dates used in the text. Calibrated ranges are at 2σ (95.4%) and were calculated with OxCAL 3.10 (Bronk Ramsey 2005) using the probability method and the IntCal04 calibration curve (Reimer et al. 2004).*

Lab. Ref.	^{14}C age BP	Cal BC	Site	Context	Reference
AA-28213	6800±60	5840–5610	Culverwell	Shell from midden	Palmer (1999)
AA-28214	6730±55	5730–5550	Culverwell	Shell from midden	Palmer (1999)
AA-28215	6410±55	5490–5300	Culverwell	Shell from midden	Palmer (1999)
AA-28216	7145±70	6220–5880	Culverwell	Shell from midden	Palmer (1999)
AA-28217	7145±60	6210–5890	Culverwell	Shell from midden	Palmer (1999)
AA-28218	7525±60	6470–6240	Culverwell	Shell from midden	Palmer (1999)
AA-28219	6525±60	5620–5360	Culverwell	Shell from midden	Palmer (1999)
AA-28220	6855±75	5900–5620	Culverwell	Shell from midden	Palmer (1999)
AA-30681	3300±55	1740–1450	Porlock Marsh	Aurochs bone	Straker, pers. comm.
Beta-93824	5890±70	4940–4580	Tor Royal	Peat	West *et al.* (1996)
Beta-115384	11400±80	11460–11160	Ashton Keynes		Lewis *et al.* (2001)
Beta-147105	4700±50	3640–3360	Birdcombe	Oak charcoal	PJ Gardiner (2000; in press a)
Beta-147106	5420±60	4370–4050	Birdcombe	Oak charcoal	PJ Gardiner (2000; in press a)
Beta-168611	11120±170	11360–10870	Allen valley, Cranborne Chase		French *et al.* (2003)
Beta-189166	7000±40	5990–5780	Wimborne Minster	Peat	Scaife (1994)
BM-447	5280±140	4450–3750	Cherhill	Charcoal associated with occupation	Evans and Smith (1983)
BM-471	9115±110	8650–7950	Aveline's Hole	Burial	Tratman (1977)
BM-473	7150±135	6350–5700	Culverwell	Charcoal from midden	Palmer (1999)
BM-525	9080±150	8700–7750	Gough's Cave	Burial ("Cheddar Man")	Stringer (1986)
BM-960	7101±97	6210–5750	Culverwell	Charcoal from hearth	Palmer (1999)
BM-2183R	12350±160	13100–11900	Gough's Cave	Cut-marked bone. See OxA-589, OxA-590	Jacobi (1991)
BM-2188R	12380±230	13200–11800	Gough's Cave	Animal bone	Bowman *et al.* (1990); Jacobi (2004)
BM-2973	8180±70	7450–7040	Totty Pot	Burial	Ambers and Bowman (2003)
GrN-5393	8100±50	7310–6830	Aveline's Hole	Stalagmite in human skull. ?too recent	Tratman (1977)
GU-1739	8655±85	7960–7530	Redhill Marsh	Mesolithic activity	Walker and Austin (1985)
GU-1739	9250±85	8710–8280	Redhill Marsh	Mesolithic activity	Walker and Austin (1985)
GU-3239	8640±200	8300–7200	Avon valley (Durrington Walls)		Scaife (in Cleal and Pollard 2004)
GU-5109	8880±120	8300–7650	Stonehenge car park	Charcoal from posthole	Cleal *et al.* (1995)
GU-5387	7480±70	6460–6220	Sourton Down	Peat	Weddell and Reed (1997)
GU-5615	5830±50	4800–4540	East Moor	Peat 77.5–82.5cm	Gearey *et al.* (2000a)
GU-8220	4690±50	3640–3360	Halscombe Allotment	Bog oak	Straker *et al.* (nd)
GU-11978	7815±40	6770–6510	Hawkcombe Head	Holly charcoal	PJ Gardiner (in press b)
GU-11979	7420±35	6390–6220	Hawkcombe Head	Hearth	PJ Gardiner (in press b)
HAR-455	9130±180	8900–7700	Stonehenge car park	Charcoal from posthole	Cleal *et al.* (1995)
HAR-456	8090±140	7500–6650	Stonehenge car park	Charcoal from posthole	Cleal *et al.* (1995)
HAR-1831	5650±70	4690–4350	SLP - Clay-Peat Dates: marine clay-peat interface	Walton Heath	Coles and Dobson (1989)
HAR-3695	6330±100	5490–5050	Higher Moors	Peat	Scaife (1984)
HAR-4568	4500±110	3550–2900	Poldowrian	Pooled hazelnut shells (?too recent)	G Smith and Harris (1982)
HAR-5083	7590±100	6640–6240	Dozmary Pool		Simmons *et al.* (1987)
HAR-5632	6100±200	5500–4550	Westward Ho!	Midden	Balaam *et al.* (1987)
HAR-5640	5200±120	4350–3700	Westward Ho!	Top of peat above midden	Balaam *et al.* (1987)
HAR-5641	5740±100	4800–4360	Westward Ho!	Peat above midden	Balaam *et al.* (1987)
HAR-5645	6320±90	5480–5050	Westward Ho!	Midden	Balaam *et al.* (1987)
I-15549	5410±110	4460–3980	Hoar Moor		Francis and Slater (1990)
OxA-464	12470±160	13200–12000	Gough's Cave	Animal bone	Gillespie *et al.* (1985); Housley (1991); Jacobi (1991); Housley *et al.* (1997)
OxA-465	12360±170	13100–11900	Gough's Cave	Animal bone	Gillespie *et al.* (1985); Housley (1991); Jacobi (1991); Housley *et al.* (1997)

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Lab. Ref.	^{14}C age BP	Cal BC	Site	Context	Reference
OxA-466	12800±170	13800–12300	Gough's Cave	Animal bone	Gillespie *et al.* (1985); Housley (1991); Jacobi (1991); Housley *et al.* (1997)
OxA-535	12210±160	12900–11800	Sun Hole	Human bone	Gowlett *et al.* (1986a); Housley (1991); Jacobi (1991); Housley *et al.* (1997)
OxA-589	12340±150	13000–11900	Gough's Cave	Cut-marked bone. Repeat of BM-2183R	Gowlett *et al.* (1986a); Housley (1991); Jacobi (1991); Housley *et al.* (1997)
OxA-590	12370±150	13100–12000	Gough's Cave	Cut-marked bone. Repeat of BM-2183R	Gowlett *et al.* (1986a); Housley (1991); Jacobi (1991); Housley *et al.* (1997)
OxA-799	9100±100	8650–7950	Aveline's Hole	Human bone	Gowlett *et al.* (1986b); Housley (1991)
OxA-1071	12300±180	13000–11800	Gough's Cave	Animal bone	Hedges *et al.* (1997); Housley (1991); Jacobi (1991); Housley *et al.* (1997)
OxA-1789	12320±130	12950–11950	Kent's Cavern	Worked bone	Hedges *et al.* (1989); Housley (1991); Jacobi (1991); Housley *et al.* (1997)
OxA-2234	11480±90	11610–11220	Gough's Cave	Human bone (?conserved). Joins OxA-2795	Hedges *et al.* (1991); Jacobi (2004)
OxA-2795	11820±120	12000–11450	Gough's Cave	Human bone. Joins OxA-2234	Hedges *et al.* (1991); Jacobi (2000)
OxA-2796	12380±110	13000–12050	Gough's Cave	Human bone	Hedges *et al.* (1991); Housley *et al.* (1997)
OxA-2797	11870±110	12050–11500	Gough's Cave	Worked antler	Hedges *et al.* (1991); Jacobi (2000)
OxA-3208	12260±140	12900–11800	Three Holes Cave	Cut-marked animal bone	Chamberlain and Williams (2001); Hedges *et al.* (1996)
OxA-3209	12180±130	12700–11800	Three Holes Cave	Animal bone	Chamberlain and Williams (2001); Hedges *et al.* (1996)
OxA-3411	12650±120	13300–12300	Gough's Cave	Cut-marked bone	Hedges *et al.* (1994); Jacobi (2000)
OxA-3412	12490±120	13100–12150	Gough's Cave	Cut-marked bone	Hedges *et al.* (1994); Jacobi (2000)
OxA-3413	12940±140	13850–12950	Gough's Cave	Cut-marked bone	Hedges *et al.* (1994); Jacobi (2000)
OxA-3414	12570±120	13200–12200	Gough's Cave	Human bone	Hedges *et al.* (1994); Housley *et al.* (1997)
OxA-3452	12400±110	13000–12100	Gough's Cave	Cut-marked bone	Hedges *et al.* (1994); Jacobi (2000)
OxA-3890	12150±110	12500–11750	Three Holes Cave	Animal bone	Chamberlain and Williams (2001); Hedges *et al.* (1996)
OxA-3891	11980±100	12120–11680	Three Holes Cave	Animal bone	Chamberlain and Williams (2001); Hedges *et al.* (1996)
OxA-4106	12670±120	13350–12300	Gough's Cave	Cut-marked bone	Hedges *et al.* (1994); Jacobi (2000)
OxA-4107	12550±130	13200–12200	Gough's Cave	Worked bone	Hedges *et al.* (1994); Jacobi (2000)
OxA-4150	10710±110	10940–10440	Great Rissington		Wilkinson (1993)
OxA-4782	40400±1600	—	Hyaena Den	Cut marked tooth	Jacobi (2000); Hedges *et al.* (1996)
OxA-4919	8520±80	7740–7360	Stonehenge car park	Charcoal from posthole	Cleal *et al.* (1995)
OxA-4920	8400±100	7600–7180	Stonehenge car park	Charcoal from posthole	Cleal *et al.* (1995)
OxA-5692	12250±110	12750–11850	Kent's Cavern	Cut-marked animal bone	Jacobi (2004); Hedges *et al.* (1996)
OxA-5844	4860±65	3800–3510	Hay Wood Cave	Human bone	Richards and Hedges (1999)
OxA-6001	7120±110	6230–5760	Sourton Down	Peat	Weddell and Reed (1997)
OxA-7990	5385±65	4350–4050	Fir Tree Field shaft	Bone from shaft infill (-5.2m)	Allen and Green (1998)
OxA-7991	5500±55	4460–4250	Fir Tree Field shaft	Bone from shaft infill (-7m)	Allen and Green (1998)
OxA-7994	12430±80	13000–12150	Kent's Cavern	Cut-marked animal bone	Jacobi (2004); Bronk Ramsay *et al.* (2000)
OxA-8002	12240±100	12700–11850	Kent's Cavern	Cut-marked animal tooth	Jacobi (2004); Bronk Ramsay *et al.* (2000)

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Lab. Ref.	^{14}C age BP	Cal BC	Site	Context	Reference
OxA-8011	5355±45	4330–4050	Fir Tree Field shaft	Charcoal from silting Layer 8 (Mesolithic flint)	Allen and Green (1998)
OxA-11230	6700±45	5710–5530	Shapwick Heath Borehole A	Plant macrofossil	Wilkinson (1998a); Gerrard and Aston (forthcoming)
OxA-13512	36800±450	—	Bench Tunnel Cave	Animal bone associated with leaf point	Jacobi *et al.* (2006)
OxA-13716	31730±250	—	Uphill Quarry	Worked bone or antler	Jacobi *et al.* (2006)
OxA-13803	31550±340	—	Hyaena Den	Worked bone or antler	Jacobi *et al.* (2006)
OxA-14164	24470±110	—	Eel Point, Caldey	Human bone	Schulting *et al.* (2005)
Q-672	6585±130	5740–5300	Westward Ho!	Peat	Balaam *et al.* (1987)
Q-1211	5005±140	4250–3500	Westward Ho!	burnt wood adjoining midden	Jacobi (1979)
Q-1212	4860±140	4000–3350	Westward Ho!	animal bone from midden	Jacobi (1979)
Q-1458	9090±110	8650–7950	Aveline's Hole	Burial	Tratman (1977)
Q-2779	5420±60	4370–4050	Marazion Marsh		Healey (1993)
Q-2781	6460±80	5610–5290	Trewornan		Healey (1999)
SRR-3203	11020±190	11350–10700	Gordano valley	Peat	Gilbertson *et al.* (1990)
Unknown	5000±50	3950–3660	Lower Pitts Farm	Burning associated with Mesolithic activity	Taylor (2001a)
Wk-8500	7100±70	6100–5800	Stannon	Peat	Tinsley (2004)
Wk-8501	5290±55	4260–3970	Stannon	Peat	Tinsley (2004)
Wk-10647	7080±60	6070–5830	Halscombe Allotment	Peat	Ralph Fyfe pers. comm.
Wk-10876	3425±60	1900–1530	Porlock Marsh	Palaeochannel top	Straker *et al.* (2004)
Wk-10878	5633±59	4600–4340	Porlock Marsh	Palaeochannel base	Straker *et al.* (2004)

Note: GU-1739 is intentially duplicated as both dates are given with this laboratory number in the source.

3

Neolithic and Early Bronze Age Environmental Background

Keith Wilkinson and Vanessa Straker

3.1 Introduction

The Neolithic and Early Bronze Age periods both fall within the middle of the Holocene geological series (equivalent to the Flandrian stage, RL Jones and Keen 1993, 208). In north-western Europe, the Holocene has been sub-divided in a number of ways based on vegetation changes observed in palynological and plant macrofossil records from peat bogs, including, in the case of the former, the Somerset Levels (Figure 3.1 on the next page).

The Neolithic coincides with West's (1980) Fl II–Fl III chronozones, in other words the early to late temperate periods of the Holocene. Therefore, in West's model, the Neolithic is seen as immediately post-dating the Holocene interglacial optimum. A further means of subdividing the Middle Holocene is Godwin's (1940) pollen zonation scheme (Figure 3.1 on the following page). The Neolithic is encompassed in the first two sub-stages of zone VII and is characterised by high-diversity temperate forests. Indeed by the end of chronozone Fl II/zone VIIa all the deciduous tree species characteristic of the mid-interglacial woodland were in place. All later colonisations would be as a result of deliberate or accidental importation by people.

The frequently used, "climatic optimum" phrase relates to the period 7000–3700 BC when Nordic seas were at their warmest and waters off Greenland less affected by sea ice than today (Koç and Jansen 1994). Nevertheless, Girling's (1979; Coles and Coles 1986, 48) well-known discovery of insect fossils associated with the Sweet Track, that are suggestive of summers 2–3°C hotter and winters 2–4°C cooler at 3800 BC, provides a salutary reminder of the local relevance of hemispherical climate reconstructions such as those of Koç and Jansen (1994). Mark Robinson's (2002) review of insects from southern English Neolithic sites similarly suggests that mean summer temperature may have been 2–3°C higher during the Neolithic, although he also points out that loss of some indicator species could have been caused by human habitat modification.

Relative sea level rise decelerated throughout the Neolithic from the peak levels seen in the Early Mesolithic (Haslett *et al.* 2001). Although the most recently published Holocene sea level curve for the South West (Heyworth and Kidson 1982; Haslett *et al.* 1997b; 2001) lacks the detail of its counterparts for the east coast of England (Devoy 1979; Haggart 1995; Shennan and Andrews 2000), it does provide some indication of the magnitude of coastal changes in the Neolithic (Figure 3.2 on page 65). A separate sea level curve has been produced for the Isles of Scilly by Charles Thomas (1985, 17–34), but it lacks absolute dating control for the prehistoric period and does not extend beyond the Early Bronze Age. For these reasons the generic South West sea level curve is used for the Isles of Scilly in this report.

According to the sea level curve for the South West, sea levels at about 4500 BC were *c.*5m below those of the present, and by 1500 BC were within 1–2m of current levels (Figure 3.2 on page 65). Therefore, during the course of the Neolithic, there was substantial coastal change resulting in the inundation and subsequent burial by marine and intertidal deposits of significant areas of former coastline. Several of these buried landscapes (termed "submerged forests" in the case of those exposed in the present intertidal zone) have been investigated (see for example, Balaam *et al.* 1987; Druce 1998) but direct evidence for Neolithic human activity has only been found on the Somerset Levels (Coles and Coles 1986). Sedimentation of intertidal muds resulting from Neolithic sea level rise has been informally classified by

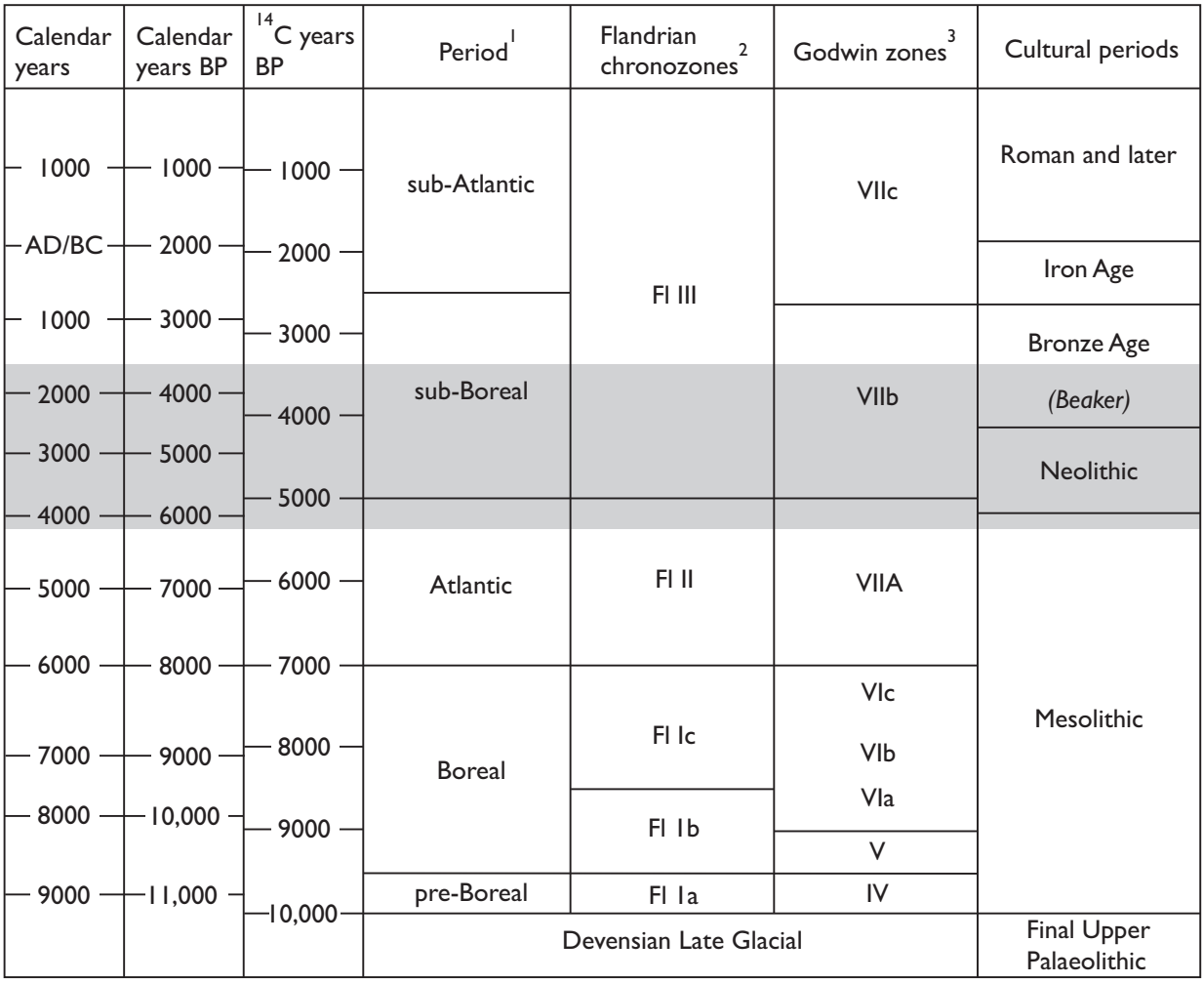

Figure 3.1: *Holocene stage names and cultural periods. Notes: 1 after Blytt (1876) and Sernander (1908), 2 after West (1980), and 3 after Godwin (1940). The shading covers the period discussed in this chapter*

John Allen as the lower Wentlooge formation (Allen 1987; Allen and Rae 1987) in the Severn levels and formally as the Somerset Levels Formation in that part of Somerset (Kidson and Heyworth 1976; Campbell *et al.* 1999).

Change in Holocene river valley environments is partly related to the pattern of relative sea level rise. Rising sea levels reduced river gradients, which, together with the development of Middle Holocene forests, led to alterations in river bedform. Thus by the beginning of the Neolithic, in common with most lowland rivers in north-west Europe as a whole, rivers in the South West had evolved meandering or anastomosing bedforms (AG Brown 1997, 210). Unlike the same river floodplains today, there is little evidence for channel migration or indeed deposition of fine-grained sediments on floodplains during the Neolithic and much of the Bronze Age. AG Brown (1997, 210) has argued that the stasis of lowland floodplain during the Late Mesolithic to Late Bronze Age was a product of the stabilising influence of the alder and hazel woodland, combined with a less seasonal flood regime than that seen at present.

Some floodplains in calcareous areas of the South West also saw the development of tufa during the Middle Holocene, while similar deposits are also associated with spring waters of the same period. These deposits result from the evaporation of water that is super-saturated with calcium carbonate and can only develop in low-energy, sediment-free waters; they also require a warm climate to form (Pedley 1990). It is notable that where tufa has been investigated in the South West it has always been associated with shade-loving land snails, suggesting adjacent forest environments (Evans and Smith 1983; Willing 1985; Goudie and Parker 1996, 60–6; Davies *et al.* 2001).

River behaviour only appears to have altered, from the pattern described, from the Late Bronze Age onwards when sedimentation of mineral silts and clays on floodplains is attributed to widespread forest clearance of floodplains and in the wider river catchment (Robinson 1992). Detailed palynological studies from

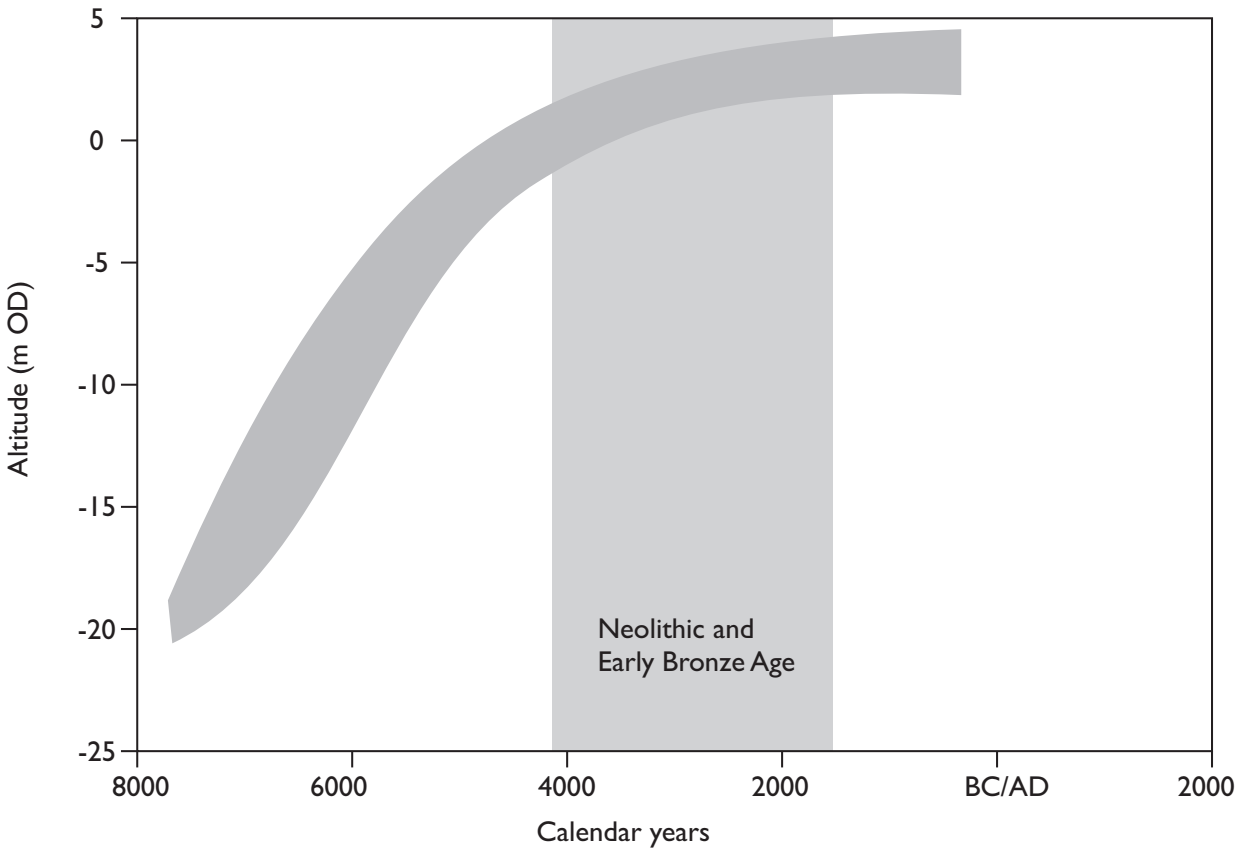

Figure 3.2: *Holocene sea level curve for the Severn estuary by Heyworth and Kidson (1982) as modified by Haslett et al. (2001) and the authors.*

Ripple Brook, near Tewkesbury on the River Severn, suggest a time lag of 300 to 400 years between woodland clearance and deposition of fine-grained alluvium on the floodplain (AG Brown and Barber 1985).

Away from the coasts and floodplains, the soils of the South West at the beginning of the Neolithic are thought to have been forest-supporting Brown Earths (Limbrey 1975). These had developed continuously since the Devensian Late Glacial and were of variable thickness depending upon parent material. Brown Earths developing on the Wessex chalklands, Mendip, areas of south Devon and the Lizard peninsula of Cornwall, did so in loess, creating particularly silt-rich soils (Catt 1977; 1978). Models developed in south-eastern England suggest there was little geomorphological change in these "dry" landscapes during the Neolithic, and that widespread slope erosion and consequent deposition in dry valleys only occurred in the Late Bronze Age (Bell 1983).

This hypothesis has yet to be tested over most of the South West region. However, Mike Allen's work (1992; 1995) on the chalklands of Wiltshire and Dorset demonstrates that in some valleys colluvial sedimentation had started in the Late Neolithic/Early Bronze Age.

3.2 Vegetation

Palynological work carried out in the region has enabled a detailed picture to be drawn of the Middle Holocene forests which Neolithic people exploited, settled, cleared and farmed. Whereas those studies undertaken before 1990 allowed a regional vegetation model to be constructed (for example, Birks *et al.* 1975; Bennett 1989; Birks 1989), analyses conducted after that date have filled in much of the sub-regional detail. Study of insect remains from archaeological sites – mostly carried out in the last two decades – has enabled detailed reconstructions of local woodland habitat to be established (see Robinson 2002 for a review). Indeed Robinson's (2002) synthesis of insect studies from southern England emphasises the diverse character of Neolithic woodland and it is notable that many insect species once characteristic of the "wildwood" have disappeared from the modern fauna. Therefore in this section the regional vegetation is discussed first, together with general explanations for its change. Following this, attention is turned to the Neolithic environmental history of the six topographic zones that characterise the South West and the models of people-environment interaction that have been proposed.

According to Bennett's (1989) analyses of the pollen diagrams available in the 1980s, the vegetation of the South West at the end of FI II varied according to geological substrate (Figure 3.3 on the next page). On the limestone (and chalk) of the Cotswolds, Mendip and Wessex Downs the forest was dominated by broad-leaved lime (*Tilia*) (henceforth called "lime"), oak (*Quercus*), ash (*Fraxinus*) and elm (*Ulmus*). Lowlands bordering the Severn and above the intertidal zone largely comprised alder (*Alnus*) carr, whereas the Carboniferous, Devonian, Triassic and Jurassic rocks of western Somerset, Devon and Cornwall supported an oak-hazel (*Corylus*) woodland, apart from Dartmoor, which seems to have been covered by birch (*Betula*) (Caseldine and Maguire 1986).

It is now known that on the "eve" of the Neolithic, these woodlands were not the pristine natural environment that biogeographers once thought. Recent palynological data from the South West indicate localised Mesolithic clearance in areas that are now moorland, on floodplains and also in lowland peat bogs (for example, Caseldine 1999; Fyfe *et al.* 2003a; J Jones 2004). Nevertheless for the most part these impacts appear to have been slight, short-lived and temporally diverse. Initial Neolithic forest clearance in the South West dates from around 4000 BC in eastern Dorset and slightly later in areas further to the west (Waton 1982). As with previous Mesolithic woodland modification it was initially small-scale and of short duration (Roberts 1998, 195). However, often coincident with Early Neolithic woodland clearance is the well-known elm decline which has been recognised in numerous pollen diagrams from the South West and dates to around 3700 BC. The exact causes of the Early Neolithic elm decline are still a source of some debate, but the consensus is that humans were a vital agent, either in the spread of Dutch elm disease or by "weakening" elm forests, thereby making them more susceptible to attack (Scaife 1988).

Pollen spectra from the South West that post-date the elm decline indicate that woodland grew back in many areas from which it had been cleared, although elm did not always recover to its former levels. Thereafter the woodland was only occasionally impacted by people – and only then on a small scale – until the very Late Neolithic and Early to Middle Bronze Age. It would appear, therefore, that a pattern of shifting agriculture and small scale pastoralism was maintained throughout the Neolithic. The Wessex Downs seem to be an exception in this respect as analysis of mollusc shells from buried soils and ditch sequences associated with monuments that span the entire Neolithic indicate the maintenance of open grassland throughout the period (for example, Evans 1971b; 1972). It would appear that this area was kept open by grazing herds of cattle and sheep, perhaps to maintain visibility to the funerary and ritual monuments that are widespread in this part of the region (Roberts 1998, 196). Fowler (1983, 36) has suggested that there was a fundamental change in subsistence economy in the Early to Middle Bronze Age to one where arable crops became of paramount importance. Widespread forest clearance accompanied this change in order to open up new areas on which crop cultivation could take place. These large-scale clearances took place asynchronously across the South West and were frequently accompanied by a significant decline in lime pollen (see for example, Waton and Barber 1987; JP Gardiner *et al.* 2002). Such vegetation changes are coincident with the development of complex societies, significant population growth and the so-called secondary products revolution (Sherratt 1981; Fowler 1983, 33), and thereby mark the end of the period covered by this text.

3.3 Area reviews

3.3.1 Chalk downland (Wiltshire and Dorset)

The Neolithic of the Wessex chalklands has been investigated far more intensively than any of the areas discussed below. This statement applies equally to the study of the environment as to artefacts and archaeological features, and in the former case is largely thanks to the work of John Evans from the 1960s and Mike Allen from the 1980s. As chalk is highly calcareous and permanently waterlogged deposits on the Wessex Downs are few, palaeoenvironmental reconstruction has largely had to rely on the study of sub-fossil mollusc shells.

Pollen analysis has been attempted on soils buried beneath Neolithic monuments but there appear to be significant taxa-related taphonomic problems to this approach (Dimbleby and Evans 1974). Therefore palynological data for chalkland environments in the Neolithic have had to be generated from floodplain features in adjacent areas. Waton's (1982; Waton and Barber 1987) analysis of 18m of peats infilling a 25–35m wide doline at Rimsmoor near Wareham is the most significant of these, despite the fact that it has only a local pollen catchment (70% of the pollen is from within 20m of the sample site). A mixed oak-elm-lime forest is recorded for the Late Mesolithic, prior to a short-lived elm decline between 4230–3770 cal BC (HAR-3919) and 3640–3350 cal BC (HAR-3920), which seems to have promoted pasture (although cereal pollen was found). After *c.*3500 BC the forest regenerated and was dominated by hazel and oak, until there were further localised forest clearances associated with a decline in lime pollen at 2480–2030 cal BC (HAR-3921). Nevertheless, permanent and large-scale clearance only occurred in the Late Bronze Age.

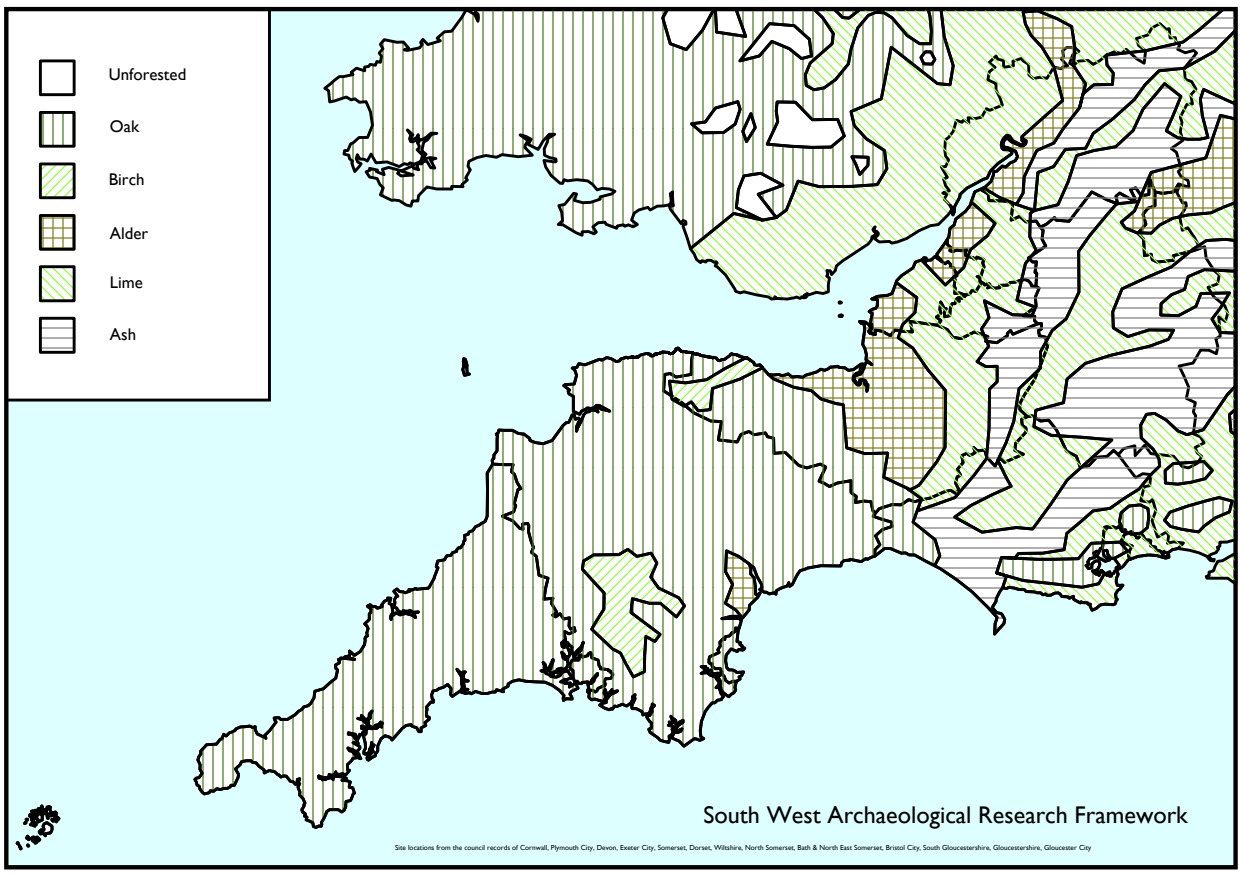

Figure 3.3: *"Climax" vegetation of south-west Britain at the Atlantic–subboreal transition, c.3750 BC. Modified from Bennett (1989) and RL Jones and Keen (1993, 232)*

Mollusc studies carried out on soils buried beneath Early Neolithic monuments provide evidence of the variation of chalkland environments at this time. Molluscs from buried soils at Windmill Hill and Maiden Castle suggest these causewayed enclosures were respectively constructed in species-rich, grassland scrub after 3800–3350 cal BC (OxA-2406) and in primary woodland after 3770–3370 cal BC (OxA-1148) respectively (Evans and Rouse in Sharples 1991a, 119–20; Fishpool in Whittle *et al.* 1999, 127). Similarly the hilltop enclosures at Hambledon Hill and Whitesheet Hill seem to have been built in local woodland clearings, according to the mollusc evidence, in the first case episodically between 3700 and 3300 cal BC (based on Bayesian modelling of a large series of dates: Bayliss in Mercer and Healy forthcoming), and the second in 3710–3520 cal BC (BM-2785, Allen in Green 2000, 43).

Other Early Neolithic monuments on Cranborne Chase also seem to have been built in woodland and include the Handley Down mortuary enclosure, built somewhere between 3700–3000 BC and the Dorset Cursus of 3650–2900 cal BC (OxA-624, Entwistle and Bowden 1991; Allen in Green 2000, 43–45). In the former, the clearance was very small-scale and the woodland was allowed to regenerate once the site had fallen into disuse. In the case of the latter, clearance was on a much larger scale, but woodland regeneration occurred during the use of the Cursus.

However, all these monuments occupy relative topographic highs in the landscape which appear to have been more heavily vegetated than the surrounding "lowlands". For example Evans' (Evans 1971b; 1972) mollusc analysis of soils buried beneath South Street long barrow, near Avebury, dating to 3800–3100 cal BC (BM-356), suggests that construction was in grassland pasture. Similarly Mike Allen's (in RJC Smith *et al.* 1997, 167) analysis of shells from a pit predating the Flagstones indicates grassland environments at 3960–3630 cal BC (HAR-9161). A colluvial sequence at Middle Farm, Dorchester dating to 3710–3370 cal BC (OxA-2382), similarly accumulated in a grassland environment (Allen in RJC Smith *et al.* 1997, 177). One further site – the Down Farm Shaft (also known as Fir Tree Field Shaft, see also pages 58 and 75) – is worthy of special mention, given that the palaeoenvironmental data span the Late Mesolithic to Early Bronze Age (Green and Allen 1997; Allen and Green 1998; Allen in Green 2000, 40–43). Mollusc shells from an erosion cone in the shaft suggest that

dense woodland of the Middle Holocene was locally cleared at *c*.4240–3970 cal BC (OxA-7987); an event that was associated with red deer bones and Late Mesolithic microliths. The remaining palaeoenvironmental data have yet to be published but, given the well-stratified ceramic assemblages, promise a detailed picture of a key environment for the entire Neolithic.

There are more widespread mollusc data available for the Late Neolithic and Early Bronze Age. Those from ditch sediments in the abandoned causewayed enclosures indicate that woodland or scrub regenerated in these situations during the Late Neolithic and that permanent clearance occurred in the Early Bronze Age (see for example, Evans and Rouse in Sharples 1991a, 120–21). However, elsewhere Late Neolithic monuments, such as the henges at Avebury, Stonehenge, Durrington Walls, Mount Pleasant and Woodhenge were all built in grassland environments (Evans 1971a; Evans and Jones 1979; Evans 1984; Evans *et al.* 1985; Allen 1997a). More detail on chalk grassland environments at 2950–2350 cal BC (I-4136) is provided by macroscopic plant remains and insects preserved in anaerobic conditions from a palaeosol and turf stack beneath Silbury Hill (Williams and Robinson in Whittle 1997b, 32–47). Most mosses and seed-producing plants recovered are found in chalk grassland at the present day, while wood remains were mainly of scrub species such as hazel. The insects, which include Scarabaeoid dung beetles, are almost entirely related to herb-rich grassland maintained by light grazing: so-called "unimproved pasture" (Robinson in Whittle 1997b, 43). Nevertheless, Mike Allen's work on the Stonehenge landscape (summarised in Allen 1997a) suggests that grassland formed just one – albeit the majority – element in a mosaic that also included primary and secondary woodland, and small arable plots. Coneybury henge is the one notable exception to the model of Late Neolithic monument construction on land devoid of woodland (Bell and Jones in Richards 1990, 154–8), but then this feature seems to have had a somewhat unusual use (Allen 1997a).

The data reviewed above suggest that clearance on the Wessex chalkland occurred earlier in lowland locations than on the tops of the Downs. Indeed Mike Allen (in RJC Smith *et al.* 1997, 183–4; French *et al.* 2003), following arguments originally put forward by Bush (Bush and Flenley 1987; Bush 1988; 1993), has tentatively suggested that the lower areas may have been partially cleared of woodland in the Mesolithic or otherwise did not support mixed deciduous woodland by the Middle Holocene. Earlier Neolithic clearance seems to have been primarily for pasture, although palynological evidence suggests cereal cultivation was also carried out, but it was on a small scale and may have been used as a supplement to wild foods, or even grown for "ritual" reasons (Fairbairn in Whittle *et al.* 1999, 139–56; Fairbairn 2000a; Robinson 2000 but see G Jones 2000 for a contrasting view in relation to Hambledon Hill). By the Late Neolithic the area of pasture had been expanded, although there is only limited evidence for a corresponding expansion of arable agriculture. Cultivation only seems to have been carried out on a large scale in the Early Bronze Age, after which notable volumes of colluvium begin to accumulate in dry valleys as a result of valley-side soil destabilisation (Allen 1995).

3.3.2 Jurassic uplands (The Cotswolds and Mendip)

Despite the fact that Neolithic monuments are well-known on both the Cotswolds and Mendip, very little palaeoenvironmental work has been conducted on stratigraphy of this period – in part due to a lack of archaeological excavation of sites of this period in these areas. Most palynological data for Neolithic environments in the Cotswolds come from the Severn or Thames valley (as reviewed by Goudie and Parker 1996, 54–9; Parker and Chambers 1997), and in the latter case largely from Oxfordshire (for example, Preece and Day 1994; Parker 1995). Similar data for Mendip are derived from work on the Somerset and Severn levels (see Section 3.3.5 on page 70). The river valleys of the Cotswolds seem to have supported alder woodland throughout the Neolithic, while the limited evidence available suggests that lime woodland characterised the limestone uplands with oak and hazel woodland on the Lias and gravel terraces (Parker and Chambers 1997). Where dated by radiocarbon, tufaceous deposits from both Mendip and the Cotswolds have been found to be Late Mesolithic or earlier (Willing 1985; Davies *et al.* 2001). Nevertheless it is likely that the woodland indicated by associated mollusc assemblages continued into the Early Neolithic.

By far the most detailed palaeoenvironmental work carried out on a Neolithic site from the Gloucestershire Cotswolds is that at Hazleton North (Saville 1990). A combination of soil, plant macrofossil, pollen and mollusc analysis (Macphail, Straker, Scaife and Bell respectively in Saville 1990, 215–27) suggests that clearance of the primary lime woodland had occurred before 4080–3800 cal BC (dated by Bayesian analysis of the radiocarbon dates, Meadows *et al.* 2007, 51). The clearance appears to have been for cereal cultivation, which seems to have been undertaken in small, shifting plots (Macphail in Saville 1990, 225). A midden sealed by the barrow contained large quantities of charred plant remains and indicates that Einkorn (*Triticum monoccocum*), emmer (*T. diococcum*) and bread wheat (*T. aestivum*) were the main crops that were grown (Straker in Saville 1990, 215–8). Nevertheless, the cultivation episode seems to have been short-lived

and by the time of barrow construction in 3695–3650 cal BC (Meadows *et al.* 2007, 53), hazel scrub occupied the site (Straker and Scaife in Saville 1990, 215, 218–9). Mollusc analysis of a pit associated with construction of the (undated) Chedworth barrow suggests that this monument was also built in a shaded environment (Mike Allen, pers. comm. 1999). It has similarly been suggested from mollusc analysis carried out on ditch fills from Condicote henge, that this monument was constructed before 2900–2150 cal BC (HAR-3067) in woodland (Bell in Saville 1983a, 39–46). However, the majority of the shade-loving molluscs recovered are also characteristic of long, ungrazed grassland and it is possible that such an environment was current at the time of henge construction (Cameron and Morgan-Huws 1975; Carter 1990). Whichever explanation is correct, it would seem that Condicote henge was built and used in an unfarmed landscape. This situation contrasts with the Priddy Circles on Mendip where Dimbleby's (in Tratman 1967) pollen analysis indicates that this area was grassland at the time of construction (see also the discussion of Dorset and Wiltshire chalkland above).

3.3.3 Moorland (Bodmin Moor, Dartmoor and Exmoor)

Bodmin Moor, Exmoor and particularly Dartmoor are upland areas of granite (Devonian sandstones and slates in the case of Exmoor), characterised through the Middle Holocene by the development of blanket (ombrogenous) mire. The peat that resulted developed where rainfall exceeded evapotranspiration, and in theory provides useful sequences for palynological and plant macrofossil study. Dartmoor is undoubtedly the most fully studied of the three and the most recent reviews of the pollen database have been made by Chris Caseldine (Caseldine and Hatton 1996; Caseldine 1999). Studies at a number of sites such as Bellever demonstrate that by the Late Mesolithic, oak, elm and hazel formed the major components of the Dartmoor woodland (Caseldine and Hatton 1996). However, the woodland appears to have contained patches of heath containing open birch woodland, while alder occupied the valleys. It also appears that Mesolithic people had been very active in the area; almost every pollen sequence examined contains large quantities of microscopic charcoal resulting from their activities (Simmons 1964; Caseldine and Hatton 1993). However, of the Neolithic, Caseldine (1999, 579) states that it "probably remains the most poorly understood period for Dartmoor in the whole of prehistory with many important questions to be answered. Palaeoecologically the period is a 'black hole' with remarkably little chronologically sound evidence". In other words, there are no pollen spectra of Neolithic age that are confirmed by radiocarbon dating. Nevertheless, there is limited evidence of woodland manipulation in the Neolithic (possibly associated with the construction of chambered tombs) and tentative (but undated) elm declines, but generally human activity seems to have been focused largely on the fringes of the moor (Fleming 1988, 94–100). Caseldine and Hatton (1996) suggest that the disappearance of trees from Dartmoor occurred in the Late Neolithic/Early Bronze Age as a result of the expansion of peat caused by a damper climate, and that the open landscape was maintained by browsing. Certainly the landscape was largely open before construction of the reaves in 1300–1100 BC (Fleming 1988).

Until recently, palaeoenvironmental studies on Bodmin Moor had largely been confined to examination of the Late Glacial and Early Holocene stratigraphy (for example, AP Brown 1977). More recent work by Ben Gearey and Dan Charman (Gearey *et al.* 2000a;b) has focused not only on the Middle Holocene, but on two sites (Rough Tor and East Moor) associated with Neolithic archaeological remains (Johnson and Rose 1994). The palynological data from Rough Tor and one of AP Brown's sites, Dozmary Pool, both suggest significant depletion of the upland hazel, birch, oak and elm woodland *c.*5400 BC (AP Brown 1977; Gearey *et al.* 2000a;b). Thereafter, and except for a minor recolonisation of hazel between 2330–3340 cal BC (OxA-6009) and 1680–1440 cal BC (OxA-6008), conditions at Rough Tor were largely open, and are suggestive of grassland (Gearey *et al.* 2000a;b). In the absence of further detailed work on Middle Holocene sequences from Bodmin Moor, it is uncertain how typical Gearey and Charman's (2000a; 2000b) data are, although AP Brown (1977) also concludes that environments were largely open by the end of the Late Mesolithic.

Palaeoenvironmental studies carried out on Exmoor prior to 1995 have been summarised by Straker and Crabtree (1995). The Chains is the most studied site, having been separately examined by Merryfield and Moore (1974), and by Crabtree (Straker and Crabtree 1995). The sequence is poorly dated, but appears to begin at about 3000 BC (although the oldest radiocarbon date, 0.4m from the base of the sequence, gives an age of 2910–2500 cal BC, UB-821). At this time both oak-hazel and alder woodland were present, with areas of heath also being of importance. Coincident with the previously quoted radiocarbon date (UB-821), grasses, sedge and heather expand, an episode that Merryfield and Moore (1974) attribute to humans, but Straker and Crabtree (1995) to the spread of blanket bog due to wetter climates (as previously discussed for Dartmoor). Human impact on the vegetation is only seen after 1000 BC (Straker and Crabtree 1995). A further upland site at Hoar Moor (Francis and

Slater 1990) also contains Neolithic pollen spectra dating from 4460–3980 cal BC (I-15549). These have higher percentages of tree pollen that at The Chains, although birch (perhaps indicative of heathland) is the most common taxon. Humans do not appear to have impacted the Hoar Moor vegetation until about 1000 BC (Francis and Slater 1990).

Since 1995, the focus of palaeoenvironmental studies has shifted to the periphery of Exmoor. Analysis of deposits on one of the main axial drainages through Exmoor, the river Exe, has been undertaken by Ralph Fyfe *et al.* (2003a). Their analysis of a palaeochannel at Brightworthy demonstrates that alder woodland occupied the valley throughout the period 4460–4250 cal BC (Beta-142643) to 2280–1940 cal BC (Beta 142642) after which sedges colonised as water tables rose. Both here and on the edge of Exmoor at Exebridge the surrounding Exmoor upland was characterised by oak woodland with an understorey of hazel. There is considerable evidence for Mesolithic burning within the woodland to create local clearance, but Neolithic people seem to have had a minimal impact. Investigations at Porlock and Minehead focused on intertidal peats and clays dating to between 5500 and 4300 BC which provided data for the vegetation of northern Exmoor (J Jones *et al.* 2001; 2004; Jennings *et al.* 1998; Straker *et al.* 2004).

3.3.4 Triassic and Devonian hills and valleys (south Somerset, Devon and Cornwall)

Whereas Neolithic environments of present moorland and intertidal areas of south Somerset, Devon and Cornwall have been studied in some detail, there are few palaeoenvironmental studies of the remaining parts of these areas. The main problem is a lack of suitable contexts for palynological sampling, whilst the acidic nature of the mainly Palaeozoic and early Mesozoic rocks mean that bone and shell are rarely preserved. Nevertheless, Fyfe *et al.* (2003a) have investigated Neolithic deposits in a buried palaeochannel at Lower Chitterley in the lower Exe valley using palynology. By the Early Neolithic, lime-oak-elm woodland had developed in this location, with alder characterising the adjacent floodplain. The first Neolithic disturbances are manifested by the middle of three elm declines, the first dated by interpolation to *c*.5500 cal BC, i.e. in the Late Mesolithic, the second to 3640–3370 cal BC (UtC-8502) and an undated third. All are accompanied by expansion of grasses and ruderals, while cereal pollen is associated with the last, which also sees widespread woodland clearance. Fyfe *et al.* (2003a) suggest the last coincided with monument construction and the establishment of field systems in the area during the Early to Middle Bronze Age.

Several palynological studies have been conducted on and around the Lizard peninsula in Cornwall. As part of a study of the lithostratigraphic succession of coastal sequences, Healey (Healey 1993; 1995) has examined Middle Holocene peats and soils buried beneath dunes at Marazion Marsh (Mount's Bay) and Praa Sands respectively. His results demonstrate the presence of oak-hazel woodland on dry ground and alder woodland lower down. Tinsley's (1999b) examination of peats from Porthallow, dating to approximately 5100–4550 cal BC (GU-8238), also suggests oak woodland with an understorey of hazel on the hills surrounding the site, while alder carr lay in the lowland. It is unclear whether any of these sequences extend into the Later Neolithic and therefore at present there is very limited evidence from Cornish palynological data for impact of Neolithic, or indeed Early Bronze Age people on the environment.

3.3.5 Coastal lowlands (Somerset, Severn and Avon levels)

Martin Bell has recently reviewed Holocene palaeoenvironmental data recovered for the whole Severn estuary levels area (Bell 2001). Earlier similar reviews of the Somerset Levels data by Astrid Caseldine (1984b; 1988b) and the local pollen zonation scheme of Beckett and Hibbert (1978; 1979) have not been superseded by published data (see Coles and Coles 1998). Woodland within the Severn levels and Avon levels was dominated by alder carr throughout the period under review, while reed and herbaceous plant communities were located in coastal locations. Sea level rises during the Neolithic transformed the alder carr to reed swamp and then tidal mud flats. In the central Somerset Levels, marine clays of Late Mesolithic date were succeeded by Phragmites peat from 4710–4480 cal BC (OxA-11233, Tinsley 2002), which developed in a freshwater fen characterised by sedges and rushes such as *Cladium*, *Juncus* and *Chara* (Beckett 1979). These fen waters were calcareous and mollusc analysis from Shapwick Heath and at Glastonbury indicate that the habitat comprised large expanses of shallow, well-vegetated water (Wilkinson 1998a;b). Both insects and molluscs indicate that the fen water was running and therefore may have been stream-fed, while the former also indicate that it was well oxygenated (Girling 1979; Wilkinson 1998b). Wood peat developed after 3800 BC, by which time birch had colonised the marsh as water levels dropped. Raised bog with acidic waters then formed after 2860–2470 cal BC (SRR-879) and was characterised by Sphagnum moss and heather (*Calluna* sp.). Throughout these changes alder is thought to have fringed the fen and is a major constituent of the pollen spectra (Beckett 1979). Early disturbances to lowland woodland areas are recorded at Burnham-

Zone	Start	End	Characteristics	Notes
A	4350 BC	3450 BC	Elm, oak, lime	Very few herbs – closed woodland
B	3450 BC	2900 BC	Oak	Elm decline and expansion of herbs
C	2900 BC	2550 BC	Elm, oak	Elm recovers, herbs reduced
D	2550 BC	1950 BC	Oak, hazel	Second elm decline, hazel fills in, few herbs
E	1950 BC	1700 BC	Hazel	Oak and elm also plentiful, very few herbs

Table 3.1: *Neolithic and Early Bronze Age vegetation changes on "drylands" around the Somerset Levels (modified from Beckett and Hibbert 1978, 86–7)*

on-Sea (Druce 1998) from 4350–4040 cal BC (Wk-5299), in Central Bristol (Wilkinson *et al.* 2002) soon after 4230–3790 cal BC (Wk-10947) and from the Late Mesolithic onwards at Westward Ho! (Balaam *et al.* 1987). Likewise the Early Neolithic trackways (most famously the Sweet Track, dendrochronologically dated to 3807/6 BC, Coles and Coles 1986, 52–6; Hillam *et al.* 1990) of the Somerset Levels seem to have been associated with localised clearance of alder carr – although much of the track ran through reed swamp. Pollen diagrams from the various levels also record vegetation from surrounding "uplands". Such upland areas were characterised by various combinations of lime, oak, elm and ash woodland, and these appear to have been impacted by human forest clearance at various times during the Neolithic and Bronze Age. As has been previously discussed, elm declines are another manifestation of Early Neolithic woodland disturbance, and in the case of data from the Severn, Avon and Somerset levels they indicate activities in adjacent upland areas. Several have been noted in pollen diagrams, for example:

1. immediately before the construction of the Sweet Track in 3807/6 BC (Beckett 1979; Hillam *et al.* 1990) but radiocarbon dated to soon after 3640–3370 cal BC (SRR-882, Beckett 1979)
2. *c.*3660–3370 cal BC (SRR-542) at the Abbots Way (Beckett and Hibbert 1979)
3. soon after 3640–3360 cal BC (NZA-12530) at Avonmouth (Scaife in JP Gardiner *et al.* 2002, 20)

In the last case the elm decline was marked by the expansion of grasses and ruderals, and the discovery of cereal pollen, all suggesting that the elm clearance was for cultivation. Nevertheless, woodland regeneration took place after *c.*2900–2800 BC and there was no permanent clearance until the latest Neolithic or Bronze Age (Scaife in JP Gardiner *et al.* 2002, 20–1).

The classic Somerset Levels vegetation sequence for the Neolithic and Early Bronze Age is based on palynological examination of peat sequences associated with the Abbots Way, Meare Heath and Sweet Tracks and is shown in Table 3.1 (Beckett and Hibbert 1978; Beckett 1979; Beckett and Hibbert 1979). The elm decline appears to have opened up the oak, elm and lime "wildwood", resulting in the expansion of herbs. Beckett and Hibbert (1978) suggest this was caused by woodland clearance on the Burtle Beds (marine sand strata of Ipswichian age, Kidson *et al.* 1978) for the purposes of pasture (Zone B, Table 3.1). Woodland regeneration had occurred by 3030–2700 cal BC (SRR-880) at the Sweet Track site (Beckett 1979), but ash (*Fraxinus*) was a new colonist into former clearings, although it was then succeeded by elm, oak and finally lime (Zone C, Table 3.1). A further elm decline took place at 2860–2470 cal BC (SRR-879, Zone D, Table 3.1), but the other tree species were unaffected, suggesting that the surrounding limestone uplands were being cleared of their elm. Elm and hazel later recolonised the cleared areas after 2130–1820 cal BC (SRR-878, Zone E, Table 3.1), and lasted until more extensive woodland clearance took place after 1700 BC (Beckett and Hibbert 1978; 1979).

Several palaeoenvironmental investigations of Neolithic strata have been carried out on the Somerset Levels since the end of the Somerset Levels Project in the 1980s. For example Julie Jones and Heather Tinsley have investigated two sites to the east of the raised bog area: Walpole and Woolavington Bridge on the Huntspill River (Tinsley 2003; J Jones 2004). Data from the former, a Lias island, suggest a complex series of vegetation and sea level interactions spanning the Late Mesolithic to Early Bronze Age period. As in the central Somerset Levels, this area was a marine embayment between 4690–4240 cal BC (Wk-9020) and 3520–3080 cal BC (Wk-9019), after which the area became saltmarsh (compare the freshwater fen in the central Somerset Levels, see above). In upland areas the oak, hazel, elm and lime woodland may have been subject to localised clearance by the latter date, but more definitive evidence of clearance is found after 2300–1890 cal BC (Wk-9018), when oak declines and herbs indicative of human activity expand. After this episode, rising sea levels once more led to the inundation of the site.

North of the Somerset Levels, Tinsley's (in Wilkinson *et al.* 2002, 17–27) analysis of pollen from the Avon levels at Deanery Road, Bristol suggests that prior to 3550–3050 cal BC (Wk-10946) the surrounding "uplands" supported lime woodland just

as they do today at Leigh Woods (Rackham 1982). Indeed palynological analyses from the Severn levels north of Bristol at Pucklechurch, west at Avonmouth and south in the Vale of Gordano, all highlight the importance of lime woodland in the raised areas bordering the river valleys (Jefferies *et al.* 1968; Gilbertson *et al.* 1990; Tinsley 1999c); Scaife in JP Gardiner *et al.* 2002). In contrast, outline palynological work at Marshwall Lane, Avonmouth suggests that between 2860–2460 cal BC (AA-30868) and 2470–2190 cal BC (AA-30865) oak-hazel woodland was the local "upland" vegetation (Carter *et al.* 2003). By 4110–3645 cal BC (interpolation of Wk-10946 and Wk-10947) from the base of the organic sequence), clearance of the lime woodland at Deanery Road was underway, but the peat sequences end at *c.*3000 BC and therefore the continuance of this trend cannot be traced.

3.3.6 Isles of Scilly

There are now three palynological studies of Neolithic and Bronze Age environments from the Isles of Scilly (Ratcliffe and Straker 1996, 32). The longest and best known pollen sequence is from Higher Moors on St Mary's (Scaife 1984). The Higher Moors peat sequence begins at 5490–5050 cal BC (HAR-3695) and indicates oak woodland with an understorey of hazel. At some point prior to 1650–1050 cal BC (HAR-3694) there was small-scale woodland clearance; cereal and ruderal pollen suggest this was for cultivation. Later on in the Bronze Age the woodland regenerated and birch rose to dominance, although cereal and herbaceous pollen were still present, indicating continued cultivation. Organic deposits associated with a radiocarbon date of 4230–3940 cal BC (GU-5061) were investigated at Higher Town Beach, St Martin's in the early 1990s (Ratcliffe and Straker 1996, 19). These contain pollen spectra indicative of hazel-oak woodland during the Earlier Neolithic. Later (but before 3380–3010 cal BC, GU-5060) birch had colonised and replaced much of the hazel, but unlike at Higher Moors there is no evidence of forest clearance. Palynological examination of a later coastal peat exposure at Porth Mellon, St Mary's which dates to 3100–2700 cal BC (GU-5394), suggests a local woodland dominated by birch, with a lesser component of hazel and oak (Ratcliffe and Straker 1996, 25). After 2900–2200 cal BC (GU-5396) lime appears and oak becomes a more prominent element of the local woodland, but once more there is no evidence of clearance.

The picture of the Neolithic environment from these diagrams is of localised disturbance of woodland, while the main phase of clearance, eventually leading to the present heathland environment, dates from the Late Bronze or Early Iron Age (Dimbleby *et al.* 1981; Scaife 1984; Ratcliffe and Straker 1996, 33). The importance of birch in the Neolithic flora of the Isles of Scilly is notable, especially given that it is a minor component of woodland elsewhere in the South West at this time. Nevertheless, given that most studies have been carried out on St Mary's, it is at present uncertain how widely any of these interpretations can be applied to other islands in the archipelago. Even on St Mary's there are many local variations in the vegetation despite its small area.

3.4 Conclusions

The very fact that this review has stretched to so many pages demonstrates the diversity of environments that existed during the Neolithic and Early Bronze Age in the South West region. Therefore, although the regional models reviewed earlier are attractive in their simplicity, they do not adequately explain the landscape changes that took place during the period 4000–1600 BC. Nevertheless the task of this conclusion is to generalise by drawing together the data under thematic headings.

3.4.1 The "wildwood" and human impact on it prior to the Neolithic

It was not so long ago that the conventional archaeological wisdom was that "climax" Holocene woodland existed in an all but virgin state until the beginning of the Neolithic. Thereupon woodland clearance began and the rest "is history" (for example, Darvill 1987a, 49–51). Data collected from the South West now demonstrate a much greater impact by Mesolithic people on the "wildwood" than had been supposed. Indeed almost every new pollen diagram – and mollusc analysis – of Mesolithic strata from the region contains peaks in microscopic charcoal or other floral/faunal indicators of clearance. Such episodes have been known from Dartmoor and Bodmin Moor from the 1990s and earlier (for example, AP Brown 1977; Caseldine and Hatton 1993; 1996), but are now evident (although not published) on the Somerset, Severn and Avon levels (for example, Druce 1998; Wilkinson *et al.* 2002; J Jones 2004) and even beginning to appear on the Wessex chalkland (for example, Green and Allen 1997; Allen and Green 1998). It would therefore seem that Neolithic culture in the South West did not emerge onto a virginal stage, but rather one that had been subjected to ongoing modification by at least two millennia of Mesolithic hunter-gatherers.

3.4.2 Woodland clearance in the earliest Neolithic

Clearance of primary woodland evidently took place in order to make space to construct certain Early

Neolithic monuments, for example Maiden Castle causewayed enclosure (*c.*3550 BC) and the Dorset Cursus (*c.*3300 BC). However, it is notable that on many more Early Neolithic sites, construction took place in environments that had been cleared some time before, and that frequently this clearance was for cultivation. South Street long barrow (built *c.*3500 BC), with its clear ard marks, is a good example of this phenomenon (Ashbee *et al.* 1979), but there are many more. Indeed in many cases not only had cultivation been carried out prior to monument building, but arable plots had subsequently been abandoned allowing secondary woodland to colonise, as at Hazleton North, for example (Saville 1990). Also worthy of note are the various elm declines which are now accepted as being at least partially caused by people. These date from perhaps as early as 4000 BC in eastern Dorset and before 3800 BC on the Somerset Levels. In many pollen diagrams (for example at Rimsmoor, Waton 1982) there is evidence of cultivation before the elm decline. These various lines of evidence suggest that Neolithic people were cultivating the landscape – perhaps on a very limited scale – for several centuries before the earliest monuments were built. However, sites from this early phase have yet to be found (or recognised).

3.4.3 Upland and lowland environments in the Early Neolithic

All of the South West region lies within the lowland zone of Britain excepting the westernmost part of Cornwall (Roberts 1998, 202). These terms are therefore used in a relative manner here, for example the Somerset Levels are "lowlands" adjacent to the Mendip "uplands", the Bodmin Moor, Dartmoor and Exmoor "uplands" contrasting with the surrounding "lowlands" of coastal and valley Cornwall and Devon. The Wessex chalk can also be viewed in this way, with the "uplands" being the hilltops on which causewayed enclosures were built, the "lowlands" the combes and river valleys. In this last area a pattern has already been highlighted for the Early Neolithic: uplands remained wooded (except where clearance was undertaken to construct causewayed enclosures) and lowlands were cleared to create grassland for pasture. The opposite pattern can be observed in western Somerset, Devon and Cornwall where the lowlands remained well vegetated (albeit with localised clearance) and the uplands (perhaps with the exception of Dartmoor) became more open, although it is likely that humans were not the sole cause for the latter. The data for areas of northern Somerset and Gloucestershire are less clear, but large areas of woodland do not seem to have been cleared in the earlier Neolithic. Robinson (2002, 68) argues of southern England generally that "much of the Neolithic landscape was probably a mosaic of relatively small clearances, abandoned clearings in various stages of scrub to woodland succession and relatively undisturbed, perhaps even primary, woodland." His insect data also suggest, on the basis of rising abundance of dung beetles during the Neolithic, that domesticated animals would have browsed in woodland environments.

3.4.4 Regional environment divisions in the Later Neolithic

By 3000 BC the Wessex chalklands were intensively exploited. All Later Neolithic monuments (with the exception of Coneybury henge) in this area are associated with grassland environments, while colluvium resulting from arable activities had begun to form in dry valleys. Forest had also been heavily reduced on the three moors by 3000 BC, although it seems likely that this was the result of climate change (perhaps "aided" by human forest clearance) leading to the formation of raised bog. However, elsewhere there is little in the palaeoenvironmental record to indicate significant landscape change from the Early Neolithic.

3.4.5 Landscape change in the Early Bronze Age

More widespread environmental change occurs in the Bronze Age. Most of the "lowland" pollen diagrams that span this period indicate woodland clearance and the expansion of ruderal elements. It would therefore seem that from *c.*2000 BC in the east of the region and *c.*1700 BC in the west, a significant change in the economy occurred to a subsistence based on cereal cultivation. Robinson (2002, 55) has suggested on the basis of insect evidence, that while much of the South West remained woodland throughout the Neolithic – even though there is evidence from many assemblages for the presence of openings in the tree canopy – by the Bronze Age, open-country species are usually the major component of the terrestrial fauna.

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Radiocarbon dates

Table 3.2: *Details of radiocarbon dates used in the text. Calibrated ranges are at 2σ (95.4%) and were calculated with OxCAL 3.10 (Bronk Ramsey 2005) using the probability method and the IntCal04 calibration curve (Reimer et al. 2004).*

Lab. Ref.	^{14}C age BP	Cal BC	Material	Context	Reference
AA-30865	3860±50	2470–2190	Peat (humin fraction)	4.16m AOD	Carter *et al.* (2003)
AA-30868	4045±50	2860–2460	Peat (humin fraction)	3.61m AOD	Carter *et al.* (2003)
Beta-142642	3700±50	2280–1940	Peat	77–82cm down core	Fyfe *et al.* (2003a)
Beta-142643	5500±50	4460–4250	Peat	114–115cm down core	Fyfe *et al.* (2003a)
BM-356	4760±130	3800–3100	Oak charcoal	Two patches on buried soil	Ashbee *et al.* (1979)
GU-5060	4510±60	3380–3010	Peat	basal 5cm of exposed peat, -0.21m OD	Ratcliffe and Straker (1996, 127)
GU-5061	5210±50	4230–3940	Peat	basal 1cm of exposed peat, -2.02m OD	Ratcliffe and Straker (1996, 127)
GU-5394	4310±60	3100–2700	Peat	basal 2cm of exposed peat	Ratcliffe and Straker (1996, 129)
GU-5396	3980±100	2900–2200	Peat	basal 2cm of exposed peat	Ratcliffe and Straker (1996, 129)
GU-5615	5830±50	4800–4540			Gearey *et al.* (2000a)
GU-8238	5950±90	5100–4550	Alder	25–38cm down core	Tinsley (1999b)
HAR-3067	3970±100	2900–2150	Oak charcoal	Post in secondary ditch deposits	Saville (1983a)
HAR-3694	3100±100	1650–1050	?peat		Scaife (1984)
HAR-3695	6330±100	5490–5050	?peat		Scaife (1984)
HAR-3919	5150±70	4230–3770	?peat	c.11.2m below surface	Waton (1982)
HAR-3920	4690±70	3640–3350	?peat	c.10.8m below surface	Waton (1982)
HAR-3921	3820±80	2480–2030	?peat	8m below surface	Waton (1982)
HAR-8349	4830±60	3760–3370	Red deer antler	In construction debris from cairn	Saville (1990, 236–7)
HAR-9161	4960±80	3960–3630	Charcoal		RJC Smith *et al.* (1997, 167)
I-4136	4095±95	2950–2350	Twigs etc	On buried soil beneath monument	Atkinson (1969)
I-15549	5410±110	4460–3980	Peat		Francis and Slater (1990)
NZA-12530	4683±55	3640–3360	?peat	Base of pollen zone AWK 2	JP Gardiner *et al.* (2002)
OxA-624	4570±120	3650–2900	Animal bone	Base of ditch	Green (2000, 153)
OxA-2382	4800±70	3710–3370	Wood charcoal	In colluvium with Neolithic artefacts	RJC Smith *et al.* (1997, 177)
OxA-6008	3275±50	1690–1440			Gearey *et al.* (2000a)
OxA-6009	4710±80	3660–3340			Gearey *et al.* (2000a)
OxA-7987	5275±50	4240–3970	Red deer scapula	Level 7	Allen and Green (1998)
SRR-542	4774±50	3660–3370	Peat	Zone AB 2	Coles and Dobson (1989); Orme (1982)
SRR-878	3600±40	2130–1820	Peat	c.0.5m below surface	Coles and Dobson (1989); Orme (1982)
SRR-879	4054±45	2860–2470	Peat	c.2m below surface	Coles and Dobson (1989); Orme (1982)
SRR-880	4278±45	3030–2700	Peat	c.3.2m below surface	Orme (1982)
SRR-882	4744±45	3640–3370	Peat	c.8m below surface	Coles and Dobson (1989); Orme (1982)
UB-821	4170±75	2910–2500	Peat	240cm down core	Merryfield and Moore (1974)
UtC-8502	4720±40	3640–3370	?peat	61–62cm below surface	Fyfe *et al.* (2003a, 164)
Wk-5299	5370±70	4350–4040	?peat	-0.17m OD, Layer A	Druce (1998)
Wk-9018	3710±70	2300–1890	Peat	2.19–2.20m AOD, base 3rd peat band	J Jones (2004)
Wk-9019	4570±60	3520–3080	Peat	1.88–1.89m AOD, base 2nd peat band	J Jones (2004)
Wk-9020	5580±100	4690–4240	Peat	0.92m AOD, top of 1st peat band	J Jones (2004)
Wk-10946	4594±63	3550–3050	Peat	7.32–7.34m below surface	Wilkinson *et al.* (2002)
Wk-10947	5174±61	4230–3790	Peat	8.15–8.17m below surface	Wilkinson *et al.* (2002)

4

Neolithic and Early Bronze Age

Edited by Joshua Pollard and Frances Healy from contributions by Frances Griffith, Frances Healy, Andy Jones, Andrew J. Lawson, Jodie Lewis, Roger Mercer, David Mullin, Jacqueline Nowakowski, Joshua Pollard, Helen Wickstead and Peter Woodward

4.1 Introduction

The South West contains a wealth and diversity of Neolithic and Early Bronze Age archaeology, much of it of national and international significance. Its quality and character are dictated by differential survival and histories of research, as well as reflecting real variation in the nature of prehistoric activity. One of the major topographic divides is that between the Wessex chalk and the different and diverse terrains of the south-west peninsula. The complementary resources of these two major areas are reflected in diverse modes and media of exchange between them throughout and beyond this period. The uplands of the west, principally Dartmoor and Bodmin Moor, include relict prehistoric landscapes where the relative absence of later cultivation has ensured excellent survival of stone monuments, settlement features and early fieldsystems. In the region's centre, work within the peats of the Somerset Levels has produced an unparalleled range of prehistoric timber trackways and artefactual material, as well as high-quality environmental data. Rich faunal and human bone assemblages have been recovered from the alkaline limestone and chalk bedrocks of Wiltshire, Dorset, the Gloucestershire Cotswolds and northern Somerset. However, it is on the Wessex chalklands that some of Europe's most spectacular and intensively studied Neolithic and Early Bronze Age archaeology occurs. This is reflected in the inscription of the Stonehenge and Avebury landscapes onto the World Heritage List by UNESCO in 1986. Extensive exploration over the last three centuries has resulted in the archaeology of Wessex dominating synthetic and interpretive accounts of the British Neolithic and Bronze Age (for example, Barrett 1994b; J Thomas 1999).

As in other regions, the picture of the known archaeological resource is dominated by sites surviving upstanding on the higher moors and downlands. However, the richness of occupation during this period in the vales and lower ground is attested by major concentrations of lithic material and, more recently, aerial reconnaissance, extensive geophysical survey and rescue work have demonstrated that by the end of the period few areas of the region were not actively used and/or settled.

4.2 Chronologies

4.2.1 The Mesolithic–Neolithic transition

The region has one of the most securely-dated Early Neolithic structures in the form of the Sweet Track in the Somerset Levels. Dendrochronologically precise construction dates of 3807/3806 BC for the Sweet Track and of 3838 BC for its predecessor the Post Track (Coles and Coles in Hillam *et al.* 1990, 218) make it clear that Neolithic artefacts (pottery, single-piece arrowheads, an axehead of chalk flint and a jadeite axehead brought from the Alps) were already current at the beginning of the 4th millennium BC, and that the surrounding woodland was managed and, to some extent, cleared, grazed and cultivated (Coles and Coles 1986; Caseldine 1984a). The region also has one of the best-dated Late Mesolithic deposits, in the upper fill of the Fir Tree Field shaft on Cranborne Chase. Stratified above a group of rod microliths dating from the late 5th or early 4th millennium (see page 58) was a hearth, associated with Neolithic bowl pottery, domestic cattle bone and a ground flint axehead, which produced radiocarbon dates of 3960–

3710 cal BC (OxA-8009), 4050–3800 cal BC (OxA-8010) and 4250–3960 cal BC (OxA-7981, Allen and Green 1998). The first of these determinations, made on relitively short-life material will be closest in age to the deposit, the other two, on charcoal of a longer-lived species and on a disarticulated animal bone, being *termini post quos* for it.

The sequence is most readily interpreted as reflecting a fairly rapid transition from one tradition to the next. Elsewhere in Britain, dates reliably associated with Mesolithic artefacts extend into the early 4th millennium BC (Spikins 2002) and some Neolithic monuments, including long barrows and cairns, were being built from *c.*3800 BC on the evidence of radiocarbon measurements on the contained human remains (including some of those listed by Richards and Hedges 1999, and those from recently dated monuments, Bayliss and Whittle 2007). Dietary change at this time seems to have been abrupt (Richards 2004), although the interpretation of the results of stable isotope analysis remains contentious (Hedges 2004; Lidén *et al.* 2004; Milner *et al.* 2004). The potential for the adoption of Neolithic lifeways within a couple of generations becomes a real one, with connotations of the persuasive power of new beliefs and identities as well as new practices (Richards 2004; J Thomas 2003).

On parts of the Wessex chalklands, including the areas around Avebury, Stonehenge, Dorchester and Cranborne Chase where major monument complexes were later to develop, the relative dearth of Late Mesolithic material suggests a process of Neolithic "infill" (Whittle 1990; Richards 1990, 263; Barrett *et al.* 1991, 29; RJC Smith *et al.* 1997); perhaps close to the 5th–4th millennium BC boundary if the single date of 4050–3640 cal BC from the Coneybury Anomaly is taken as reliable (OxA-1402, Richards 1990). While dense Later Mesolithic scatters are present on the clay-with-flints of Cranborne Chase, they are absent from the chalk on which many Early Neolithic monuments were constructed (Barrett *et al.* 1991, 29–31).

In other instances, certain practices and the significance of particular places may have spanned the transition to the Neolithic. The sequence at Hazleton North, Gloucestershire, beginning with a Late Mesolithic flint scatter (see page 56), followed by Early Neolithic occupation and the construction of a chambered cairn (Saville 1990), *might* reflect repeated return to this locale by the same social group and an accruing sense of place. In Somerset surface collection around the Devil's Bed and Bolster long barrow, Gorsey Bigbury henge and the Stanton Drew stone circles has, in each instance, revealed a Late Mesolithic presence (Lewis 2005). However, the nature of the relationship, if any, between these activities and the later construction of monuments is uncertain.

On Dartmoor, 45% of all scatters of Neolithic and Early Bronze Age lithics also contain Mesolithic material, but this may reflect periodic reoccupation of areas where conditions have subsequently proved auspicious for recovery. Lithics from a scatter currently under excavation at Batworthy Corner reveal a hiatus between Mesolithic and subsequent Neolithic and Early Bronze Age assemblages.

4.2.2 Chronology in the established Neolithic and Early Bronze Age

For parts of the region, for example around Avebury, it is now possible to create detailed sequences (Whittle 1993, table 2; Gillings and Pollard 2004, table 2). There are now useful and secure suites of dates for major Neolithic monuments in Wessex, parts of the Cotswolds and elsewhere. For the 4th millennium BC these include Hazleton North long barrow (Saville 1990; Meadows *et al.* 2007), the West Kennet long barrow (Bayliss *et al.* 2007), Fussell's Lodge long barrow (Wysocki *et al.* 2007), Wayland's Smithy long barrow (Whittle *et al.* 2007), Windmill Hill (Whittle *et al.* 1999), Maiden Castle (Ambers *et al.* 1991), Hambledon Hill (Bayliss *et al.* forthcoming), Raddon (Gent and Quinnell 1999) and and for the 3rd millennium BC, Stonehenge (Cleal *et al.* 1995), the Beckhampton Enclosure (Gillings *et al.* 2002), the West Kennet palisades (Whittle 1997b), Flagstones, Mount Pleasant (Healy 1997, table 79) and the Dorchester timber circle (PJ Woodward *et al.* 1993). What these appear to show is that while the construction of major public monuments spans the period 3800–2000 BC, there may exist horizons of more intensive activity at *c.*3650–3400 BC and *c.*2600–2200 BC. Recently obtained dates of *c.*2400–2200 BC from the "Amesbury Archer" (OxA-13540, 13541, 13562, 13623) and "Boscombe Bowmen" (OxA-13542, 13543, 13598, 13599, 13624, 13681) burials put the appearance of Beaker ceramics, early metalwork and flint barbed-and-tanged flint arrowheads (the "Beaker package") into a terminal Neolithic context, contemporary with late Grooved Ware (Garwood 1999).

It is important not to forget how long the Early Bronze Age was, and how much change and development occurred within it. The seriation of metalwork, associated finds and their contexts has led to daunting cultural-historical sub-division (for example, Burgess 1980), but with the benefit of radiocarbon dates this has been rationalised and valuable progress has been made in creating absolute internal chronologies (Needham in Randsborg 1996; Garwood forthcoming). Four "periods", which span the mid-3rd to mid-2nd millennia BC – the conventional Early Bronze Age – have been proposed (Needham in Randsborg 1996):

- **Period 1 (2500–2300 BC).** The earliest phase

of metalwork, coeval with the occurrence of Late Neolithic pottery. Simple ornaments of gold and tanged copper knives found in graves (as at Amesbury and Shrewton), joined shortly by halberds, daggers, and awls. Flat axes have been found as isolated pieces (and elsewhere in rare hoards), their style suggesting an independent British metalworking tradition from the outset.

- **Period 2 (2300–2050 BC).** Graves with flexed inhumations often accompanied by Beaker and other grave goods, including daggers (for example from Yettington, Gerloff 1975) and halberds. Flat axes also occur. Significantly, there appears to have been a swift transition to the use of alloys, especially tin-bronze, seen in flat daggers with plug rivets (Butterwick type) and narrow-butted flat axes (Migdale type). The striking gold lunulae (for example, from Harlyn Bay) probably belong to this period, which correlates with the central European Reinecke A1 phase.

- **Period 3 (2050–1700 BC).** Alongside new diverse pottery traditions (late Beaker, Food Vessel, Collared Urn, and Trevisker in Cornwall) and the urned cremation burial rite, are rich inhumation graves epitomised by the Bush Barrow "Wessex 1" burial (Gerloff 1975). Grave goods include Armorico-British daggers and gold ornaments (for example from Clandon, Dorset), as well as ornaments (such as from Crewkerne) and fittings of other materials (jet, shale, amber, etc). The transition to the next phase is indicated by the bronze daggers from the primary burial at Norton Bavant, Wiltshire (Butterworth 1992). Axes, which at this stage have stop bevels and low flanges and are sometimes decorated (as at Mount Pleasant, Dorset), are not normally deposited in graves (Ridgeway 7, Dorset, and Bush Barrow being exceptional).

- **Period 4 (1700–1500 BC).** Towards the start to this period the rich inhumation burials of Wessex 1 were evolving into the cremation-dominated burials of Wessex 2, associated with the Camerton-Snowshill type of dagger and a different range of objects, including pins. It is probable that the gold cup from Rillaton belongs to this phase. Hoards include tanged spearheads and low-flanged axes in the Arreton style (such as Ashton Court, Plymstock, Westbury-on-Trym and Milverton), while the earliest palstaves (Acton phase 1) herald the profusion of new Middle Bronze Age types, equivalent to the continental Reinecke B. Beakers fade from the burial record but Deverel-Rimbury urns in Dorset had emerged before the end of this period.

Local chronologies

At an intra-regional level radiocarbon chronologies are highly variable in quality, with good coverage for certain areas, and particular horizons, such as Neolithic Wiltshire and Dorset, but less satisfactory for Somerset and Gloucestershire. However, the situation is beginning to change. Until recently the database of radiocarbon determinations for Cornwall was largely limited to those from the two tor enclosures of Carn Brea and Helman Tor (Mercer 1981; 1997). These have been augmented through programmes of AMS dating on a variety of Cornish Neolithic and Early Bronze Age sites. Earliest Neolithic dates are now available from pit deposits and structural features in the lowland zone, such as Penhale Round, Indian Queens (Nowakowski 1998) and Tregarrick, Roche (Cole and Jones 2002–3). There are very early Bronze Age dates from a sealed pit containing a Food Vessel at Metha, Newlyn East (AM Jones and Taylor 2004), and the Poldowrian pit (Harris 1979). The majority of Early Bronze Age dates from Cornwall come from round barrows and cairns (now over 50 dates, AM Jones 2006; Nowakowski forthcoming a). Determinations from single barrows such as Chysauster (G Smith 1996), Colliford (Griffith 1984), Trelan 2 (G Smith 1984; 1988b), Trelowthas (Nowakowski forthcoming b), Watch Hill (AM Jones and Quinnell 2006; AM Jones 2005) document structural changes providing, in all cases, a deeper time-depth to the individual stories of these monuments than has previously been realised (Nowakowski forthcoming a; AM Jones 2005).

Despite having numerous sites that are *thought* to be Late Neolithic or Early Bronze Age, Dartmoor has been described as a "black hole" during these periods (Caseldine 1999, 579). Until very recently there were no absolute dates for the Neolithic. Recent radiocarbon sequences have emerged from palaeoenvironmental work on peat cores (West 1997; Thorndycraft *et al.* 2003; 2004). The only excavation of modern times with dates relevant to this period is that of the cairn group at Shaugh Moor which produced dates beginning at the end of the Early Bronze Age (Wainwright 1979b). Not far from Dartmoor radiocarbon determinations showing occupation during the Neolithic accompany structures and artefacts of the period at Hazard Hill (Houlder 1963), Marldon (Berridge and Simpson 1992) and Raddon Hill (Gent and Quinnell 1999).

Caves continued to be an important focus in the Neolithic and Early Bronze Age, with evidence for practices, including deposition of human bone, continuing into the middle of the 2nd millennium BC (see Chamberlain and Williams 2001 for summary). A number of radiocarbon determinations have been returned on material relevant to this period, mainly

on human and animal bone, from sites including Three Holes Cave, Broken Cavern, Tornewton Cave and the Kitley Caves (Chamberlain 1996; Chamberlain and Williams 2001).

4.3 Landscape

4.3.1 The impact of agriculture

The Early Neolithic sees the introduction of domesticated livestock and cereal cultivation (see Section 4.4.4 on page 88), though agrarian landscapes are a later development. While there is localised evidence for the use of ard ploughs from the 4th millennium BC, notably beneath the South Street long barrow and under the bank at Avebury (Ashbee *et al.* 1979; Evans 1972), Neolithic fieldsystems are not known in the region or elsewhere in southern England – although clearance piles associated with a cultivated surface were observed at Carn Brea (Mercer 1981). Formal land division and the creation of fields for arable farming are, for the most part, features of the 2nd millennium BC and later, linked perhaps to a shift from long to short fallow systems, and a more place-bound sense of being (Barrett 1994b).

Ploughing as an agent of landscape change is a phenomenon of the late 3rd and 2nd millennia BC, when it often seems to precede the establishment of substantial settlements and field boundaries and to fall within the currency of Beaker pottery (see Allen 1997b). In a dry valley at Bovey Lane, Beer, in Devon, the charcoal-rich lowest layer of a colluvial deposit contained Beaker and earlier material (Tingle 1998, fig 9). Beaker pottery is associated with ploughsoils in the upper fills of the ditches of earlier monuments: the ditch at South Street long barrow saw an inwash of chalk rubble (Evans 1990), cultivation from the Beaker period is indicated by the ditch fills of the Amesbury 42 long barrow on Salisbury Plain (Entwhistle 1990) and ploughsoils filled the ditch tops of the long mound at Maiden Castle (Sharples 1991a, 56). There was colluviation of Beaker date at Middle Farm, Dorchester (Allen 1997b), and in Cranborne Chase the site on which the Middle Bronze Age settlement at South Lodge developed had already undergone sufficient ploughing to generate lynchets (Barrett *et al.* 1991, 146–51). Well-preserved Bronze Age fields together with plough-marks and spade marks have also been excavated at Gwithian in Cornwall (see C Thomas 1958; 1970; Nowakowski 1989; 2004).

4.3.2 Character of activity in relation to topography and "landscape zones"

Topographic zonation of activity may have been more marked in the south-west of the region (parts of Devon and Cornwall) than in the east or north (Dorset, Wiltshire, Gloucestershire). There is, for example, little evidence of sustained occupation on the higher areas of Exmoor, though occasional lithic finds and the occurrence of a range of small stone monuments could be linked to seasonal exploitation (for example, summer grazing) and attendant ceremonial activity (Riley and Wilson-North 2001).

Activities at the Cornish Neolithic tor enclosures included the exchange of resources such as stonework and pottery, as at causewayed enclosures farther east, but this was accompanied by distinctive depositional practices and more persuasive evidence for settlement in the interiors (see Carn Brea and Helman Tor, Mercer 1981; 1997). A far more fluid relationship to places, involving smaller-scale but related practices, existed in the contemporary lowland landscape of the tor enclosures.

4.3.3 The appropriation of natural topographic features

In Devon and Cornwall, tors and distinctive hilltops may have been referenced and embedded within both the routines of everyday life, and in cosmological and mythical structures (Bender *et al.* 1997; Tilley 1995). Some were transformed through the construction of tor enclosures during the earlier Neolithic, as at Carn Brea (Mercer 1981), Helman Tor (Mercer 1997) and Stowe's Pound (Johnson and Rose 1994). Other lesser outcrops were the focus for pit depositions during the period as at Roche Rock (Cole and Jones 2002–3), while Early Bronze Age pottery has been found deposited in crevices in craggy outcrops at Treryn Dinas in West Penwith (Sharpe 1992). Tors, outcrops and *in situ* boulders also formed focal points for a number of excavated round barrows.

A type of site recently recognised is the "pseudo-quoit" or "propped stone", found on Bodmin Moor at sites such as Leskernick and Tregarrick Tor (Tony Blackman pers. comm., AM Jones 2005), the former apparently marking a major solar event (Herring 1997a). Further examples have been recognised on Dartmoor, Penwith and the Channel Islands (Blackman pers. comm.). Similar constructions ("earth-fast" monuments), apparently of Neolithic date, are known from south-west Wales (Cummings 2002).

The limestone geology of northern Somerset incorporates caves and swallets that have seen intermittent human use from the upper Palaeolithic onwards. At least 16 caves in this region have produced evidence of Neolithic and Early Bronze Age activity (Lewis 2005). The use of these features changes between the earlier Neolithic and later Neolithic/Early Bronze Age (Lewis 2005). In the earlier period, caves were primarily used for burial of both single and multiple inhumations, some of which are dated to the 4th millennium BC (Ambers and Bowman 2003). Later activity

is more diverse, and includes the continuing deposition of human remains, but also the deposition of Grooved Ware and Beaker pottery, axeheads and fine flint items (for example at Bridged Pot Shelter and Soldier's Hole), and apparent occupation, suggested by hearths, burnt and butchered animal bone, and artefactual material (for example at Rowberrow Cavern and Sun Hole).

It was perhaps the unusual properties of swallets (water percolation, mist pockets, strange noises) that made them a focus for deliberate depositions of artefactual material, human and animal remains (Lewis 2000). The most outstanding example is Charterhouse Warren Farm swallet, a 21m deep natural shaft that contained four Late Neolithic-Early Bronze Age horizons. At the base were juvenile human bones, animal bones and a range of flint, stone, antler and bone items (including a flint dagger, and "sponge-finger stones"). Further deposits included more human and animal bone and Grooved Ware and Beaker pottery.

4.3.4 The landscape context of monuments

The relationship between monuments and topography is a complex one. Even during the Early Neolithic there is much variation on a local scale. Around Avebury, general visibility and intervisibility of long barrows seems not to have been important (Wheatley 1995) and these monuments are to be found in varied landscape locations, including hilltops (for example, Adam's Grave), in valley bottoms (such as Beckhampton Road) and on hillslopes (for example, Horslip, Pollard and Reynolds 2002, 59). In contrast, the long barrows of the Wylye valley were consistently sited in positions with views into the valley (Allen and Gardiner 2004). The frequent occurrence of traces of prior occupation, cultivation or deposition under earthen and chambered long barrows (for example at Hazleton North or South Street) suggests that siting was also driven by the histories or associations of particular locations (Darvill 2004, 92). Perhaps liminal in both setting and status, several enclosures within the region (for example Knap Hill, Rybury, Whitesheet Hill, Crickley Hill, Hembury or Hambledon Hill) are located on the junction between upland and vale, with aspects variously into and out from downland zones (Oswald *et al.* 2001, 99–102). The megalithic quoits in West Cornwall occupy high positions. Some were clearly sited with reference to both distant and near places, as at Zennor Quoit and Mulfra Quoit (Barnatt 1982; 1998).

Tilley (1999) makes a convincing argument that certain Early Neolithic monuments on the South Dorset Ridgeway represent attempts to relate to or appropriate mythological knowledges of the powers of place through a process of deliberate mimicry. Thus, the format of the Maiden Castle enclosure referenced that of Portland, and local bank barrows that of Chesil Beach. Similar homologies between monument form and local topography may be seen to operate in the construction of the Avebury henge (Watson 2001).

Links between monuments and significant natural features were sometimes more explicit. The siting of the Priddy Circles in an area of landscape with a high density of swallet holes may be significant (Lewis 2000), while at Knowlton the Late Neolithic monument complex is sited adjacent to the River Allen, but separated from it by a river cliff and a series of possible natural shafts (Green 2000). Henges within the region and elsewhere have a frequent association with water (Richards 1996). Most famously, Stonehenge is linked to the River Avon by an earthwork avenue. The south-east entrance of Durrington Walls is connected to the same stretch of river via another avenue, and further upstream the Avon defines one side of the analogous henge enclosure at Marden. While it is not proven, the remains of the Late Neolithic dead may have been taken from henges and deposited within rivers (Parker Pearson and Ramilisonina 1998). A similar situation occurs at Stanton Drew, where stone avenues link two of the circles to the floodplain, or an earlier course, of the River Chew.

Early Bronze Age barrows and cairns are a major feature of the archaeology of this region, and this picture has recently been amplified by the addition of many barrow sites now recognisable only as ring-ditches (see, for example, Griffith and Horner 2000, fig 2.2). Barrows, ring cairns and their many complex variants form distinctive concentrations and groupings across a wide variety of landscape "zones" (coastal settings, uplands and around natural outcrops). There are significant differences in landscape siting between large barrows/cairns and other forms; large barrows are often in prominent locations although sometimes from a restricted range of viewing points. False-cresting, where the profiles of barrows are skylined from valley bottom locations, is well-attested (for example on Overton Hill). Spatial analysis of round barrow cemeteries on the South Dorset Ridgeway, around Avebury and around Stonehenge suggests that their placement was strictly regulated, each being related to earlier monument complexes and local topography, but with an underlying structural principle of circularity (A Woodward and Woodward 1996). This is seen spectacularly in the Stonehenge region, where barrow cemeteries form a visual "envelope" around the henge (A Woodward and Woodward 1996; Exon *et al.* 2000). Given that round barrows were built for many centuries, these placements would have been cumulative and are likely to reflect changing and developing structuring principles rather than fixed and static ones (Garwood forthcoming).

4.3.5 The perception and definition of place

Place (the ascription of identity to a locale) was defined in various ways, not least through the creation of monuments, the burial of the dead and the deposition of artefacts. Natural features, including hills, tors and large stones (Gillings and Pollard 1999) would also have undoubtedly constituted named and known places. Because of the striking character of the region's monuments it is easy to forget how a "sense of place" was also marked through occupation and the residues of dwelling. A striking number of sites in the Avebury landscape have extremely long if punctuated histories of activity, sometimes spanning the full Neolithic and Early Bronze Age, testimony to what J Thomas (1999, 220) has described as "the enduring significance of place".

In certain instances, as at Avebury G55 and the West Kennet Avenue occupation site (IF Smith 1965), the residues of occupation events (such as ceramics, lithics and food remains) were consciously curated to form middens and discernible refuse spreads (J Thomas 1999, 209–10). Middening can be seen to represent more than casual refuse disposal, being the product of deliberate strategies of accumulation (Needham and Spence 1997). In a context where extensive arable cultivation may not frequently have been practised, and where spatial constraints within loosely structured settlement areas were unlikely to result in elaborate refuse-management regimes, purely functional explanations for middening are probably insufficient. In one way or another their role may have been symbolic, providing, in their final form, monumental expression to the process of occupation. In their later stages they may have become symbols of occupational continuity, standing for a sense of "deep" time, and even accumulating associations with specific or generalised ancestors.

In Cornwall there is evidence for middening at Gwithian and middens are a feature of the Isles of Scilly. The importance/identity of place is clearly demonstrated by the way that locales were reworked over considerable periods of time. For example, at Stannon Middle Bronze Age settlement activity took place around an Early Bronze Age cairn group that had been in use for centuries (AM Jones 2006), and at Gwithian where fields and burials throughout the Bronze Age show an attachment to a particular place unrivalled in the county (Nowakowski 2006).

4.3.6 Settlement

> *There remains an expectation that if only we try hard enough or look cleverly enough in the right places, a more abundant and better preserved Neolithic settlement record will somehow emerge.* (Whittle *et al.* 2000, 177)

For much of the Neolithic and Early Bronze Age in the region, permanent settlement and sedentism, and with it well-defined traditions of domestic architecture, were not commonplace. We must assume varying degrees of mobility, longevity and residential composition of occupations/settlements (Whittle 1997a; J Thomas 1999; Pollard 1999). Acknowledging mobility, it is not therefore surprising that the evidence for settlement is both insubstantial – consisting for the most part of lithic and artefact scatters, pits, hearths and stake- and post-hole settings that do not readily describe neat building plans – and difficult to interpret. Added to this, distinctions between ceremonial activity and occupation are not always clear cut, and it is from major monuments of the 4th and 3rd millennia BC (such as Hambledon Hill, Mount Pleasant and Durrington Walls) that some of the best assemblages of occupation material (ceramics, lithics and so forth) derive. This should occasion little surprise since such places acted as foci for large-scale gatherings of some duration. Nonetheless, our expectations of *how* the settlement record *should* manifest itself are often confounded by the evidence. Brück (1999b) emphasises that our own mindsets mislead us with the concept of the settlement as a distinct, circumscribed category – with the corollary that varying combinations of the activities which made up contemporary life were carried out at all kinds of locations, few or none of which may have been "domestic" in a modern sense.

Lithic scatter evidence

The most durable evidence for the location, extent, density and duration of settlement is provided by surface scatters of lithic and, much more rarely, ceramic material. These have been identified through both casual collecting, in some instances beginning in the late 19th century (Lewis 2005; Whittle *et al.* 2000), and more systematic programmes of fieldwalking. Scatters are plentiful on the chalk downlands of Wiltshire and Dorset, where major programmes of surface collection in the Stonehenge Environs and along the South Dorset Ridgeway have revealed dense concentrations (up to 210 pieces per 50m collection unit) spanning the Early Neolithic to Middle Bronze Age (Richards 1990; PJ Woodward 1991b). Some of the densest scatters, and those with the greatest chronological range, can be seen to occur around the major monument complexes of Stonehenge, Dorchester and Avebury, in part reflecting repeated occupation related to the construction and use of these monuments. It should be borne in mind, however, that because of a particular interest in such areas, fieldwalking is more likely to be undertaken in them than elsewhere and its results are more likely to be disseminated. It is clear that this has created an imbalance.

The accumulated collections of past decades point to a focus of activity throughout the period on the coastal plain around the mouth of the Avon in what is now the Bournemouth area, not only in an overall concentration of lithics but of fine and exotic implements (JP Gardiner 1984; Field 2004). Field emphasises the evidence for settlement of the fertile, sheltered coastal plain as a whole, as well as of river valleys, which, like the coastal plain, have seen far more attrition of earthworks by cultivation in the historic period than has the chalk downland. Field's research has also highlighted multi-period concentrations of lithics at "pinch points" likely to have seen movement between the chalkland and adjacent, lower-lying areas, notably in the Tisbury–Dinton area of west Wiltshire, where the upper Nadder provides a route between the chalk and the Blackmore Vale, and in the Warminster area of north Wiltshire, where the Wylie valley links Salisbury Plain with the fringes of the Somerset Levels.

To the north-west, dense scatters are known off the chalk on the western parts of the Mendip Hills, predominantly of Early Neolithic date (Bond 2004; 2006; in press c). Two large-scale fieldwalking projects on the Priddy Plateau, by Taylor and Smart in 1972–77, and Lewis and Mullin from 1996 to date, have revealed high densities of material around the tops of gorges and coombes and between Priddy village and the southern slopes of Mendip (Lewis 2005). It seems that Neolithic and Bronze Age scatters may extend over much of the western Mendip plateau. There is a great diversity of material from a few sites, which must be taken as indication of the range of productive tasks performed at these locations. The Priddy Hill scatter is one example, with over 600 worked flints, large amounts of waste, quern stones, quern rubbers, a polissoir, hones, broken axeheads, pebbles and burnt flint (Hack 1987). Dense lithic scatters are also recorded on the Polden Hills (Bond in Gerrard and Aston forthcoming). Here, on the lower to mid slopes of the hills, adjacent to the Sweet Track and other later wooden trackways, lithic scatters represent the signatures of seasonal visits. These are the settlement areas associated with the tracks; the lithic technology, stage of working and quantitity of artefacts is best interpreted as evidence for repeated visits, not sustained long-term stays. Whittle's (1997a) tethered mobility model fits well this evidence.

In other parts of the region, multi-period scatters are known from the Cotswolds (Snashall 2002), the Forest of Dean (Saville 1986; Hoyle *et al.* forthcoming), western and southern Somerset (including sites with large numbers of flint and stone axes at Milverton and Ham Hill, Minnitt in Aston and Burrow 1982, 23), much of central and east Devon, notably the Exe valley, on Dartmoor (with major collections in both Exeter and Plymouth Museums), and Cornwall (Gould 1994; AM Jones 1997; Lawson-Jones in AM Jones 2000–1; Lawson-Jones 2001). Certain areas have produced few lithic scatters, for example Exmoor and the Quantock Hills, though to an extent this may be a product of landuse (the predominance of grazing over arable) and levels of investigation (Riley and Wilson-North 2001; Riley 2006).

In general, earlier 4th millennium BC scatters are small and localised, often almost "lost" within the far more extensive spreads of both earlier and later periods. This is often seen as a reflection of small-scale, short-lived episodes of occupation, as is the digging and filling of isolated pits. Both practices are, for example, represented in the Dorchester (RJC Smith *et al.* 1997, 295) and Stonehenge areas (Richards 1990, 263–7; Cleal *et al.* 1995, 56–60, 473–6). The only substantial scatters of this period relate to causewayed enclosures, suggesting that the scatters may be products of aggregation: there is one immediately outside Robin Hood's Ball, Wiltshire (Richards 1990, 61–5), another on the southern slopes of Windmill Hill (Whittle *et al.* 2000), and two outside the earthworks on Hambledon Hill (Saville forthcoming; Palmer and Oswald forthcoming).

Many lithic scatters are the remnants of erstwhile middens and surface refuse spreads, which would originally have included ceramics and organic materials such as bone. Because of their soft and friable fabrics, Neolithic and Bronze Age ceramics survive only exceptionally outside the protected environments of feature fills. A more representative view of the composition of surface scatters is perhaps provided by the quantities of occupation material perhaps inadvertently included in the turf cores of Bronze Age round barrows, as on King Barrow Ridge (Cleal and Allen 1994) and at Milton Lilbourne, Wiltshire (Ashbee 1986b). The latter produced a rich assemblage of Beaker and Collared Urn, alongside quantities of animal bone and lithics.

Lithic material reflects a gamut of activities across the landscape, at varying levels of intensity, from which "settlement" can be isolated only arbitrarily. In the area of the South Dorset Ridgeway, the density and composition of lithics vary along transects, suggesting a more sustained and/or frequent presence on mid-slopes with abundant lithics and relatively high proportions of retouched forms, and a more fleeting presence on higher and lower ground (PJ Woodward 1991b, figs 18–20). The same area, centred on what would later be Dorchester, shows a relation between lithics and monuments in that, once earthwork mounds and enclosures began to be built in the interfluve of the Frome and South Winterbourne, around the turn of the 4th and 3rd millennia BC, day-to-day living seems to have been focused to the north and south rather than in the immediate area of the monuments (Bellamy 1997). Comparable observations can be made for other monument complexes.

In Cranborne Chase, Middle and Late Neolithic lithics are concentrated on the clay-with-flints to the north of the Dorset Cursus and nearby later monuments, with a secondary concentration of scatters close to the cursus containing unusually high proportions of polished and other fine implements (JP Gardiner 1991). On Salisbury Plain, an area south of Stonehenge and others immediately west and north-east of the Stonehenge Cursus remained virtually devoid of lithics in all periods, despite fluctuating levels of adjacent activity (Richards 1990, fig 10, 157–60).

Pits

Pits filled with occupation debris and more-evidently-selected deposits can also be taken as an index of settlement. In many instances these features were dug to receive deposits (J Thomas 1999), perhaps performed as rites surrounding the abandonment of a site or "closing" of an episode of occupation (Pollard 2001), material being drawn from a number of sources but including settlement middens. Early 4th millennium BC pit depositions include several of a massive scale, as with the Coneybury Anomaly (Richards 1990), Rowden (PJ Woodward 1991b), and Pamphill, Dorset (Field *et al.* 1964), and another on Roughridge Hill, near Avebury. Here we may be witnessing the wholesale burial of middens.

At Cadbury Castle, a series of Early Neolithic pits was found over a wide area, containing leaf-shaped arrowheads, other flint, plain bowl pottery, animal bones, antler, and human bone (Alcock 1972). A small cluster under the Hemp Knoll Beaker barrow near Avebury incorporated deposits of worked sarsen, flint and a complete but smashed pottery vessel (Robertson-Mackay 1980). Similar pit deposits are associated with the enclosures at Maiden Castle (Wheeler 1943; Sharples 1991a), Windmill Hill (IF Smith 1965; Whittle *et al.* 2000), Hambledon Hill (Mercer and Healy forthcoming), Whitesheet Hill (Rawlings *et al.* 2004) and Robin Hood's Ball (Richards 1990), in various chronological relations to the enclosures themselves.

Pits associated with Grooved Ware often display a greater formality in terms of the structured placing of objects within them, and the occurrence of "exotics". In Fir Tree Field, Cranborne Chase, a cluster of sixteen pits associated with Grooved Ware was divided into two groups with different combinations of material included in each (Barrett *et al.* 1991, 75–84). Selected depositions within these included arrowheads and polished implements, pig incisors, and a complete cattle skull. There existed a greater variety of material in the southern group of the two, which was situated closer to the later 4th millennium BC Dorset Cursus.

Intra-regional variability in practices may be detectable. In the south-west of the peninsula pits generally remained small (under 1m in diameter and less than 0.5m deep) from the start of the Neolithic into the Early Bronze Age. The scale of deposition is also rather conservative here, and currently there is little evidence for increasing formality beyond changes in the ceramics selected for deposition. Deposits of charcoal, quartz pebbles (and other stones) and worked flint remain consistent throughout (for example the pits at Roche Rock and Tremough, Gossip and Jones forthcoming).

The development of "domestic" architecture

Darvill (1996) lists eight Early Neolithic and seven later Neolithic/Beaker sites in the region with convincing or possible "domestic" buildings (structures used for habitation). This excludes the large multiple timber circles, associated with Grooved Ware, such as those at Woodhenge, Durrington Walls and Stanton Drew, which are unlikely to have been roofed buildings. The remainder fall into a widespread pattern of rectilinear Early Neolithic structures and later oval and circular buildings. The former are largely concentrated in the west of the region, and include the post-built houses at Haldon, Devon (Willock 1936), Chew Park, Somerset (Rahtz and Greenfield 1977), and that discovered at Penhale, Cornwall (Nowakowski 1998). There are lighter stake- and post-built structures, perhaps of Neolithic date, within the tor enclosures at Carn Brea and Helman Tor (Mercer 1981; 1997), at the causewayed enclosure at Hembury (Liddell 1931; 1932), as well as under the chambered long barrow of Hazleton North (Saville 1990). At Penhale the rectilinear building was associated with a circular structure (Nowakowski 1998). To this list can be added small Late Neolithic structures with central hearths and rammed chalk floors discovered during excavations at Durrington Walls in 2005 and 2006 (Parker Pearson *et al.* 2006). The majority of these buildings were probably short-lived, and their status as true houses is open to debate (J Thomas 1996). Whatever their roles or residential composition, they are unlikely to represent normal components of Neolithic settlements.

Two Late Neolithic structures on Wyke Down, Cranborne Chase, highlight the interpretative ambiguities often surrounding the function of apparently domestic buildings. Both were circular with central four-post settings, and produced quantities of burnt daub, some fragments with traces of decoration (Green 2000, 73–5). Associated with Grooved Ware, they were set adjacent to the contemporary Wyke Down 2 henge. Architecturally, they are similar to Late Neolithic timber settings within the Stonehenge landscape, including the Northern Circle at Durrington Walls (Wainwright and Longworth 1971), that within Coneybury henge (Richards 1990) and

the structure under Durrington 68 (Pollard 1995), all of which might be regarded as ceremonial in nature. Perhaps it is best to think of an architectural continuum, from small stake-built shelters (as at Trelystan, Powys, Britnell 1982) through to large timber circles, though without any single functional identity. More typical, light-weight and temporary, dwellings may be represented by stakehole clusters such as those at Fir Tree Field, Cranborne Chase (Barrett *et al.* 1991, 76), King Barrow Ridge (Richards 1990, 116) and Easton Down, Wiltshire (Stone 1933).

Among the later structures are the post-built roundhouses at Gwithian site GM/XV, associated with Beaker pottery (Megaw 1976; although see Nowakowski 2004 for a reconsideration), the form of which seems to prefigure that of Middle Bronze Age roundhouses. At Brean Down, Somerset, an oval building (structure 57) dating to the Early-Middle Bronze Age was built over an earlier stone structure (Bell 1990, 31). Associated with Beaker and Biconical Urns, the oval building may have been used for craft production rather than occupation (Bell 1990, 36). There was a thin midden associated with the structure and nearby evidence for peat burning.

In Wessex, while Beaker settlements are regularly identified, often surviving as pits, artefact scatters, or both, those of the full Early Bronze Age, from *c.*1900 to 1600 BC (Needham in Randsborg 1996), before the emergence of Deverel-Rimbury and related pottery traditions, remain obstinately invisible. The living sites of those who built and buried their dead in round barrows and were responsible for the final phases of Stonehenge remain elusive. In fact, the largest Early Bronze Age "domestic" assemblage from Wessex is the mass of butchered animal bone, struck flint and fragmented Food Vessels and Collared Urns from the upper fills of the massive henge ditch at Mount Pleasant (Wainwright 1979b, 35–47, tables III, XII), which are indeed the by-products of living, although probably not for any length of time at that place. The key to this low visibility is that settlements of this period *have* been found in circumstances where they are well-protected, whether under the peat of the East Anglian Fens (Healy 1996; Martin and Murphy 1988) or the sand dunes of the south Welsh coast (Benson *et al.* 1990). However, in the largely plough-reduced terrain of Wessex they are near-invisible because their structures were little more substantial than those of earlier periods: pits were dug with decreasing frequency from the later 3rd millennium BC onwards, Early Bronze Age pots were made in friable, rapidly disintegrated fabrics and Early Bronze Age (as distinct from Beaker) flint working is barely distinguishable from that of the Middle Bronze Age.

4.4 The Material World

4.4.1 Material culture

The region possesses some rich assemblages of Neolithic and Early Bronze Age material culture, though these are unevenly distributed, both geographically and according to context. The excavation of major 4th millennium BC enclosures in Cornwall (Carn Brea, Mercer 1981), Dorset (for example, Maiden Castle, Sharples 1991a, or Hambledon Hill, Mercer and Healy forthcoming), Wiltshire (Windmill Hill, IF Smith 1965; Whittle *et al.* 1999) and Gloucestershire (Crickley Hill, Dixon 1988b) has produced substantial stratified assemblages of ceramics and lithics, with a chronological range that occasionally extends from the Early Neolithic into the Early Bronze Age. There are sizeable and nationally important collections of late 3rd-early 2nd millennium BC ceramics (Grooved Ware, Beaker, Food Vessel and Urn) from the henge enclosures of Durrington Walls and Mount Pleasant (Wainwright and Longworth 1971; Wainwright 1979b); to which should be added the remarkable assemblage of at least 125 fine- and coarseware Beakers from the secondary fills of the henge ditch at Gorsey Bigbury (S Jones 1938; ApSimon *et al.* 1976; Lewis 2005).

Reflecting a national situation, organic components of the material culture repertoire are not well represented, though a range of wooden artefacts has been recovered during excavation of the Somerset Levels trackways. Associated with the early 4th millennium BC Sweet Track were three paddles, a dish, hazel arrow shafts, parts of three hazel bows, a small bow and "tomahawk", yew pins, digging sticks, a mattock, a comb, toggles, a spoon fragment and wedges (Coles *et al.* 1973). We might also infer the use of skins and basketry from both the use-wear on some lithics and perhaps from ceramics, with some Grooved Ware vessels perhaps skeuomorphic copies of basket work (Wainwright and Longworth 1971, 246; Hurcombe 2000).

The intensity of barrow burial within the region, and sustained traditions of interment with grave goods, are reflected in the rich assemblages of Early Bronze Age ceramics, ornaments and metalwork recovered from antiquarian and more recent excavations (Annable and Simpson 1964; Clarke *et al.* 1985). These include several of the richest grave assemblages from the British Isles, notably the mid-3rd millennium BC "Amesbury Archer" Beaker burial (Fitzpatrick forthcoming), and the "Wessex" series burials of several centuries later from Wilsford G5 (Bush Barrow), with sheet gold lozenges, Breton daggers, flat axe and mace (Clarke *et al.* 1985, figs 4.30, 4.42), Upton Lovell G2e, Wiltshire (Clarke *et al.* 1985, figs 4.51, 4.57) and Clandon, Dorset, again with sheet gold work (Clarke *et al.* 1985, fig. 4.54). The

diversity of objects from full Early Bronze Age (i.e. *c.*1900–1600 BC) funerary contexts is remarkable, and includes miniature pottery vessels (accessory cups) and metalwork (such as the halberd pendants from Preshute G1a and Wilsford G8), amber and other composite necklaces, faience, gold-covered shale and amber items, and possible imports such as Breton daggers, crutch-headed and ring-headed pins (both types with Únětice connections) and the unique fork-shaped "horse-goad" from Wilsford G58 (Annable and Simpson 1964, 1006–62; Clarke *et al.* 1985; Piggott 1973b, 357–61). Of note are the remarkable series of small handled cups from the region, in shale (Broad Down and Amesbury), amber (Clandon) and gold (the famous example from Rillaton, salvaged during the 19th century from one of the largest barrows on Bodmin Moor, Piggott 1973b, 369).

First metals

Historically, the study of prehistoric metalwork has been important for establishing a basic chronological position for certain sites within British prehistory and for demonstrating cultural links both within the British Isles and with the Continental mainland. The growth of knowledge concerning the deposition of early metalwork was inextricably linked with antiquarian interest in round barrows, because it is within such funerary contexts that the majority of early metalwork was found. Useful though this early work may have been, the standard of recording of the time was usually so imprecise as to leave open to question the actual context and association of the metalwork – the excavation of the Lockington barrow, in Leicestershire, for example, has demonstrated that the "grave goods" were not associated with the barrow but with a palisaded enclosure (Hughes 2000). Not until the middle of the 2nd millennium BC is metalwork found regularly in settlement or other earthwork contexts, probably a reflection of the degree of sedantism and concomitant permanency of settlement. To the repertoire of grave goods can be added a number of individual isolated finds and, exceptionally within the early period (and unlike the more common hoards of the late 2nd and early 1st millennia BC), the deliberate disposal of two or more items together. Bearing in mind the relative scarcity of early metal, it is questionable whether any metal object was "accidentally lost" and it is more probable that the objects reported as "isolated finds" have been separated from their true context of deliberate deposition. The modern use of metal detectors has increased the number of discoveries, but in itself has not often added to the understanding of the context or circumstances of disposal.

The study of metalwork, especially the circumstances of deposition, continues to contribute to our understanding of prehistoric societies. Although modern excavations have considerably improved our knowledge of the contexts of early metalwork, and have led to new interpretations of the motives behind deposition, the basic perception of the pattern of deposition has not altered, namely that early metal objects were regarded as special pieces of great symbolic significance, carefully selected and purposefully positioned in their final resting place. Their deposition, therefore, continued practices established in the Neolithic, albeit that the circumstances of deposition, the cultural context and probably the prevailing philosophy had changed. The rare occurrence of axe and dagger motifs carved in stone (for example at Stonehenge), or halberd-like pendant ornaments, further demonstrates the strong symbolic role of metal objects.

The earliest dates of deposition (though not necessarily the date of manufacture) of metal objects in Britain occur in the mid-3rd millennium BC and are associated with Beaker pottery. While the idea of a "Beaker invasion" is no longer fashionable, both isotope analysis of teeth and the typology of metalwork in the grave of the "Amesbury Archer" indicate a common Central European origin, an area with an already well-established history of metallurgy. These analyses, and others, suggest a wide mobility of people and with them the spread of new ideas and techniques. The early date for mining at Ross Ireland, Co. Kerry (O'Brien 1994, 229–31), suggests that knowledgeable prospectors had already discovered the resources of the British Isles before 2300 BC.

From its earliest appearance, and throughout the period when bronze was the principal material used for tools, weapons and ornaments, metal objects were probably both utilitarian and symbolic. Like the stone of earlier Neolithic polished axes, the material itself may have been thought to posses particular potency. Form and decoration may have been equally significant and to have held particular meanings. Our own interpretations have to be carefully considered: "dagger" (an offensive weapon) has a different meaning to "knife" (an everyday tool), while "jewellery" (for the decoration of the body) has a different connotation to "badge of office" (with implied authority). Grave goods are also open to different interpretations, so that rare occurrences of gold (as in the "Wessex" burials) might be considered to represent the expensive possessions of a wealthy elite, whereas they could represent tokens presented from far flung associates, or the customs of a particular group of people. None of these explanations is, of course, necessarily mutually exclusive. However, it is clear that even from the earliest use of bronze, grave goods were selected from a broader repertoire (Needham 1988, 245), and that the adoption of metal was a significant event for the societies of south-west Britain and beyond. Needham sees Wessex in the late 3rd millennium BC as a zone of

net accumulation, receiving metal from Ireland and the continent, with the south side of the Bristol Channel, from Gloucestershire to Somerset, serving as a flow-control zone (Needham 2004).

Representative examples of Early Bronze Age metalwork are displayed in the region's museums and are noted in both published catalogues of the collections (for example, Bristol, Grinsell 1968, Devizes, Annable and Simpson 1964 and Salisbury, Moore and Rowlands 1972), and fleetingly in general county syntheses, such as those for Cornwall (Christie 1986), Devon (Pearce 1979), Somerset (Aston and Burrow 1982), Avon (Aston and Iles 1986) and Gloucestershire (Darvill 1987b). Detailed classifications of certain classes of object are given in specific typological analyses (for example, goldwork: Taylor 1980, daggers and knives, Gerloff 1975 or Beaker associations, Clarke 1970). More comprehensive treatment of the metalworking traditions of the "South West" (that is Somerset, Dorset, Devon and Cornwall) was given by Susan Pearce (1983), and the "stray finds" of metalwork from Somerset by Ian Colquhoun (1978).

On the basis of Pearce's 1983 catalogue, it is possible to give some idea of the quantities of early metalwork then known in the region (here excluding Gloucestershire and Wiltshire): 113 axes, 95 daggers and knives, 4 tanged spearheads, 18 awls, 1 chisel, 6 pins and various other simple ornaments. Clearly, the number of finds is considerable but it is also variable in density across the region. Bronze Age metalwork distributions tend to show a concentration of finds in Wessex and, to a lesser extent, the Somerset lowlands and Mendip Hills, with notably fewer in the peninsula (Gerloff 1975, plates 28–9; Rowlands 1976, map 97). Goldwork is present in some quantity, in numerical terms at least, from both funerary and hoard contexts. The list includes some remarkable sheet gold artefacts, including the Bush Barrow ornaments and the two lunulae (of Irish influence, if not manufacture) found with a bronze flat axe at Harlyn Bay, Cornwall (Taylor in Clarke *et al.* 1985, 190, 260).

Since the operation of the Treasure Act 1996, and more importantly its extension from January 2003 to cover prehistoric base-metal associations, the number of reported prehistoric metal objects has grown (nationally from 191 in 1998 to 403 in 2003, MLA 2004). Between 1997 and 2003, 194 items of "treasure" of all periods were reported from the South West (representing nearly 13% of the national total), the greatest proportion being from Wiltshire (53 reports) and Dorset (48).

There is no doubt that the widespread use of metal-detectors has expanded the populations of distribution plots, but these are even more problematically informative than distributions of other materials. Metalwork finds reflect (imperfectly) the extent to which artefacts were buried or "drowned", not the extent to which they were current and used. An individual may have parted with a bronze axehead by consigning it to another region by gift or exchange or to the melting pot, rather than by depositing it in a context from which it might eventually be recovered. The relevant practices and beliefs may well have varied from region to region, even from community to community within a region at any given time, with yet more scope for variation over time.

4.4.2 Material extraction and artefact production

The south-west peninsula has long been an important raw material source, with its products transported over long distances.

Stone

A wide variety of coarse-grained greenstones from the south-west peninsula were made into implements, mainly axeheads, and transported over much of Britain. They include petrological groups I, II, III, IV, XVI and XVII as well as numerous ungrouped specimens. All of these are found beyond the peninsula (Clough and Cummins 1988, maps 2–5, 15–16). Of these, Group I is one of the most abundant in Britain, and the prevalence of rocks of probable peninsular origin among the numerous ungrouped implements underscores the extent to which these artefacts were transported beyond their source area. Attempts to locate their precise sources have been unsuccesful, an experience variously attributed to rising sea levels, later quarrying and the lack of distinctive knapping debris deriving from pecking a coarse-grained rock rather than flaking a fine-grained one. The likelihood of their production from beach pebbles rather than extracted rock has been persuasively argued by Berridge (1994) and their probably diverse origins have been reinforced by Markham's investigation of Cornish dolerite outcrops, as well as of the artefacts themselves (Markham 2000).

There is surprisingly little evidence for flint-mining on the Wessex chalklands. Quarries, such as were worked at several locations on the South Downs, barely extend across the Hampshire-Wiltshire border, with one extensive example at Easton Down (Stone 1931) and a few shallow pits at Durrington (Barber *et al.* 1999, fig 1.1). Given the extent of investigation in the region, it can only be concluded that flint mines were rarely sunk in Wessex. Even at Beer Head, in Devon, an imposing chalk cliff in which good quality flint is abundant and clearly visible, no evidence has materialised for the quarrying long surmised to have taken place (Tingle 1998). Recent work by John Newberry (2002) has shown that the available flint sources in the south-west peninsula are more widespread and more complex than has often been

asserted, especially in Devon, and that in particular a wide variety of small sources of good quality chert were being exploited in this period. The extra-utilitarian aspects of flint mining have been emphasised persuasively (for example by Barber *et al.* 1999, 61–7, 73). It may be that, in contrast to attitudes and beliefs prevailing elsewhere, there was no motivation to delve into the chalk to extract flint at considerable effort and risk.

Instead, as in many other areas, there were foci for procurement, the early stages of flint working, and the production of core tools on material from superficial sources within wider spreads of lithics, reflecting a range of domestic and other activities, often over extended periods. Examples include several locations in the Stonehenge area, notably Wilsford Down (Richards 1990, 22–4, 158–71), the Bridport Road Ridge near Dorchester (Edmonds and Bellamy 1991b), and the clay-with-flints in Cranborne Chase (Barrett *et al.* 1991). These were all multi-product industries generated from superficial flint sources in essentially domestic contexts, but with an industrial facies. In the Dorchester area in the early 4th millennium BC flint axe manufacture, often associated with flint mines, was undertaken within the Maiden Castle causewayed enclosure to the exclusion of other locations which would have provided equally good raw material (Edmonds and Bellamy 1991a). It is noteworthy that ground flint axeheads or their surviving fragments are often made of different kinds of flint from the industries of which they form a part, although it is not always clear whether this entailed transport as well as careful selection (JP Gardiner 1991; Saville 1981a; Healy 2004a).

The extent to which flint from the Wessex chalk was transported westwards and north-westwards has been explored many times, with some disagreement as to the scale of the transport, but none as to its reality (Saville 1982; Healy 1988; Tingle 1998, 89–98; Bond 2004; 2005; in press a). However, earlier Neolithic assemblages in Somerset, Gloucestershire and the far south-west include large numbers of implements worked on nodular flint, imported into these areas from chalk sources. It seems likely that flint from the chalk may have moved in greater bulk than any other material in the 4th millennium BC, and was transported at every stage of the reduction sequence, from finished implements to unworked, fully cortical nodules.

Ceramics

In the earlier 4th millennium BC, the peninsula was in the mainstream of pottery production. It has a distinctive south-western ceramic style within the round-based Neolithic bowl tradition, characterised by trumpet, and tubular and other lugs, shallow open bowls, deep bag-shaped pots or jars, undeveloped rims, girth cordons, and the virtual absence of scored or impressed decoration; carinated bowls are generally rare, though exceptionally frequent at Carn Brea (IF Smith 1981). Neolithic bowl pottery is frequently found in the region and the gabbroic clays of the extreme south-west were the source of particularly fine vessels which were transported over long distances (Peacock 1969b). The Peterborough Ware and Grooved Ware of the later 4th and earlier 3rd millennium BC are, however, rare in the peninsula (Mepham 1999, 211; Longworth and Cleal 1999). So too are the Beaker, Collared Urn, Biconical Urn and Deverel-Rimbury traditions, all of which abound farther east (Clarke 1970, maps 1–10; Longworth 1984, fig 42; Parker Pearson 1990, fig 12), although Food Vessel is less so (Parker Pearson 1990, fig 7). There is no obvious explanation for the scarcity of Peterborough Ware, Grooved Ware and Beakers. From the earlier 2nd millennium BC onwards, however, the development of the distinctive Trevisker pottery tradition of Cornwall and Devon was sufficiently strong to eclipse the Collared Urn, Biconical Urn and Deverel-Rimbury styles prevalent to the east. Trevisker pottery was largely made of gabbroic clay in Cornwall, and from more local sources in Devon (Parker Pearson 1990, figs 8–11), and individual vessels, some of Cornish clays, have been identified as far away as the Pas de Calais, Wiltshire, Dorset and Kent (Parker Pearson 1990; Gibson *et al.* 1997). In Cornwall, production became more and more focused on the gabbro as the 2nd millennium BC progressed, although not to the exclusion of other sources (Parker Pearson 1990). This is an exceptional expression of regional identity, especially in the context of the ubiquity of Collared Urn in the rest of Britain. It coincides with distinctive metalwork distributions in the later 2nd millennium BC, but this would have been well after the establishment of the tradition (Parker Pearson 1995, 91, 98). A link with the putative position of the peninsula in the European tin trade remains attractive but is so far unsubstantiated.

Metals

Cornwall, Devon and Somerset have between them sources of copper, tin, lead and gold, mapped by Pearce (1983, figs 3.1, 3.3, 3.4). During the earlier Bronze Age gold was probably being sourced from Ireland, but although there is currently little evidence of prehistoric exploitation, copper and tin may have been mined in Cornwall. Tin is perhaps the most significant of these, because it is rare in both Britain and continental Europe (Pearce 1983, fig. 3.2).

This rarity heightens the probability that tin from Cornwall and Devon was exploited from early in

the history of insular bronze working, in which a consistent copper/tin alloy was achieved by the end of the 3rd millennium BC (Needham in Randsborg 1996, 130). The lack of direct evidence for early tin extraction and working in the peninsula has traditionally, and reasonably, been put down to removal of evidence by mining and quarrying in the historical period. However, recent analysis of trace elements deposited in Dartmoor peats and in sediments from Dartmoor rivers has provided indirect evidence for mineral extraction here in the prehistoric period (West 1997; Thorndycraft *et al.* 2003). Increasing concentrations of copper, zinc and arsenic occur from the mid Neolithic onwards. It is likely that the low levels of trace elements encountered in the Neolithic derived from soil dust generated through local landscape disturbances. In the Bronze Age, however, two peaks occur: the first in the Early Bronze Age (*c.*2500 BC) and the second, a larger peak, in the Middle Bronze Age (*c.*1600 BC). These signals suggest either widespread burning or prehistoric metal mining, perhaps principally for tin, but also generating atmospheric pollution from other minerals (West 1997, 348).

Given the scarcity of tin sources, the use of tin *beyond* the South West from the Early Bronze Age onwards is a strong indication that south-western sources were being exploited. Particularly persuasive is a burial at Rameldry Farm, Fife, 2280–1980 cal BC (GU-9574), where a set of V-perforated buttons included one jet example inlaid, exceptionally, with tin and one example made, equally exceptionally, of the mineral lizardite which may, like the tin, have originated in the south-west peninsula, although a Scottish source is also possible (Baker *et al.* 2003). Also in the late 3rd millennium BC, traces of corroded tin were found under the rim of one of two gold armlets at Lockington, Leicestershire (Hook and Meeks 2000). A single tin-plated flat bronze axe from Barton Stacey, Hampshire (Kinnes *et al.* 1979), further reflects the transport of tin in isolation as well as in alloyed metal and echoes the far more frequent tinning of flat axes in Scotland (Needham 2004, 203). In the first half of the 2nd millennium BC, now-lost tin beads (apparently skeuomorphic of segmented faience) were placed in a burial at Sutton Veny (Colt Hoare 1812), and actual faience beads made in Britain and Ireland have a higher tin content than those made elsewhere, although this would not have improved them or altered their appearance. This can be interpreted as the conspicuous consumption of a scarce resource, more readily available in these islands than in much of mainland Europe (Sheridan and Shortland 2004). Alison Sheridan's recent work on prehistoric faience in Britain has concluded that there is evidence to support local production in coastal zones. XRF-analysis of a faience star-bead from Stannon has suggested that Cornish sand deposits form the fabric of the paste (Sheridan in AM Jones forthcoming).

Other materials

Another major area of raw material extraction within the region, the Isle of Purbeck, seems to have been exploited on a relatively modest scale in this period. Kimmeridge shale was worked and exchanged in moderate quantities from the Neolithic onwards, as in the case of shale beads in the secondary infill of the West Kennet long barrow (Piggott 1962), and the Eyford and Notgrove long cairns in Gloucestershire (Clarke *et al.* 1985, 233–5, figs 2.9, 7.2, 7.3). It became more significant in the 2nd millennium BC, when it was used to replicate personal ornaments otherwise made in jet (Pollard *et al.* 1981) and also to make exceptional, highly crafted objects, such as the handled cup from a barrow at Farway Broad Down (Clarke *et al.* 1985, 282, fig 4.46), and the gold-inlaid macehead from the Clandon barrow (Clarke *et al.* 1985, 274–5, fig 5.49). There is evidence for shale working (Kimmeridge sources) at the Bronze Age settlement at Gwithian (Nowakowski 2004).

4.4.3 Art

While non-ceramic art is uncommon (as indeed it is nationally), it does occur in a variety of contexts and media, both portable and immobile. The exceptional preservation of the Somerset Levels has led to the survival of an hermaphrodite wooden "god-dolly" found sandwiched between two trackways (Coles 1968, 253–7, pl XII). Dates for the two tracks place the figure in the mid 3rd millennium BC (Coles and Dobson 1989), making it so far the earliest wooden figure from Britain or Ireland (Coles 1990, 326–8).

Chalk offers itself to easy and rapid carving and engraving. Perhaps serving as votives, portable carved chalk objects (cups, phalli, "figures") are known from 4th and 3rd millennium BC monument contexts, including Windmill Hill (IF Smith 1965, 130–4), Mount Pleasant (Wainwright 1979b, 167–71), Maumbury Rings (Bradley 1975), Stonehenge (Cleal *et al.* 1995, 399–407) and Woodhenge (Cunnington 1929, 112–3); the latter producing, exceptionally, two carved chalk axes. These are reviewed by Varndell (1991, 105–6). A recently discovered carved chalk block from the Monkton Up Wimborne "henge", Cranborne Chase, is decorated with pecked arcs and lines in arrangements not dissimilar to Boyne passage grave art (Green 2000, 82); while the designs on the carved plaques from King Barrow Ridge and Butterfield Down, Amesbury, may draw inspiration from motifs more commonly employed on Grooved Ware (Rawlings and Fitzpatrick 1996, 22–3).

Far rarer, but perhaps not originally so, are engravings on the walls of four segments of the late 4th/early

3rd millennium BC Flagstones enclosure, Dorchester. Comprising incised arcs, multiple concentric ovals, a horseshoe motif and lattice, these were found on the lower part of the ditch sides, having been rapidly covered with chalk rubble (Healy 1997, 33–7). Other such works may have disappeared where chalk-cut ditches infilled less quickly or were cleaned out, providing more time for erosion, especially if they were as shallowly cut as the Flagstones engravings.

The axe and dagger carvings on five of the sarsens at Stonehenge are well-known, and provide one of the most dramatic examples of glyphic art in direct association with a major ceremonial monument in southern Britain (Lawson and Walker in Cleal *et al.* 1995, 30–3). Most are probably copying bronze flanged axes of Arreton type, and can therefore be placed in the full Early Bronze Age, several centuries after the erection of the trilithons. The sole parallel for the dagger carving comes from the two examples on a sandstone block from the Badbury Barrow in Dorset (Piggott 1939), while an axe carving has recently been identified on the central stone of the Boscawen-un stone circle.

Other funerary/monument associations include the cup-marked standing stone on Longstone Hill, Kilve, Somerset (Somerset HER 33283), a slab with concentric ring patterns from Knowlton and another from Winterborne Came 18b, near Dorchester (Lewis *et al.* 2000). There are also cup-marked stones in Early Bronze Age barrows at Tichbarrow (Trudgian 1976), Treligga 7 (Christie 1985) and Davidstow Moor, Cornwall (Christie 1988). Among the cup-marked and perforated stones in a rough circle beneath Davidstow barrow XXVI (22) was a slate disc pecked and incised with a unique representation of a human face (Christie 1988, 109–31, fig 78, L77). A remarkable slab decorated with seven foot-carvings, ten cup-marks and a horned device from the Pool Farm cist on Mendip (Grinsell 1971, West Harptree 8) formed part of a sealed stone cist containing two cremations dating to the first quarter of the 2nd millennium BC (Horne 1931; Coles *et al.* 2002). The motifs from Pool Farm are largely without parallel in Britain, and most similar to Scandinavian examples (for example, Bornholm), though it has been suggested that the destroyed Calderstones passage grave (Liverpool) is a comparison. Known rock art (on *in situ* rocks) is relatively insignificant and restricted to the far south-west. The earthfast cup-marked boulders at Bodrifty, Tregerthen Farm, Zennor (Nowakowski and Herring 1987) and most particularly Stithians, Cornwall (Hartgroves 1987), are rare exceptions. The fact that the last were only revealed by the action of a reservoir suggests that others may still be concealed in lowland contexts.

4.4.4 Subsistence

Stable isotope analysis of human bone has provided direct evidence for diet during the 4th millennium BC. Samples from Hambledon Hill suggest a variable but generally high input of animal protein, whereas a more mixed plant/animal protein diet is indicated for the populations from the Cotswold-Severn tombs of Hazleton North and West Kennet (Richards 2000). For the Early Neolithic, Richards suggests "different subsistence regimes were followed in different areas by different communities and at a regional and national scale the picture is more one of a 'mosaic' of adaptations" (Richards 2000, 132).

Absorbed organic residues in pottery (lipids) provide further direct evidence of diet. Analysis of ceramics from Hambledon Hill and Windmill Hill conclusively demonstrates the exploitation of domesticated ruminants for dairy products as well as meat during the Early Neolithic (Copley *et al.* 2003).

Animals

The survival of faunal remains is locally varied, occurring in some quantity on the alkaline chalk and limestones of the east of the region, but being largely absent from the acidic geology of the peninsula. Since many of our best faunal assemblages derive from monument contexts or from pit deposits where character may imply selection or the generation of material through set-piece consumption events, gauging the relative ubiquity and economic significance of particular species can be difficult. However, this becomes less of a problem if we recognise the socially embedded and context-specific nature of animal husbandry and economic practices (different species operating in different regimes of value in different contexts), and avoid the search for elusive "norms".

The early 4th millennium BC sees the introduction of domesticated cattle, pig, sheep and goat into southern Britain from as yet undetermined continental sources. Significantly, there is no evidence for autochthonous domestication of wild cattle and pig (Grigson 1999, 213) and Tresset (2003) has found close compositional and metrical similarities between animal bone assemblages from 4th millennium BC sites in Britain (including Windmill Hill and Maiden Castle) and those from contemporary or slightly earlier sites in the Paris Basin. This, along with the general dearth of wild species from 4th millennium BC assemblages, may imply the ascription of a reduced status to non-domesticated species rather than the playing out of any antithetical nature-culture distinction (Pollard 2004). The ontological and cosmological status of animals was constructed as much through an understanding of their habits, their perceived proximity to people, and their involvement in social relations

as through any kind of abstracted symbolic scheme (Whittle 2003, 78–106).

The remains of cattle dominate assemblages from the 4th millennium BC enclosures of Hambledon Hill (Legge forthcoming), Windmill Hill (Grigson 1999) and Maiden Castle (Armour-Chelu 1991) and from contemporary pit assemblages such as those from the Coneybury Anomaly (Maltby in Richards 1990, 57–61) and the slopes of Windmill Hill (Davies in Whittle *et al.* 2000). The pattern is not universal, and although a limited sample, pig out-numbered cattle in Early Neolithic contexts at Whitesheet Hill (Maltby in Rawlings *et al.* 2004), and from earliest 4th millennium BC pit deposits at Rowden, Dorset (Maltby in PJ Woodward 1991b), and Roughridge Hill, Wiltshire (Pollard 1993).

The Coneybury Anomaly is anomalous in many ways. This large early 4th-millennium BC pit produced a faunal assemblage "unparalleled in Britain" (Maltby in Richards 1990, 57–61), perhaps resulting from a major butchery episode involving at least ten cattle and several roe deer. Sheep bones were absent, and Maltby suggests that these animals may not have been present at this point in time within the Stonehenge landscape, although they do occur at a slightly later date in the pit assemblages outside Robin Hood's Ball (Maltby in Richards 1990, 247). An indication of how selective such deposits may be is provided by the contents of the Hemp Knoll pits, near Avebury (Robertson-Mackay 1980). The assemblage here was dominated by cranial fragments, and perhaps also included individual burials of a sheep and calf (Grigson in Robertson-Mackay 1980).

There is no doubting the social value of cattle during the 4th millennium BC. In addition to providing a rich source of meat, milk and leather, a close identification was often made between cattle and people by the placing of the bones of the former within mortuary contexts (Grigson in Ashbee 1966). Cattle bones were included as deposits with the human dead in long barrows in the region (Grigson in Ashbee 1966; J Thomas 1988). At Fussell's Lodge and other Salisbury Plain barrows, hides were draped over mortuary deposits (Grigson in Ashbee 1966), bespeaking of a containment, melding together, or absorption of ancestral bone and cattle. Ray and Thomas argue that cattle existed as a form of inalienable wealth, used in gift exchanges, as bridewealth, or in procuring alliances or settling death payments, with slaughter and consumption enacted only on special occasions (Ray and Thomas 2003, 41).

Cattle bone was also incorporated in the chambers of Cotswold-Severn tombs (J Thomas 1988, 549), though a different picture emerges from Hazleton North in Gloucestershire (Saville 1990). Here, only one cattle bone was found with human bone deposits in the chambers, but a complete perinatal sheep had been placed in the south chamber, along with other sheep bones and the limb of a roe deer (Levitan in Saville 1990, 211–2).

While the bones of some non-domesticated animals (especially deer, wild cattle and wild pig) are occasionally present in small numbers, those of other species, such as cat, fox, wolf and brown bear, are exceptionally rare. The situation is remarkable given the heavily-wooded character of earlier Neolithic landscapes within which occupation took place, and across which such animals must have been ubiquitous. It is this kind of contradiction, among others, that must suggest our knowledge of earlier Neolithic landscapes is incomplete.

A prime feasting animal, pig is present in abundant quantities from the 3rd millennium BC ceremonial centres at Durrington Walls (Harcourt in Wainwright and Longworth 1971), Mount Pleasant (Harcourt in Wainwright 1979b) and the West Kennet palisades (Edwards and Horne in Whittle 1997b). The scale of feasting at these sites is further emphasised by the results of recent excavations outside the south-east entrance of Durrington Walls, which have revealed extensive middens and pit depositions containing feasting debris (Parker Pearson *et al.* 2006). Assemblages from other, contemporary, sites show the continuing importance of cattle. Primary deposits in the Wyke Down 1 henge, for example, included more cattle than pig (Legge 1991, 56–7); a pattern repeated with the pit assemblages from Windmill Hill (Davies in Whittle *et al.* 2000) and King Barrow Ridge (Maltby in Richards 1990, 248).

An indication of the range of animals present within the 3rd millennium BC landscape is given by assemblages (both incidental accumulations and deliberate deposits) from cave and swallet sites on Mendip (Rowberrow Cavern, Sun Hole, Bone Hole, Bos Swallet, Brimble Pit Swallet and Charterhouse Warren Farm swallet). In addition to domesticated cattle, pig and sheep, red and roe deer, wolf, boar and aurochs are present (Lewis 2005).

Human relations with non-domesticated animals appear complex; non-domestic species occur with greater frequency on Grooved Ware-associated sites than they do in 4th millennium BC contexts (Wainwright and Longworth 1971, table 29). In Wessex and Somerset, the bones of a wide range of non-domesticated species are found at henges, albeit often in small numbers: here we have wild cattle and pig, deer, horse, cat, wolf, fox, pine martin, badger, beaver and bird (including white-tailed sea eagle from the Coneybury henge, Maltby in Richards 1990, 153). Dog remains are also common. Fewer species are present in pit deposits, though alongside the familiar range of ungulates there are cat, fox, two important finds of brown bear from Down Farm, Cranborne Chase, and Ratfyn near Stonehenge (Legge 1991), and a "large

bird" from The Loders, Lechlade, Gloucestershire (Darvill *et al.* 1986).

That differential treatment could be afforded to the bones of domesticated and wild cattle and pig is illustrated by the seeming restriction of the latter to ditch contexts at Woodhenge and Durrington Walls (Richards and Thomas 1984; Pollard 1995, but see the cautionary notes in Albarella and Serjeantson 2002). The phase 2 deposits at Stonehenge are highly unusual in including the bones and even skeletons of wolf, fox and bird (including raven), placed in the same sectors of the henge ditch as disarticulated human bone and cremations (Serjeantson in Cleal *et al.* 1995; Pollard and Ruggles 2001). Overall, the proportion of wild animals from the site is unusually high (Serjeantson in Cleal *et al.* 1995, 450). Here may be a contextual link between certain wild animals, particularly carnivores, and the transformed human dead/ancestors.

In the case of red deer the distinction between animals classified as either domesticated or "wild" may even dissolve. Herds of deer were probably managed through selective culling and the creation of browse during the Neolithic (Sharples 2000). There existed high demand for antler to provide digging tools for the construction of monuments and the excavation of flint mines (Clutton-Brock 1984).

The status of horse remains ambiguous. In Wessex, small quantities of horse bone have been found in primary post-hole packing at the Sanctuary (Cunnington 1931, 331) and in other contexts at Durrington Walls, Mount Pleasant and Marden (Wainwright and Longworth 1971, 265). Seemingly no longer indigenous to Britain by the Neolithic, these animals, or at least their bones, had to be introduced; Serjeantson (1998) concludes, cautiously, that this occurred during the 3rd millennium BC. Harcourt (in Wainwright and Longworth 1971) thought the Durrington horse was wild, though if an introduced species some form of human control seems likely. They may have been kept for riding or as a source of meat.

While it is normally possible to distinguish between domesticated and wild varieties of individual species, it is much more difficult to be certain about the kinds of husbandry or control exerted over animals. Even with nominally domesticated species we can postulate different degrees and intensities of interaction with people, from close husbandry to a very loose form of management in which animals may be largely feral. Recent re-analysis of the faunal assemblage from Durrington Walls by Albarella and Serjeantson (2002, 43–4) has revealed evidence for morphologically "domesticated" pigs and cattle being shot with flint-tipped arrows. Such practices might have comprised a form of "ritualised" slaughter.

Latest 3rd to early 2nd millennia BC assemblages from the Stonehenge region show a decline in numbers of pigs and the increasing importance of sheep (Maltby in Richards 1990, 249), though note should be taken of the large amount of cattle bone from the Beaker "midden" deposits in the Coneybury henge (Maltby in Richards 1990) which testifies to the continuing significance of these animals in special consumption events. Animal remains, principally wild mammals and birds, have been found in close association with cremated human remains in Cornish Early Bronze Age cists and barrows, for example, Trelowthas (Locker in Nowakowski forthcoming b), Highgate (Nowakowski 1998), Gunwalloe (Patchett 1944), Treligga 7 (Christie 1985) and Trebartha cist (King and Miles 1976)). In Gloucestershire, at Bourton-on-the-Water, a Bronze Age ring ditch contained a pit with two dog burials (O'Neil 1977, 15–17). Assemblages from domestic sites are rare for this period, though the Early to Middle Bronze Age horizons at Brean Down contained cattle, pig, sheep, goat, deer and dog bones in quantities that varied according to phase and structure (Levitan in Bell 1990).

One of the latest occurrences of aurochs in southern Britain comes from the skeleton recovered from the Charterhouse Warren Farm swallet, dated to 1620–1430 cal BC (BM-731) and there is another late find, also from Somerset at Porlock Bay dating to 1740–1450 cal BC (AA-30681, Rob Wilson-North, pers. comm.).

Plants

Both cultivated and collected plant foods played an important role in Neolithic and Early Bronze Age subsistence practices. Initially introduced from Continental sources, cereals (emmer wheat and barley) are present from the beginning of the 4th millennium BC, featuring in early pit assemblages from the Coneybury Anomaly (Carruthers in Richards 1990, 250–2), Rowden, Dorset (Carruthers in PJ Woodward 1991b), and Penhale Round, Cornwall (Straker in Nowakowski 1998). From the mid 4th millennium BC pits on the slopes of Windmill Hill comes good evidence for the range of plant foods exploited in a single setting: emmer and emmer/einkorn wheat, naked barley, fruit and nuts including sloe, hazelnut and crab-apple together with and a rich range of other wild plants including goosefoot, dock, mint, meadow-grass (Fairbairn in Whittle *et al.* 2000). At Hambledon Hill, in addition to widespread scattered cleaned grain and hazelnut shells, some 50,000 emmer spikelets, charred before they had been dehusked, had been tipped into a mid 4th millennium BC pit (G Jones and Legge forthcoming). These authors argue that cereals are inherently under-represented in deposits of this period because the waste from them, in the form of straw and chaff, is readily burnt to nothing or eaten by livestock, in contrast to the more robust debris of

some wild plant foods, especially nuts. Querns and stone rubbers are not infrequent finds in contexts of this date, and may be seen as good proxy evidence for the preparation of cereals.

Though the evidence is somewhat ambiguous, there was perhaps less reliance on cereals and more on collected plant foods such as hazelnuts, crab apples and tubers during the later Neolithic. Cereals are known from Grooved Ware contexts (M Jones 1980), but not in the same quantities as earlier (for example at Windmill Hill, Fairbairn in Whittle *et al.* 2000), implying a more restricted or specialised dietary role. Commensurate with increased evidence for plough agriculture, the scale of cereal production noticeably rises in the latest 3rd and early 2nd millennia BC when barley, perhaps, replaced wheat as the favoured crop (Carruthers in Richards 1990, 250–2). A rich deposit of processed naked and hulled six-row barley from a Beaker/Early Bronze Age deposit in the ditch of the Coneybury henge most likely represents a deliberate deposit (Carruthers in Richards 1990) and may be seen as indicative of the increased status of cereal foods during the period.

Fishing and marine resources

Stable isotope analysis suggests a marked shift away from the exploitation of aquatic resources in coastal locations at the beginning of the Neolithic (Richards and Hedges 1999). There is also little reason to believe that freshwater fishing played a major role in earlier Neolithic subsistence practices; the brown trout bones from the "transitional" assemblage from the Coneybury Anomaly being an unusual find for the period (Richards 1990). The story is different for the 3rd and 2nd millennia BC. Marine shell, including that of the Common European Oyster and Great Scallop, is present in pits and as temper in Grooved Ware from the Stonehenge region (Cleal *et al.* 1994). Whether transported as "dry" shell or live shellfish, the nearest source for this would be from the coast *c.*50km to the south.

Bird and fish bones were present within Units 6 and 5b at Brean Down within the three Bronze Age structures; the earliest structure (57) produced the greatest concentrations of these remains. It is possible that deep-sea fishing was taking place, suggested by the presence of ling. Shellfish, whilst present, were not found in large quantities (Levitan in Bell 1990, 233). Contemporary deposits at Gwithian also produced large quantities of marine foodstuffs (shellfish and estuarine fish). Numbers of worked animal bone points and needles from the site give us indirect evidence for fishing, together with waisted elongated flat pebble tools which have been interpreted as line-winders. This would imply the practice of both deep-sea as well as shoreline fishing (Nowakowski 2004).

Drugs

The identification of grape vine charcoal from Hambledon Hill (Austin *et al.* forthcoming) combines with the earlier identification of a charred grape pip (G Jones and Legge 1987) to suggest that grapes may have been introduced, cultivated, and potentially converted to alcohol in the 4th millennium BC. The innovations of the period may have included mind-altering substances, additionally represented by opium poppy seeds in a waterlogged sample from near the base of an early 4th millennium long barrow ditch at Raunds, Northamptonshire (Campbell and Robinson forthcoming).

Storage of food stuffs

Ceramic vessels were probably employed for the storage of cereals and other foodstuffs. Meat may have been preserved through smoking, but in the absence of evidence during the Neolithic at least, was more likely consumed while fresh in the context of major consumption events/feasts. Preservation could also be achieved by salting, and briquetage from Brean Down represents the earliest evidence for salt extraction in Britain, indeed some of the earliest in Atlantic Europe (Foster in Bell 1990, 171). Pedestals and evaporation trays were recovered from occupation deposits associated with structures 95 and 59, and in an earlier context within Structure 57, for which there is a date of 1780–1420 cal BC (HAR-7020, Foster in Bell 1990).

4.4.5 Transport

Long-distance exchange of stone axes and ceramics is well attested within the region. The identification of charred fragments of Cornish Heath (*Erica vagans*), now native in mainland Britain only on the Lizard peninsula, at Hambledon Hill (Austin *et al.* forthcoming) suggests that some of the gabbroic pottery and south-western stone axeheads buried at the site may have been transported there directly. However, evidence for land-based trackways is absent, with long-distance routes of claimed early prehistoric date such as the Wiltshire Ridgeway now considered to be Roman or Medieval in origin (Fowler 2000). The numbers of cattle driven to causewayed enclosures to be slaughtered and consumed there raise the possibility that, if they and those who brought them came from any distance, they could have served as pack animals.

Routes along rivers would surely have been a prime means of communication in the largely wooded landscape of the 4th millennium BC, and indeed later. They connected monuments and monument complexes, as reflected by the positioning of avenues and enclosure entrances in relation to the Avon at Durrington Walls and Stonehenge (Parker Pearson *et al.* 2006). Sherratt (1996) has noted that the location of Wessex

between the Channel and the Irish Sea, with rivers providing potential links between them, as well as to the North Sea via the Thames, could make it nodal to a large number of long-distance routes. Tapping into many different communication networks, the region may have enjoyed an advantageous position in relation to the movement of many different low-bulk, high value materials. An exceptional instance of long-distance movement of high-bulk items is provided by the phase 3 bluestone settings at Stonehenge (Cleal *et al.* 1995). Unlikely to be derived from nearby glacial deposits, it now seems certain that the bluestones were brought from south-west Wales (Scourse 1997), probably via the Bristol Channel and Bristol Avon. While boats must have existed during the time period considered here, none have been found.

The region's wetlands offer better evidence of non-riverine inland transport. Joining islands within the fens to adjacent high ground, at least 38 Neolithic and Bronze Age timber trackways are known from the Somerset Levels, some with associated platforms (Coles and Coles 1986; Somerset HER). The earliest, of post and rail construction, are the early 4th-millennium BC Post Track and Sweet Track, while the repertoire of later Neolithic and Early Bronze Age trackways includes corduroy (Abbots Way) and hurdle (for example, the Eclipse and Walton Heath) constructions (Coles and Coles 1986; Somerset HER).

4.5 Social life

4.5.1 Social relations

Social organisation

Throughout the 4th to 2nd millennia BC we are dealing with small-scale, non-centralised societies. Models have been created which envisage increasing social "complexity" over time and the emergence of institutionalised elites, most notably by Renfrew in his seminal 1973 paper (Renfrew 1973). Other models, produced in the 1980s, avoided uni-linear sequences of social development and instead saw change being enacted through the jostling of competing ideologies. Most explicit was Thorpe and Richards' 1984 paper on "ritual authority structures" (where status was achieved through relative seniority of descent from a founding ancestor and ritual practice directed towards emphasising the group) and "prestige goods economies" (here status was fluid and based on direct control over resources), each seen as coterminous with Grooved Ware and Beaker packages respectively (Thorpe and Richards 1984).

Few prehistorians would now support the notion of chiefdoms or similar static hierarchical social formations, for the Neolithic at least. Status divisions undoubtedly existed, and were perhaps played out and reinstated through ceremonial practices (Barrett 1994b) but these distinctions could have been fluid, contested, or structured around lines of age and gender rather than birth-right. The construction of major ceremonial monuments undoubtedly involved considerable labour input (there are estimates of three million hours in the case of Silbury Hill). Motivation to continue with these projects must have been strong, and may have come from conviction of belief as much as coercion, although the organisation of these prodigious undertakings must imply some degree of hierarchical specialisation and command of resources. Whittle talks of people being driven to emulate the achievements of their ancestors and undertaking such projects out of respect for sacred traditions (Whittle 1993, 48). In such a model labour is given voluntarily, and projects can be initiated and stimulated by charismatic individuals (Whittle 1997b, 166).

Participation in the creation and use of monuments provided small social groups with a wider sense of community, if only temporarily. However, we know very little about the make up of individual social groups. Mass deposits of human bone within some chambered and earthen long barrows perhaps indicate the existence of small, closed kin groups, but residence and family membership may have been quite fluid, as implied by the Monkton Up Wimborne multiple burial of a woman with three children, two of whom were not her own (Green 2000, 79).

Regional identities

There is a very distinctive Early Neolithic sub-regional identity in the south-west peninsula, as expressed in distinctive forms of artefacts (south-western style bowl pottery, greenstone axes, and so forth) which were being widely exchanged. In addition, tor enclosures and the megalithic traditions of chamber tombs are distinctive features within the landscape. The degree of contrast between the overall Cornish earlier Neolithic "monument suite" and those of other regions may be diminishing, however, with the recent recognition in Cornwall of a wider range of linear monuments, including a cursus, a bank cairn and long cairns (see for example, Herring and Kirkham forthcoming) and a possible causewayed enclosure at Bury Down, Lanreath (Ray 1994). Other, later, styles of monument also display a distinct south-western focus, such as the entrance graves of Scilly and Penwith, and the stone rows of Cornwall and Devon. The former may be related to similar monuments in the Irish Sea zone, and reflect interaction with communities to the west of Britain.

Equally the Bronze Age has strong traits and traditions as expressed in material culture (such as the Trevisker ceramic tradition), funerary rites, mortuary practice and ceremonial traditions.

Conflict and violence

At Crickley Hill and Carn Brea, hundreds of leaf-shaped arrowheads were found clustered around the entrances and were associated with evidence of burning. This is most readily interpreted as reflecting attack by numerous archers in the earlier 4th millennium BC (Mercer 1981; Saville 2002, 96–8; Dixon 1988b). Arrowheads were scarce at Hambledon Hill and they were thinly spread in time and space (Saville 2002; forthcoming). The most substantial of several outworks on the hill was, however, burnt for a distance of 200m after initial fine silts had accumulated, the condition of some of the charcoal suggesting temperatures of around 700°C. A chalk rubble rampart framed by a chalkfast timber substructure is not easily burnt, and the intensity and extent of the event suggest deliberate firing. At a later stage the deaths of two young men by arrowshot indicate at least one further episode of hostility (Mercer 1999). Leaf-shaped arrowheads were also the probable cause of death for individuals buried on Crichel Down (Piggott and Piggott 1944, 51, 75, fig 23: 3) and in the Wor Barrow ditch (Pitt Rivers 1898, 63), both in Cranborne Chase, as well as in the West Kennet long barrow (Piggott 1962, 25). Some individuals buried in long barrows and cairns in the region had suffered head injuries, as at Belas Knap, Gloucestershire and Fussell's Lodge and Norton Bavant in Wiltshire. These and others recorded beyond the region ranged from massive, unhealed injuries, which would have caused or contributed to death, to healed depressed fractures. Most would have been caused by a blunt implement such as a club, others possibly by antler tines, or, in one case, a flint or stone axe (Schulting and Wysocki 2002a; 2005). The whole indicates a spectrum from inter-personal to inter-group violence, although the maximum scale of the latter remains unclear.

Evidence for conflict in the later 4th to mid 3rd millennia BC is scant, though note should be made of a recent find of a Late Neolithic human femur with arrow wounds from Durrington Walls (Mike Parker Pearson pers. comm.). Palisades, as at West Kennet and Mount Pleasant, could, in part, have fulfilled a defensive role, especially since sections of both were destroyed by fire (Wainwright 1979b; Whittle 1997b). However, it is difficult to define levels of inter-personal violence during this period due to the scarcity of human remains.

The latest 3rd and early 2nd millennia BC present a curious picture. The only case of death by arrowshot in the region is a man buried near the entrance to Stonehenge, who was shot at close range by at least three arrows tipped with barbed-and-tanged points, two of which were lodged in the sternum and a rib, at least one of them having entered through his back (Evans 1984, 13–22). The unique location and the uniquely large number of arrows strongly suggest that this was an exceptional event. Leaf-shaped and barbed-and-tanged arrowheads both occur in similarly large numbers across England and Wales (Green 1980, figs 31, 47). Both were made and used over about a thousand years and a dearth of evidence for hunting throughout suggests that both were primarily inter-personal weapons. There are many times more inhumations from the late 3rd and 2nd millennia BC than from earlier, yet, while evidence gradually accumulates for death or injury inflicted by arrows in the 4th millennium BC (Mercer 1999; Wysocki and Whittle 2000, 599–600), it remains elusive in the whole of Britain for the period of Beaker burials in which the panoply of archery is sometimes elaborated. At present it seems that the role of archery had changed by this time (Healy and Harding 2004), although more thorough examination of late 3rd/early 2nd millennium BC skeletons, for example in the course of the project *The Beaker people: diet and mobility in Britain 2500–1700 BC* being undertaken by the universities of Sheffield and Bradford, may yet prove this false.

Human mobility

Direct evidence for the distances travelled by individuals is only just beginning to accumulate, largely through the application of stable isotope analysis. A woman buried in the Monkton Up Wimborne "temple" in Cranborne Chase in the later 4th millennium BC had a high level of lead in her bones, such that the Mendip Hills were the nearest area in which she could have lived a substantial part of her life (Green 2000, 77–84). A thousand or so years later, the continental origin of the "Amesbury Archer" and the probable Welsh origins of the "Boscombe Bowmen" (Fitzpatrick in preparation) indicate far longer journeys.

An imperfect proxy for personal mobility in the 4th millennium BC is provided by artefacts and materials that were transported with relatively frequency over relatively short distances, in both respects on a different scale to rare items transported over long distances, whether gabbroic pottery or stone axeheads. Cleal's 1995 paper is a reminder of quite how much fossil shell-tempered pottery from the Jurassic ridge was transported into Wessex, not only to sites close to Jurassic outcrops, like Maiden Castle (Cleal 1991), Windmill Hill (IF Smith 1965; Zienkiewicz and Hamilton 1999) or Whitesheet Hill (Cleal 2004) but to others well into the Chalk, like Robin Hood's Ball (N Thomas 1964). The widespread dispersal of these wares, their relative high quality, and the fact that the technological problems of firing fabrics with calcareous inclusions (which are prone to spall) were successfully overcome (Cleal 1995), would all be compatible with a pottery production

Figure 4.1: *Excavations in 2000 at Longstones Cove, Beckhampton, the end of the second avenue at Avebury. Photo: M Gillings, J Pollard, D Wheatley.*

area on the Jurassic ridge from which vessels were transported onto the chalk. The diversity of bowl fabrics from this area (Darvill forthcoming) points to a zone of production rather than a single source. The various Jurassic fabrics at Hambledon Hill would thus have been brought there from 25–60km to the west and north west. Old Red Sandstone from Mendip, which recurs in querns and rubbers at Hambledon (Roe forthcoming), points to an area some 40–80km to the north west. Materials like these may provide an approximation to the range from which people travelled to the complex. Movement over a comparable distance may be reflected by the presence at the Hembury causewayed enclosure in Devon of bowl pottery tempered with carboniferous vein quartz from 20km or more away (Quinnell in Gent and Quinnell 1999, 38–53).

4.5.2 Monumentality

The South West contains some of the most important landscapes of prehistoric monuments in Europe, which have made its archaeology internationally famous. Hyperbole is almost inevitable. The great 4th and 3rd millennium BC ceremonial centres around Avebury, Stonehenge, Knowlton and Dorchester on the Wessex chalk represent a largely unparalleled concentration of monumental constructions that contain within them the largest known cursus, henge monuments, stone circles and artificial prehistoric mounds. A short distance to the west, in Somerset, geophysical survey at the Stanton Drew stone circle complex has revealed what may prove to be the largest Late Neolithic timber circle in Britain (David *et al.* 2004). The prominence of these ceremonial centres tends to overshadow other nationally important monument groups within the region, including the Cotswold-Severn long barrows of Gloucestershire, north Somerset and north Wiltshire (Darvill 2004), the stone circles and rows of Dartmoor (Fleming 1988), and the tor enclosures and chamber tombs of Cornwall and the Isles of Scilly.

There exists much potential for further discoveries, particularly through the application of systematic aerial reconnaissance, which has until the last 20 years been extremely variable across the region. At Stapleton Farm, Damerham, on the Hampshire chalk, adjacent to Cranborne Chase and in a parish which formed part of Wiltshire until the 19th century, the extent and nature of a large Neolithic and Bronze Age ceremonial and funerary complex have only recently been defined by a programme of aerial and ground survey (Martyn Barber in prep.). Off the chalk and away from the major ceremonial centres in Dorset

are recent discoveries of a Late Neolithic/Early Bronze Age palisaded and ditched monument at Chickerell (PJ Woodward 2002), and a 30m-diameter pit circle at Hinton St Mary (PJ Woodward and Martin 2001). In Devon, two major enclosures of potential Neolithic date, with a cursus and numerous ring ditches and enclosures in close association with them, have recently been identified within 15km of Exeter (Griffith 2000). In Somerset, Devon and Cornwall previously "blank" areas have been infilled and transformed by both aerial reconnaissance and, for Cornwall, the National Mapping Programme. Even long-known complexes may be far from well-understood and can produce surprising new evidence as seen with the discovery of a mid 3rd-millennium BC enclosure at Beckhampton, near Avebury, and confirmation through excavation of the existence of the often disputed Beckhampton Avenue (Gillings *et al.* 2000; 2002).

Diversity

The diversity of monument forms within the region is striking. For the earlier Neolithic there exists a range of long mounds (with and without timber and stone chambers), major stone, earthwork and tor enclosures, cursus and the so-called mortuary enclosures. For the later Neolithic and Early Bronze Age this is extended to henges, henge enclosures, palisades, stone and timber circles both enclosed and free-standing, stone rows and other settings, megalithic entrance graves, round barrows and cairns in various forms. Some monument types, such as the diminutive stone settings on Exmoor (Riley and Wilson-North 2001, 27), and "pit henge" with central shaft at Monkton Up Wimborne on Cranborne Chase (Green 2000) are without obvious analogy, and illustrate the inventive way in which constructional themes were exploited.

The region's geology and topography predispose to the construction of timber and earth monuments in the east and stone ones in the west. But this did not exclude the exercise of choice in building material, including the choice to transport it, as is emphatically demonstrated by the contrast between the timber settings of Durrington Walls and the stone settings of Stonehenge, both on the chalk of Salisbury Plain and only 3km apart (Parker Pearson and Ramilisonina 1998). In the early 4th millennium BC one major contrast is between the construction of causewayed enclosures, which show major concentrations in Wessex and the Cotswolds and extend into Devon (Oswald *et al.* 2001, fig 1.1) and tor enclosures, so far demonstrated to be Neolithic only at Carn Brea and Helman Tor, both in Cornwall (Mercer 1981; 1997). In the 3rd millennium BC, henge monuments are well represented in Wessex and Somerset, though less so in the peninsula. The discovery of two small rectangular Middle Neolithic enclosures – a kind of monument most often found in the river valleys of central and eastern England – in the Otter valley on the route of the Honiton-Exeter bypass (Fitzpatrick *et al.* 1999) suggests that different kinds of monument may have been built on different terrains here as elsewhere. Irrespective of the forms of individual elements, each complex had its own history and its own dynamic.

Chronology

Chronological precision has been achieved very unevenly. The application of Bayesian analysis to sequences of rigorously selected samples has refined the chronologies of Stonehenge (Bayliss *et al.* 1997) and the Hambledon Hill complex (Healy 2004b; Bayliss *et al.* forthcoming), in both cases leading to reinterpretation of the monuments and their social implications. Otherwise, absolutely dated sequences have developed piecemeal, and less satisfactorily, as in Cranborne Chase and the Dorchester area. The chronology of individual monument types has been a focus in several cases. Cursus have been reviewed by Barclay and Bayliss (1999), a particular challenge because they are finds-poor. Recent projects on long barrows (Bayliss and Whittle 2007) and on causewayed and other Early Neolithic enclosures (Whittle *et al.* 2004) are both investigating many sites in the region and are delivering exciting results which change existing interpretations. They are, however, more effective in the Cotswolds and on the Wessex Chalk than in the peninsula. This is because largely acidic burial environments often preclude the dating of articulated bone, one of the sample types most likely to be contemporary with its context rather than redeposited. This gap can be closed, for example, by the increasingly routine recovery of short-life charred plant remains, by the dating of cremated bone (Lanting *et al.* 2001) and of superficial carbonised residues *on* pottery, and by the development of experimental techniques for the dating of lipid residues *in* pottery (see for example, Copley *et al.* forthcoming). Currently available dates from Early Neolithic enclosures and settlements in the peninsula, for example, are few and of limited value, often because they were made on bulk and/or unidentified charcoal samples capable of including material of diverse ages and/or because they were made early in the history of radiocarbon dating and have very large standard deviations. Some monument classes remain almost entirely undated. A notable example in the South West is that of the stone rows of the upland moors, for which no reliable dates have yet been achieved.

Early Neolithic contexts and developments

The region sits in an interesting position at the junction of two traditions of monument construction. Long barrows and earthwork enclosures ultimately constitute the legacy of central European *Linearbandkeramik* and post-LBK traditions, while the megalithic dolmens and passage-grave style monuments of the South West are an element of an Atlantic Early Neolithic that represents a fusion of local, Late Mesolithic practices and external Neolithic influence – Kinnes's "impact zone" (Kinnes 1992, fig 2.1.1).

In the Mendip Hills and Cotswolds it may be possible to define a sequence that runs from portal dolmens, rotunda graves and simple passage graves to long mounds of the Cotswold-Severn group (Darvill 2004, 46–66). At least seven rotunda graves are known from Gloucestershire, and some of these, such as Sale's Lot and Notgrove, were later incorporated into long mounds (Darvill 2004). The simple open boxed chambers of Cornish megalithic quoits might also be early, though there are no secure dates.

Earthen and stone chambered long mounds are well represented in the region (Kinnes 1992; Darvill 2004): the former largely in the east, and the latter in the west and north, though their distributions overlap in the Mendip Hills and North Wiltshire Downs (Lewis 2005; Pollard and Reynolds 2002). Those of the Cotswold-Severn group seem to fall within the period *c*.3800–3400 cal BC (Darvill 2004, 81); earthen mounds may begin at broadly the same time, but probably have a longer currency.

Several earthen long barrows in Wiltshire have been the subject of extensive excavation over the last 50 years: Horslip, South Street, Beckhampton Road (Ashbee *et al.* 1979), Fussell's Lodge (Ashbee 1966), Kingston Deverill G1 and Woodford G2 (Harding and Gingell 1986). Significantly, of these, only Fussell's Lodge and Woodford G2 produced mortuary deposits, illustrating the non-funerary associations of many of these constructions, although many previously excavated examples did indeed contain burials (Kinnes 1992). Constructional elaboration is evident at Amesbury 42 and at Millbarrow, Winterbourne Monkton, both with successive sets of flanking ditches (Richards 1990, 96–109; Whittle 1994), and at Wor Barrow with an early phase of ditch and mound (Barrett *et al.* 1991, fig 2.9). The mounds themselves are often of complex construction, with internal fence divisions and dumps of different soils (for example, Thickthorn Down, Drew and Piggott 1936); features also seen in many Cotswold-Severn tombs (Saville 1990).

At the extreme end of the scale are the little-understood bank barrows of Maiden Castle, Long Bredy and Broadmayne in south Dorset (PJ Woodward 1991b, 131). All are set on ridge crests, that at Long Bredy associated with two cursus-style monuments, and that at Maiden Castle being superimposed on the earlier enclosure (Wheeler 1943). Allington Avenue, Dorchester, may be a further example (Davies *et al.* 2002), as may a monument on Pen Hill, Mendip (Lewis 2005).

Loosely allied to long mounds are other 4th millennium BC linear constructions such as cursus and mortuary enclosures, both possessing a wide distribution across the region. In Gloucestershire, the Lechlade Cursus is one of the most westerly of a significant concentration along the Thames valley, and is paired with another, to the south, at Buscot Wick on the opposite side of the Thames in Oxfordshire (Barclay *et al.* 2003). Although no dating evidence was obtained from primary levels, Peterborough and Grooved Ware was recovered from the middle ditch fills, and the monument provided a focus for pit digging and subsequent Beaker burials. Secure mid-4th millennium BC dates are available for the Lesser Cursus, near Stonehenge (Richards 1990), and the 10km long Dorset Cursus which bisects Cranborne Chase (Barrett *et al.* 1991, 46). Both were constructed in two stages. The Dorset Cursus displays a close relationship with (pre-existing?) long barrows, especially at the Thickthorn Down and Martin Down terminals where barrows are aligned on the cursus ends (Barrett *et al.* 1991, 47).

The scale of the Dorset Cursus is striking, and in an Early Neolithic context only matched by the complex of enclosures on Hambledon Hill, 10km to the west. Hambledon (Mercer and Healy forthcoming), like many of the region's enclosures – both causewayed and "tor" – has been the subject of excavation, here and at Crickley Hill (Dixon 1988b), Carn Brea (Mercer 1981) and Windmill Hill (Whittle *et al.* 1999) on an extensive scale. These sites and others, such as Knap Hill (Connah 1965) or Whitesheet Hill (Rawlings *et al.* 2004), have produced evidence for episodic aggregation, if not more sustained occupation, and a remarkably full range of activities which included feasting, lithic production, ancestor and mortuary rituals and possibly exchange (Edmonds 1999). Their sitings may often have been marginal – at the edge of regions, away from major areas of contemporary occupation and in woodland – but their roles seem central to mid 4th-millennium BC social life.

Oswald *et al.* (2001) list two certain and 12 possible "tor enclosures", and 11 certain and 11 possible causewayed enclosures within the region. Their scale and complexity (as defined by number of ditch circuits and outworks) varies immensely, with the largest (enclosing an area 600m across) occurring in the far east of the region at Crofton, Wiltshire (Lobb 1995), set in an interesting position straddling the valley of the River Dunn. However, its exceptionally large size and unusual location raise the question of whether or not this is a causewayed enclosure.

Late Neolithic contexts and developments

Both drawing upon an established architectural repertoire and reflecting innovation perhaps brought about by new bodies of belief, the origins of henge monuments are likely to be complex (Harding 2004). Within the region, the three enclosures at Stonehenge (Cleal *et al.* 1995), Flagstones (Healy 1997) and Beckhampton (Gillings *et al.* 2000; 2002), look to be "transitional", combining features common to both earlier causewayed enclosures and 3rd millennium BC henges. Dates for both Stonehenge 1 and Flagstones place them within the Middle Neolithic, *c.*3300–2900 BC (Bayliss *et al.* 1997; Healy 1997, table 79), a period during which the intensity of monument construction seems to have considerably lessened. On Cranborne Chase, there are other constructions that can be placed within this horizon, including the anomalous Monkton Up Wimborne pit circle and shaft (Green 2000, 77–84) and the early round barrows of Handley 26 and 27, adjacent to Wor Barrow (Pitt Rivers 1898; Barrett *et al.* 1991, 84–7). Gloucestershire round mounds with stone cists containing multiple burials at Soldier's Grave, Frocester (Clifford 1937a), and The Waste, Hawling (O'Neil and Grinsell 1960), may represent Middle Neolithic developments, on the basis of sherds seemingly in a Peterborough Ware fabric from the former (Darvill 2004, 219).

Henges and "hengiform" monuments occur in several parts of the region, notably on the Wessex chalk (Harding and Lee 1987). This is a loose category of monument, displaying considerable variation in scale, structural complexity, participation and use. Small hengiforms, such as those on Conygar Hill, Dorchester (RJC Smith *et al.* 1997), are likely to have acted as family shrines, while the massive henge enclosures of Avebury (Gillings and Pollard 2004), Marden (Wainwright 1971), Durrington Walls (Wainwright and Longworth 1971) and Mount Pleasant (Wainwright 1979b) represent collective undertakings on a scale that must have required labour from many groups both within and outside the area. Even these four sites display marked differences in format, landscape setting (from hilltop to valley bottom), internal features (stone circles, coves, timber circles and so forth), and the range of contemporary activities (such as Avebury being remarkable "clean" and Durrington Walls containing vast quantities of feasting debris).

In Somerset, the four Priddy Circles are highly unusual in their striking similarity and linear setting (Lewis 2001), though in this respect they invite comparison with the Thornborough henges in North Yorkshire (Harding 2004, 90–9). The stone circles at Stanton Drew are now known to be set within henge earthworks and may replace earlier timber settings (David *et al.* 2004), a process of "lithicisation" seen at other monuments such as Stonehenge (Cleal *et al.* 1995), the Sanctuary (Pollard 1992), Site IV, Mount Pleasant (Wainwright 1979b), and perhaps from earth to stone at Beckhampton (Gillings *et al.* 2002).

The range of 3rd millennium BC monument forms is considerable and, in addition to henges and stone or timber circles, includes palisades at, for example, Dorchester (PJ Woodward *et al.* 1993), West Kennet (Whittle 1997b) and Mount Pleasant (Wainwright 1979b), earthwork and megalithic avenues, for example, at Stonehenge (Cleal *et al.* 1995) and Avebury (Gillings and Pollard 2004), and a series of enigmatic large mounds associated with henge enclosures at Silbury Hill (Whittle 1997b), Marden (the Hatfield Barrow), Knowlton and Mount Pleasant (Conquer Barrow). Combinations of these different monument forms are commonly found within the same locality, forming ceremonial complexes of great longevity.

Regional traditions are evident. In Dorset, earlier interest in chalk-cut shafts, both natural and artificial, seems to continue with the pit-circle henges of Cranborne Chase (such as Wyke Down 1 and 2: Barrett *et al.* 1991, 92–106; Green 2000, 87–8) and the remarkably deep shafts cut into the base of the ditch at Maumbury Rings, Dorchester (Bradley 1975). At 5.5m deep, the ditch of the southern henge at Knowlton may be of a similar character (see Burrow and Gale 2006). Within the pits/shafts at Wyke Down and Maumbury Rings were deposits of human bone, carved chalk and antler. On the upland landscapes of the peninsula, especially Dartmoor, Bodmin Moor, Penwith Moor and Exmoor, are a series of "open" megalithic constructions (stone circles, rows and other configurations) that may well begin in the later Neolithic and which certainly extend into the early 2nd millennium BC. Single, double and triple stone circles can all be found and Barnatt (1982) has shown that many Cornish stone circles are smaller than those elsewhere. Very few have been investigated in modern times; the 1930s excavation by Radford at The Hurlers (Radford 1938) revealed a quartz pavement, while limited investigation at Leskernick recovered material that produced a radiocarbon date of *c.*1700 cal BC (Barbara Bender pers. comm.).

The free-standing timber circle at Boscombe Down may well provide a "lowland" equivalent to stone circles, though the metaphorical qualities of constructional materials should be taken into account (Parker Pearson and Ramilisonina 1998), and with it differing concepts of durability and relevance to ontological domains. It should be noted that the pit circles at Norton Fitzwarren, Somerset (Ellis 1986; Riley 2006) now appear more likely to have been a Second World War barrage balloon tethering site (Chris Webster, pers. comm.).

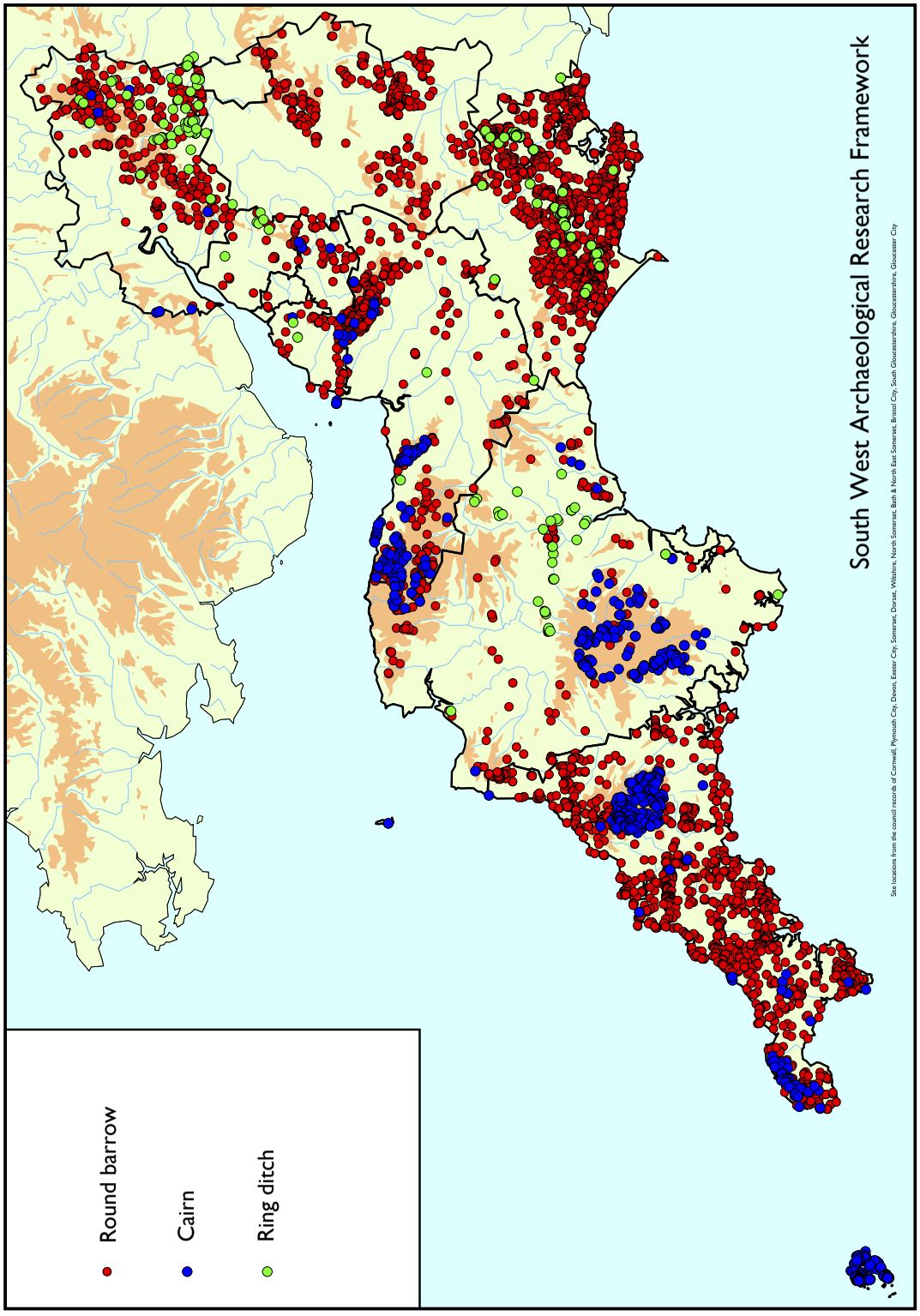

Figure 4.2: *Distribution of round barrows, carins and ring-ditches across the region as recorded in HERs.*

Early Bronze Age contexts and developments

Traditions of megalithic tomb construction and use may extend into the Early Bronze Age in the far south-west. Although their chronology is poorly understood, and Ashbee (1982) has argued for a Mesolithic origin, most of the finds from excavated Entrance Graves in the Isles of Scilly and West Cornwall date to the Early Bronze Age (O'Neil 1952). The Try menhir cist (see below) has now produced a radiocarbon date of 1880–1600 cal BC, the first from a burial context in Cornwall or Devon (AM Jones and Quinnell forthcoming). Over 80 of these monuments are recorded on Scilly, as opposed to only nine in West Penwith.

Elsewhere, the region includes dense concentrations of round barrows and round cairns, surviving as upstanding monuments in many upland areas (see Figure 4.2 on the preceding page). With over 6,000 in Wessex (mostly Wiltshire and Dorset, Grinsell 1958, 93), at least 745 in Somerset (Grinsell 1969; 1971) and 3500 in Cornwall, these represent the most prevalent category of prehistoric monument in the South West. Their distribution is far from even, occurring both in relative isolation, or as part of bigger cemeteries. There are notable concentrations on Mendip (especially around the Priddy Circles, along the South Dorset Ridgeway (spreading over 16km), and around the pre-existing ceremonial centres at Stonehenge and Avebury (A Woodward and Woodward 1996). Aerial reconnaissance is radically altering the distribution pattern of such monuments in the plough-levelled lowlands.

Complete excavations have revealed that many Cornish barrows have complex site histories and that the incorporation of human remains may be just a small part of the barrow tradition. The list of complete barrow excavations is steadily increasing, and includes work at Crig-a-Mennis (Christie 1960), Davidstow Moor (Christie 1988), Tregulland (Ashbee 1955–1956; 1958), Watch Hill (Miles 1975a), Caerloggas (Miles 1975a), Gaverigan (Nowakowski 1995; 1998; forthcoming a), Highgate (Nowakowski 1998), Trenance (Miles 1975a), Chysauster (G Smith 1996) and Stannon (Harris *et al.* 1984). Such work demonstrates the tremendous variety in size and structure of these monuments, ranging from large turf-built ditched mounds to small stone cairns. Excavations of groups of Early Bronze Age barrows such as the Davidstow Moor campaign in the 1940s (Christie 1988), Colliford (Griffith 1984) and Stannon (AM Jones forthcoming) have provided insights into the diversity of ceremonial practices not directly linked to disposal of the dead. Analysis has shown that specific zones on individual sites and even within even larger (local) landscapes may have performed particular roles in ritual practice (see Owoc 2001; Nowakowski forthcoming a; AM Jones 2005; 2006). This highlights the danger of regarding barrows solely as the physical depositories for human remains.

A feature of the barrows and cairns of the peninsula is their longevity and complexity, with many monuments revisited and remodelled over many generations. Their form may develop, for example, from flat cemetery to ring-cairn to platform cairn to end in conventional round barrow form, a fact that should be borne in mind when analysis is made of these features in their final visual form. In many cases "round barrows" also shade into other forms such as henges and stone circles: for example the "multiple stone settings" at Shovel Down and elsewhere on Dartmoor show relationships with both barrows and stone circles, while being intimately connected with the stone rows of the complex.

Similar structural complexity is evident among round barrows on the chalk. There has been a series of major cemetery/barrow group excavations, both in the first half of the 20th century at, for example, Crichel Down and Launceston Down (Piggott and Piggott 1944), and especially following post-war arable intensification and military activity, as at Wilsford cum Lake (IF Smith 1991), Winterbourne Stoke (Gingell 1988), Shrewton (Green and Rollo-Smith 1984), Milton Lilbourne (Ashbee 1986b), Amesbury (Ashbee 1985) and Snail Down (N Thomas 2005). While some barrows follow simple ditch and mound formats, others show successive enlargements (for example, Amesbury 71, Christie 1967), and the presence of ring cairns (West Overton 6b, IF Smith and Simpson 1966), stake circles, turf cores, mound platforms, and so forth. Earliest Beaker barrows are generally quite small, but often provided the focus for the creation of extensive linear cemeteries that continued to be used into the middle of the 2nd millennium BC. By the full Early Bronze Age there is a wide repertoire of barrow formats, including bell, saucer, disc and pond varieties, some perhaps with specific gender associations.

Arguably of Early Bronze Age date, circular hilltop enclosures are known in the west of Cornwall that appear to encircle ring-cairns and other monuments, for example at Bartinney and Caer Bran (Herring 1995; Lawson-Jones and Herring 1997). In the east of the county a spur top enclosure at Liskeard was recently radiocarbon dated to the Middle to Late Bronze Age (AM Jones 1998–9b), but much of its interior had already been removed by development. Standing stones (menhirs) – single, paired and in rows – are also a feature of the Cornwall and the Isles of Scilly. Some have been investigated by antiquarians, such as Blind Fiddler in West Penwith where a deposit of bone chips and ashes were found by Borlase in the late 19th century (Borlase 1872). At Try, Gulval, a large menhir was associated with a stone-lined cist containing a multiple deposit of animal bone, cremated

human bone, a rare handled Beaker and fragments of Trevisker pottery (Russell and Pool 1964). The cist now has a radiocarbon date of 1880-1600 cal BC (AM Jones and Quinnell forthcoming). Try shows us that these types of sites can have long histories.

4.5.3 Mortuary Practices

The same geological conditions leading to the differential preservation of animal bone across the region also apply to human remains, unburnt bone especially. From sites on the chalk of Wiltshire and Dorset and the limestone of Mendip and the Cotswolds come important mortuary deposits that have been the subject of investigation since the early 18th century (for example, Stukeley 1740; Colt Hoare 1812). By way of contrast, to date, there are no identified human remains for the entire Neolithic in Cornwall.

Early Neolithic practices

Collective deposits of semi-articulated and disarticulated human bone are seen as characteristic of mortuary practices associated with 4th millennium BC long barrows and chamber tombs. There is much anecdotal detail of these deposits from antiquarian explorations: for example William Cunnington and John Thurnam's work on South Wiltshire long barrows revealed multiple disarticulated burials (such as at Bowl's Barrow), chambers with smaller numbers of articulated individuals (Knook 5) and also "crematorium" formats (see Kinnes 1992, 98–106). More useful are the results of 20th century excavations at sites like Hazleton North (Saville 1990), West Kennet (Piggott 1962), Lanhill (Keiller and Piggott 1938) and Fussell's Lodge (Ashbee 1966). Human remains were found in varied states of articulation and disarticulation in the chambers at West Kennet and Hazleton North; the final phase "flintknapper" burial at Hazleton being fully articulated (Saville 1990, 250). This strongly suggests a practice of successive interment of complete bodies, which then underwent a process of decay, with occasional resorting of the bones (Piggott 1962, 22–3). The process may have been quite different at Fussell's Lodge, where the relative lack of small bones and ribs, the unevenly matched numbers of long bones and over-representation of skulls, implies the introduction of fully disarticulated bone into the deposit (Brothwell and Blake in Ashbee 1966). Complete, articulated burials are also not uncommon in Cotswold-Severn tombs (Saville 1990, 260–1), and deposits of cremated bone are known from Hazleton North (Saville 1990), West Kennet (Piggott 1962, 21–4) and several Somerset long barrows (Lewis 2005).

Numbers of individuals interred within Cotswold-Severn tombs vary considerably, but rarely exceeded 50 (Saville 1990, 261). Estimates for Hazleton North suggest between 35 and 42 individuals (Saville 1990) and for West Kennet, the largest tomb of this group, 36 (Bayliss *et al.* 2007). Adults, adolescents, infants and even neonates are present, implying little restriction on those who could be included. However, at Hazleton North, as at many other Cotswold-Severn tombs with the exception of West Kennet, there exists an apparent preponderance of males over females (Rogers in Saville 1990, 198). The sorting of bodies according to age, and to a lesser extent sex, has been noted in several Cotswold-Severn tombs (J Thomas and Whittle 1986; Darvill 2004, 153–6). From later 4th millennium BC earthen long barrows come mortuary deposits with fewer, and largely articulated, burials (as at Wor Barrow, Pitt Rivers 1898). Grave goods, if they can be considered as such, are limited to pottery vessels, flint implements and rarely other items such as beads.

It must be remembered that barrow burial was chronologically limited and certainly not the normative rite during the full course of the 4th millennium BC. Human bone is a common find within contemporary enclosures; both single and multiple disarticulated bones are known from pit deposits, as at Cadbury Castle, Somerset (Alcock 1972, 110), and Handley Hill, Dorset, (Pitt Rivers 1898). Individual inhumations with bowl pottery from the cave sites of Tom Tivey's Hole and Chelm's Combe, hint at other traditions of burial (Lewis 2005).

Excarnation and the manipulation of defleshed human bones have long been recognised as a part of 4th millennium BC practice. It is becoming increasingly clear that active defleshing played a part in this process, as at the West Tump long barrow (MJ Smith and Brickley 2004) or Hambledon Hill (McKinley forthcoming). Manipulation of the fleshed human corpse, as well as of defleshed bones, may have been far more prevalent than it has so far appeared.

Late Neolithic practices

Middle and Later Neolithic funerary practices are not well represented, and we must assume the existence of rites that are archaeologically invisible. A number of latest 4th to early 3rd millennium BC inhumations from Cranborne Chase provide a hint of rites that must have been rare and socially restricted. The Handley 26 and 27 round barrows covered inhumations, one with a jet belt slider, while two articulated male inhumations (one with an arrowhead) had been placed in the ditch of the adjacent Wor Barrow (Pitt Rivers 1898; Barrett *et al.* 1991, 84–7). Four individuals had been buried in an oval scoop cut into the wall of the central pit of the nearby Monkton Up Wimborne "temple" (Green 2000, 78–80). That they were fully articulated implies contemporaneous death, and perhaps a rather unusual set of circumstances surrounding the burial.

Our best evidence for Late Neolithic mortuary treatment comes from the cremation cemetery associated with Stonehenge 2 (Cleal *et al.* 1995) and cave and swallet sites in Mendip (Lewis 2000).

Early Bronze Age practices

Traditions of single burial (inhumation and cremation) are intimately linked to the widespread appearance of round barrows and round cairns at the beginning of the Bronze Age. In general, the sequence might be seen to run from inhumation, especially with Beakers, to cremation, though the reality is much more complex, and likely to vary across the region. Cremations and inhumations are found together, for example at Durrington 7 (Richards 1990, 171–84) – even with Beakers as at West Overton 6b (IF Smith and Simpson 1966) and the Lousey Barrow (Christie 1985). Inhumations are frequently crouched or flexed, but rare instances of extended burial are known, as at Bush Barrow (Colt Hoare 1812). Bodies were sometimes placed in stone cists, dug-out tree-trunk coffins (as at West Overton 1, Winterbourne Stoke 5 and 9, Piggott 1973b, 357) or contained within pitched-roofed timber mortuary houses (for example, Amesbury G15, Piggott 1973b). Grave goods frequently accompanied burials, signifying and helping to constitute networks of relationships and constructed identities (J Thomas 1991; Brück 2004) as much as lived status.

Possibilities exist for mummification, and that burial did not always follow on immediately from death is seen with the deposit of disarticulated and weathered bones from three individuals within a grave pit under Amesbury 61a (Ashbee 1985). At Sutton Veny, an adult male inhumation with Food Vessel, contained within a timber coffin placed on a bier, looked to have been dismembered before burial, or subsequently disturbed (Johnston 1980). Several Beaker burials on Crichel Down were also disturbed following interment (Piggott and Piggott 1944), though whether this represents grave robbing or more purposeful extraction of skeletal elements remain unclear.

Not all burials were marked by mounds. Beaker flat graves are common in certain parts of the region, for instance around Avebury, where many were covered by sarsen slabs or placed at the feet of standing stones (Pollard and Reynolds 2002, 128–30). It is notable that the richest, that of the "Amesbury Archer", seems to be unmarked.

It is clear that only a small proportion of the Early Bronze Age population received barrow burial. Many people may have been subject to excarnation, with bones being circulated and deposited in a variety of locations. Human bone has been found in Units 6 and 5b at Brean Down (Bell 1990, 257), in the ditch of the Avebury henge (Pollard and Reynolds 2002, 127) and in Mendip caves and swallets. At Charterhouse Warren Farm swallet, disarticulated human bones from Horizon 2 had cut marks near their articulation points, suggesting defleshing. This horizon produced a date of 2460–2030 cal BC (OxA-1559) and contained Beaker pottery (Levitan and Smart 1988, 391).

4.6 Radiocarbon dates

Table 4.1: *Details of radiocarbon dates used in the text. Calibrated ranges are at 2σ (95.4%) and were calculated with OxCAL 3.10 (Bronk Ramsey 2005) using the probability method and the IntCal04 calibration curve (Reimer et al. 2004).*

Lab. Ref.	^{14}C age BP	Cal BC	Site	Context	Reference
AA-30681	3300±55	1740–1450	Porlock Marsh	Aurochs bone	Vanessa Straker, pers. comm.
BM-731	3245±37	1620–1430	Charterhouse Warren Farm swallet	Aurochs bone	Burleigh and Clutton-Brock (1977)
GU-9574	3725±40	2280–1980	Rameldry, Fife	Skin from dagger sheath in burial	Baker *et al.* (2003)
HAR-7020	3310±80	1780–1420	Brean Down sandcliff	Bulk sample of unidentified charcoal from Early to Middle Bronze Age structure	Bell (1990)
OxA-1402	5050±100	4050–3640	Coneybury "Anomaly"	Animal bone from primary deposit	Richards (1990)
OxA-1559	3790±60	2460–2030	Charterhouse Warren Farm swallet	Disarticulated human bone from cave entrance shaft	Levitan and Smart (1988); Chamberlain (1996)
OxA-7981	5250±50	4250–3960	Fir Tree Field shaft	Disarticulated pig femur layer 6a hearth	Allen and Green (1998)
OxA-8009	5045±45	3960–3710	Fir Tree Field shaft	Charred *Clematis* roots from layer 6b	Allen and Green (1998)
OxA-8010	5150±45	4050–3800	Fir Tree Field shaft	*Fraxinus* charcoal from layer 6b hearth	Allen and Green (1998)
OxA-8011	5355±45	4330–4050	Fir Tree Field shaft	*Corylus* charcoal layer 8 (below microliths)	Allen and Green (1998)
OxA-13540	3877±33	2470–2230	Amesbury Archer	Boar tusk	Andrew Fitzpatrick pers. comm.
OxA-13541	3895±32	2480–2280	Amesbury Archer	Articulated human bone	Andrew Fitzpatrick pers. comm.
OxA-13542	3955±33	2570–2340	Boscombe Bowmen	Human bone	Andrew Fitzpatrick pers. comm.
OxA-13543	3822±33	2460–2140	Boscombe Bowmen	Articulated human bone	Andrew Fitzpatrick pers. comm.
OxA-13562	3829±38	2460–2140	Amesbury Archer's companion	Human bone	Andrew Fitzpatrick pers. comm.
OxA-13598	3889±30	2470–2280	Boscombe Bowmen	Human bone	Andrew Fitzpatrick pers. comm.
OxA-13599	3681±30	2200–1960	Boscombe Bowmen	Human bone	Andrew Fitzpatrick pers. comm.
OxA-13623	3866±28	2470–2200	Amesbury Archer	Boar tusk	Andrew Fitzpatrick pers. comm.
OxA-13624	3845±27	2460–2200	Boscombe Bowmen	Human bone	Andrew Fitzpatrick pers. comm.
OxA-13681	3825±30	2460–2140	Boscombe Bowmen	Human bone	Andrew Fitzpatrick pers. comm.

5

Later Bronze Age and Iron Age Environmental Background

Vanessa Straker, Anthony Brown, Ralph Fyfe, Julie Jones and Keith Wilkinson

5.1 Introduction

This is not a full review of all the palaeoenvironmental studies carried out in the region, but a general summary with most emphasis placed on the environment in which later prehistoric communities lived. It does not provide a comprehensive review of crop and animal husbandry in the region. Reviews of environmental archaeology carried out or commissioned by English Heritage are in progress or complete and will give an account of knowledge in these areas. Those wishing to follow this up should consult the English Heritage website (http://www.english-heritage.org.uk and follow the links Research & Conservation → Archaeology & Buildings → Scientific Techniques → Environmental Studies → Regional Reviews). At the time of writing, the reviews on insects (Robinson 2002) and wood and charcoal (W Smith 2002) were available. Reviews of plant macrofossils, pollen, animal bones and geoarchaeology from southern England are in preparation and will be placed on the website when available. Rob Scaife very kindly made available a draft of his pollen review for this resource assessment. The excellent review by Bell (1984) is still a very useful source of information. There are also reviews of environmental evidence in the Urban Archaeological Assessments for Bath (not yet published) and Bristol (Brett 2005), which are of relevance for this period. The inclusion of "grey" literature has not been comprehensive.

The sources of evidence referred to in this resource assessment are plant and animal micro- and macrofossils, principally pollen, diatoms, plant macrofossils and charcoal, foraminifera, ostracods, bone, insects, snails and the soils and sediments in which they survive.

Geology, soils and hydrology are the most important factors in determining the types of palaeoenvironmental evidence likely to survive. For example, in the acid soils of the drier granite areas, pollen preservation is usually good, compared with other non-waterlogged remains, as the exine of pollen grains survives well in acid soils where soil acidity reduces decomposition by soil micro organisms. In contrast, shell and bone is poorly preserved or absent as the calcareous content is dissolved in acid conditions. Pollen, however, is poorly preserved in neutral to calcareous, biologically active soils.

Molluscs survive best in the base-rich soils of the chalk and limestone as well as shell-rich dune sand in many coastal areas, for example at Brean Down where several phases of sand-blow separate settlements of Early–Late Bronze Age date (Bell 1990). Molluscs provide general information about local ground conditions and have been particularly important in reconstructing the broad character of the chalk downland in Wiltshire and Dorset (see below).

Most studies of insects are from the upper Thames valley and Somerset peat moors. Robinson (2002, 70) comments that unlike in the Neolithic and Early Bronze Age where insect evidence is mainly from coastal areas and wetlands, in later prehistory there is more digging below the water table, and so deep ditches, water holes and ponds provide sources of evidence.

Pollen analysis is the technique which has most to offer for understanding vegetation history in general terms. However, interpretation of pollen assemblages requires an understanding of how pollen grains are dispersed (wind, insects, human agency) and differential pollen production (some species are more prolific pollen producers than others). There is also the question of differential preservation in poor conditions. In common with other micro- and macrofossils, the

assemblage is also affected by the likely source area of the sampling site. Pollen is sourced both from the local area and wider catchment, the catchment size affected by the choice of sampling site. Pollen in buried soils allows reconstruction of vegetation of immediate and local origin, compared with that from some wetland sequences, where the sources of input can be diverse and from a wider area. Thus, data from both sources is valuable for building a representative picture for an area.

Plant macrofossils (fruits, seeds, wood, bud scales etc) and insects preserved in waterlogged deposits are invaluable for understanding local vegetation and placing structures and settlements into their environmental settings. Some pollen grains can only be identified to a type or genus and not to a species, whereas plant macrofossils can usually be identified to genus, if not to species. Thus, carried out in association with pollen analysis, they allow more precise interpretation of the local environment. Insects are very sensitive to changes in temperature and are thus earlier indicators of climate change than pollen, for example.

Diatoms (unicellular algae) and foraminifera (protists) are useful for identifying changes in salinity and nutrient levels. They have been used principally to study sea level, tidal regimes and coastal change and have been used extensively in the Severn Estuary levels. Examples include Haslett *et al.* (1997a) which demonstrates the use of modern foraminifera assemblages from known tidal conditions to interpret archaeological data and Carter *et al.* (2003) where multi-proxy analyses included pollen, diatoms, plant macrofossils, sediment and foram analyses from transects along the Severn levels in South Gloucestershire, in a study of mid-late Holocene landscape evolution.

5.2 Soils

Soils preserved under monuments or which have developed under or within naturally accumulated deposits such as alluvium, peat, sand dunes or hillwash, are important sources of information. Pedological, pollen and molluscan analyses of such palaeosols have proved particularly valuable for understanding the setting of monuments in the landscape and for human activities such as clearance, burning and farming. However, obtaining good dating evidence from buried soils can be difficult as datable material is often sparse and there is a high chance of the inclusion of residual charcoal or charred seeds. Where suitable material is found, radiocarbon dates give the date of the death of the organism being dated and therefore potentially the age of the surface on which the monument was built.

It is very difficult to make general statements about soils in a region as complex and diverse as the South West. As noted before (on page 65), away from the coasts and floodplains of the region, forest-supporting Brown Earths were thought to have developed continuously since the Devensian Late Glacial and were of variable thickness depending upon parent material (Limbrey 1975). This situation pertained to the Neolithic, but in the Bronze Age, a combination of climatic deterioration and human impact may have contributed to acidification and nutrient loss resulting in, for example, the development of podzols, particularly in the high moorland of the region where the parent geology is both impermeable and acidic. The areas include Dartmoor, Bodmin Moor, outcrops in the St Austell area and Carnmenellis, all of which have a granitic geological basement, and also the slate geologies of Exmoor.

Topographic features such as slope aspect may also be of great significance in soil development and burial. For example at Colliford on Bodmin Moor, Maltby and Caseldine (1984) describe a brown podzol beneath a barrow on a south-west facing slope and compare it with highly advanced podzolisation beneath a barrow on a north-east facing slope. They suggest that this difference could be attributed to aspect, differences in land-use or possible age differences concealed by calibrated age ranges of radiocarbon dates.

5.3 Scientific dating

Radiocarbon dating has been the principal scientific dating method used to understand the chronology of environmental change in the Bronze and Iron Ages. Dendrochronological (tree-ring) dates have provided precise dates for some waterlogged prehistoric structures in the Somerset levels and moors. OSL (Optically Stimulated Luminescence) dating is now being used to date inorganic sediments in Holocene and Pleistocene sequences and is likely to become of increasing importance as the technique develops. Its potential has been demonstrated recently at Gwithian, for example (Roberts 2006).

5.4 Climate, sea level and rivers

The Middle Bronze Age, Iron Age and later periods fall in the later part of the Holocene (or for the UK sometimes called the Flandrian), the most recent period of the Quaternary era. The literature on Quaternary palaeoenvironmental change (such as Roberts 1998, 200) frequently alludes to a deterioration of the climate in the Late Bronze Age to Early Iron Age. However, in his review of insects from southern England Robinson (2002), did not find changes in the insect fauna which he could definitely relate to climatic deterioration in the early 1st millennium BC. The insect evidence for temperature is somewhat ambiguous and could suggest that conditions were similar to or slightly warmer than at present (and

see Bodmin Moor below, on page 112, for further discussion). Future studies making use of testate amoebae and chironomid larvae may add useful detail to climate change studies. Increases in wetness indicted by testate amoebae can reflect climate change and chironomids (non-biting midges) are sensitive to water temperature.

Analyses of testate amoebae in blanket mires on Dartmoor are in progress from Cut Hill and Whitehorse Hill (Hazell pers. comm.) and complete for Tor Royal where a 5000 year proxy-climate record for central Dartmoor has been established (Amesbury *et al.* in press). The Tor Royal record has a particular focus on testing existing models of climatically-driven expansion and contraction of settlement on Dartmoor, and resolves periods of amelioration and deterioration during prehistory.

As noted previously (on page 63), coastal change is fundamental to the changing environment of the South West. The major part of the post-glacial rise in sea level (*c.*55m in the last 11,500 years) was achieved by *c.*5000 BC, but subsequent changes have had a major impact on the shape of the coast (see Figure 3.2 on page 65). Haslett *et al.* (1997b); Allen (2001) have noted problems such as sediment compaction associated with some of the data used in the sea level curve published by Heyworth and Kidson (1982) and added to by Jennings *et al.* (1998). This still gives a useful overall impression of sea level change, but other recent research (such as Haslett *et al.* 2001) shows the importance of understanding local coastal changes, some of which were very significant. For example, the episodes of flooding in the 1st millennium BC in the Somerset peat moors (see below on page 108) had a major impact on land use. The flood event in the early centuries of the millennium was related to sea level rise and later episodes noted below may also have been, at least indirectly. Where estuarine silts did not extend landwards, ponding up of freshwater was an indirect effect. On the south coast at Poole Harbour, a Middle to Late Iron Age marine incursion has also been identified (Long and Scaife in Ladle and Woodward forthcoming).

As has been seen (on page 64), by the beginning of the Neolithic, rivers in the South West had evolved meandering or anastomosing bedforms (AG Brown 1997, 210). River behaviour only appears to have altered further during the Late Bronze Age and later when sedimentation of mineral silts and clays on floodplains is attributed to widespread forest clearance of floodplains and in the wider river catchment (Robinson 1992). Robinson (1992; 2002) comments that in earlier periods, hydrological changes in wetlands were mainly due to natural agencies such as sea level change, but in the later prehistoric period, human activity played a significant part. He suggests that the flooding of the raised bog at Meare in the Somerset peat moors and increased wetness noted in the upper Thames valley (see below on page 107) could be due to clearance in the river catchments causing increased runoff. For some flooding events, both human impact and an indirect effect of sea level rise may be factors.

5.5 Area reviews

A brief summary of present knowledge is given for each of the physiographic sub-regions, broadly similar to those used in Chapter 3.

5.5.1 Chalk downland, heaths (Wiltshire and Dorset)

Scaife (forthcoming) notes that for Wiltshire, "knowledge of Holocene palaeovegetation especially in relation to human activity is limited". This is due to the absence of peat-forming mire vegetation and the fact that the groundwater is carbonate-rich and high in dissolved oxygen even where organic sequences are present. The same can be said for parts of Dorset. As a result, most data on vegetation change comes from molluscan studies of colluvium, soils and ditch sediments, and while this gives general information, it does not provide detail about the species composition of the various habitats.

Exceptions, where palynological investigations have been carried out, are floodplain palaeochannels, Poole Harbour, greensand soils (such as the Devizes area) and the Dorset heaths. There are also occasional valley peats and organic lenses on the Thames terraces in north Wiltshire (see below on page 107).

Allen (1988) argued, on the basis of soil and mollusc studies, that large areas of the Wessex chalk downland of Wiltshire and Dorset were cleared of secondary woodland by the Middle Bronze Age and constituted a farmed landscape. In east Dorset, evidence for this comes mainly from studies along the route of the A35 Tolpuddle By-Pass (Allen 1999). In the west of the county, excavation in the Dorchester area has provided a series of data sets from the Neolithic onwards. Allen (1997b), drawing together the evidence from soil descriptions by Staines, plant macrofossils (Straker and Letts), animal bones (Bullock and Reilly) and molluscs concludes that from the mid-2nd millennium BC until the Middle Iron Age, increasing arable farming is indicated. Colluvial sequences, such as those at Middle Farm and Fordington Bottom date to this period and suggest erosion of thin chalky soils. There is also evidence for large scale mixed farming on the downland. The particularly large sheep from Middle and Late Bronze Age contexts at Middle Farm may suggest the introduction of new flocks to the area, while cattle husbandry was probably for meat rather than dairy produce. By the

later Iron Age, *c.*450 cal BC, extensive tillage had led to soil depletion in some areas. At Flagstones and Fordington Bottom, for example, long standing arable land may have reverted to lightly grazed grassland. New arable land was established elsewhere, such as in the area round Fordington Farm barrow. There is speculation that in the later Iron Age, some grain was imported to the Dorchester area and stored in pits.

A peat-filled palaeochannel of the Easterton Brook at Market Lavington, near Devizes, proved an exceptional find for the area (Wiltshire 2006). The site was on a low greensand ridge at the foot of the north west scarp of the Salisbury Plain chalk. The earliest dated sediments at 1540–1580mm depth were Iron Age (800–200 cal BC, with 89.3% probability of the date being between 800 and 350 BC, OxA-2998) and pollen assessment allowed a crude reconstruction of the vegetation at, and below, this level. A mainly pastoral open landscape is inferred from the Late Bronze Age (and possibly earlier) until the Iron Age. The virtually treeless environment contained very low levels of hazel-type, oak and alder, but plentiful, weedy grassland and heath vegetation (Wiltshire 2006). However, the most important palaeoenvironmental information comes from the Early Medieval fills of the palaeochannel where pollen preservation was good permitting detailed analysis (see page 164).

A rare opportunity to study both charred and mineralised plant remains arose during the excavation of a Late Bronze Age–Early Iron Age midden at Potterne, near Devizes (Straker 2000; Carruthers 2000). The midden developed on greensand soils, but gley soils on Gault clay and rendzinas on chalk are also to be found locally. The charred plant macrofossils mostly relate to arable farming of crops typical for the period (spelt wheat, hulled barley) and associated weeds, however the species of mineralised seeds are less biased by human activity in their composition and so afford a glimpse of local environmental conditions, similar to those often preserved by waterlogged assemblages. The predominant group of plants was of wasteland and disturbed ground, including species such as henbane (*Hyoscyamus niger*) and stinging nettles (*Urtica dioica*) and members of the Chenopodiaceae family (goosefoots). Micromorphological and geochemical analyses by MacPhail (2000) suggested that long term stabling or pounding of animals on the midden enhanced the levels of phosphorous, but plant macrofossil evidence for stabling or pounding is absent (Carruthers 2000). Carruthers also notes the very good preservation of mineralised plant remains at East Chisenbury, 15km to the south-east on Salisbury Plain and considerable potential for further study. Charcoal analysis at Potterne (Straker 2000) was limited, but demonstrated that the main species selected for burning were oak, hazel and Pomoidae (a group which includes hawthorn, apple, pear, whitebeam and rowan) with some *Prunus* (cherry or sloe). Apart from the oak, these are all efficient secondary colonisers and all could have been collected from local stands of woodland, scrub or hedgerows.

At Durrington, in the Avon valley, pollen survives in some floodplain sediments and detailed analysis is in progress. The sequence starts in the Devensian Late Glacial–Early Holocene (see page 48) and is likely to continue to the Medieval period with some hiatuses. However, one of these hiatuses may cover the Late Bronze Age and Iron Age (Scaife in Cleal *et al.* 2004; Scaife forthcoming).

On Cranborne Chase, a peat-filled palaeochannel produced a late prehistoric and historic pollen profile. The earliest record is Late Bronze Age (1050–830 cal BC, Beta-189162) and was largely herb-dominated (Scaife forthcoming).

Scaife (forthcoming) summarises the vegetation history studies of the Dorset heathlands which have received attention from several workers, starting with the pioneering studies of Dimbleby (in Case 1952) on a pre-barrow soil and Seagrief (1959) at Wareham Bog. Soil profiles beneath barrows have been the subject of studies by several workers. The open heath and woodland identified at Bourne Bottom, Poole (Dimbleby in Case 1952) is typical for many such pre-barrow soils in the present heathlands of central southern England. Scaife gives the references for other pre-barrow pollen analyses; the profiles obviously predate the barrows, but are not closely dated and further well-dated analyses would be useful.

A recent study at Golden Cap on the Dorset coast, demonstrated that away from the heathland soils, clearance is not so evident. The pre-barrow hazel scrub at Golden Cap may be intermediate vegetation between woodland, clearance and pasture (Scaife 1993; Scaife in Papworth 1997, 56–9).

Work on the peat beds in Poole Harbour is discussed in full in the forthcoming report on the excavations at Bestwall which is located on the western side of Poole Harbour (Long and Scaife in Ladle and Woodward 2007; Ladle and Woodward forthcoming). A recurring feature is a marine incursion dating from the Middle to Late Iron Age. At Bestwall itself, Scaife has identified pollen from a range of features including a small basin whose fills date from the Neolithic to the Early Medieval period. An Early to Middle Bronze Age date coincides with major clearance of the open oak-hazel woodland, the lime element having been removed earlier (in the Neolithic or Early Bronze Age). The clearance appears to have been for arable purposes, and arable and pasture episodes are noted in both the Bronze and Iron Ages. Scaife (forthcoming) points out that unlike other parts of this region (such as the west side of Poole Harbour and Hengistbury Head) the vegetation here did not revert to heathland.

The present heathlands on the western side of Poole Harbour and Furzey Island have been studied as a result of the development of the Wytch Farm oilfield. Scaife (in Cox and Hearne 1991) found Bronze Age heathland in two sequences and he also postulated the presence of areas of late prehistoric pine woodland. The full publication of the Bestwall and Poole Harbour results will make a major contribution to our knowledge of vegetation and coastal change in south Dorset.

Further east on the coast at Hengistbury Head, pollen from the "eastern depression", which was found to be the upper end of a truncated valley, showed that it had supported woodland during the Neolithic and Bronze Age including species such as oak, lime, ash, alder and birch. In a soil profile under a bank and dated to 1880–1440 cal BC (HAR-6186) the vegetation was fairly similar, but although lime was no longer evident, holly was present (Scaife 1992), adding to data on the decline in lime on the south coast. This Early Bronze Age vegetation was subsequently replaced by heathland.

5.5.2 Jurassic uplands (Cotswolds and Mendip)

Knowledge of vegetation history and landscape change is virtually absent for this period, apart from a general understanding of the principal crop plants and domesticated animals. However, the sites at Latton and Latton Lands in the upper Thames valley (see on this page) are also on the dip slope of the Cotswolds, and thus provide some general information relevant to this area.

A molluscan study from Malmesbury gives some useful information of local interest. Snails were analysed from Iron Age ditches and buried soils (Davies 2002). Short-turfed grassland was evident, with some areas of longer, more shaded, grassland associated with the ditches and/or palisades. Burnt freshwater species were found in ditch 3; these are thought to originate from burnt daub containing clay from a wetland source, which was found in the ditch fills.

5.5.3 Upper Thames valley, Gloucestershire (and Wiltshire)

Woodland clearance was probably complete in the main valley of the Thames downstream of the Cotswold Water Park by the Late Bronze Age, though it was still taking place on some of the tributary floodplains at this time (Robinson 1992, 53; Robinson 2007, 357). The area of the Cotswold Water Park, the southern and eastern hinterland of Cirencester (Miles *et al.* 2007) may not have been fully cleared of woodland until the end of the Bronze Age, however Robinson (1992; 2007) noted a rise in water table in the Late Bronze Age caused by the effects of clearance and agricultural intensification. It was at this time, for example, that the effects were noted on the previously dry soils at Latton "Roman pond" (see below).

The Late Bronze Age economy of the upper Thames valley was mostly concerned with cattle rearing and a pastoral system (Lambrick 1992, 21). More mixed farming economies are evident in the Early Iron Age, with an increase in both arable and pasture. The extent of arable may have been greater further downstream, as for example at the Ashville Trading Estate (Robinson 2007).

Drawing together the evidence from charred and waterlogged plant macrofossils, insects and molluscs from a number of sites in the Cotswold Water Park, including major centres such as Claydon Pike (Miles *et al.* 2007) and Thornhill Farm (Jennings *et al.* 2004), Robinson (2002; 2007) suggests that by *c.*650 BC both the floodplain and first gravel terrace supported agricultural land-use. The Middle Iron Age landscape in the Cotswold Water Park area was open and agricultural with the main emphasis on raising domestic animals, with fields on drier ground supporting arable crops including winter-sown cereals (Robinson 2007). This is broadly in support of the views expressed by Lambrick (1992) based on sites further downstream. Robinson (2007) notes that Claydon Pike was sited at a junction between the floodplain and first gravel terrace, the wetter floodplain would have provided good summer grass for pasture whereas the first terrace could have supported some cultivation and over-wintering of animals. More specifically, the evidence from insects summarised by Robinson (2002) suggests that the landscape surrounding the enclosed and unenclosed Middle and Late Iron Age settlements was grassland, with heavier grazing pressure around the unenclosed sites. Here, shorter turfed grassland is indicated and the settlements are regarded as specialised, grazing domestic animals on the floodplain. This does not appear to have been typical of higher gravel terraces in the Thames or elsewhere where mixed farming was the norm.

Although flooding in the Early Iron Age was noted in some areas further downstream (for example at Yarnton, Oxfordshire), it was not seen at Claydon Pike. Robinson (1992, 54) identified the effects of agricultural intensification in the Middle Iron Age causing flooding with the onset of deposition of alluvium starting in the Late Iron Age.

A few kilometres upstream on the Gloucestershire/Wiltshire border, peat accumulated in a shallow palaeochannel in the top of the first gravel terrace of the Thames known as Latton "Roman pond". This was examined during the excavations along the A419 (Ermin Street) between Cricklade and Birdlip Quarry (Mudd *et al.* 1999). Molluscs, plant macrofossils and pollen were studied by Robinson (1999b, 497–500) and Scaife (1999c). As noted above, dry condi-

tions had allowed tree growth on the bed of the palaeochannel, but the raised water table in the later Bronze Age killed the trees and allowed fen peat to accumulate. In the local area at around 1380–970 cal BC (NZA-8579), oak-lime-hazel woodland was being cleared, though some oak-hazel-alder woodland persisted suggesting some selective clearance of lime. Scaife (1999c) considers that the lime clearance took place in the Late Bronze Age, however Mudd *et al.* (1999, 521) suggested that this was in the Early Iron Age. The remaining woodland was removed in a later phase of clearance and herbs of arable and pasture are evident. This was most marked in the upper part of the profile (particularly zone 3) in what are regarded as Iron Age levels. This study is of major importance; however, as Mudd notes, the sequence is not precisely dated. Pelling (1999, 474–5) studied the charred plant remains from the sites along the route and noted that the cereal cultivation in the Cotswolds and this part of the upper Thames valley appeared to have been on a small scale when compared to Oxfordshire upper Thames valley sites and the Wessex chalklands, implying greater emphasis on pasture.

Contrasting results from another site nearby on the first Thames terrace at Latton (Latton Lands) demonstrates the value of spatial sampling within a local area. Pollen from a waterhole suggested a settlement in a much more open landscape than at the "Roman pond" with high percentages of arable and pasture species as well as local aquatic/fen taxa (Huckerby in Stansbie and Granville Laws 2004, 135). It is not clear from the radiocarbon dates of 1450–1190 cal BC (WK-12942) and 1440–1250 cal BC (WK-12941) whether the two sites are contemporary with varied vegetation or whether there is short-term vegetation change. More recent excavation on another part of the site, supported by a larger number of radiocarbon dates interpreted using Bayesian modelling, may clarify this (Rebecca Nicholson pers. comm.).

5.5.4 Coastal lowlands (Somerset, Severn and Avon Levels)

There is a considerable body of literature regarding the environmental changes in the Somerset Levels and Moors, particularly for the last 6000 years. This can be found in the *Somerset Levels Papers* and research papers in various specialist and period journals, books and theses. Examples include Clapham and Godwin (1948), Godwin (1955), Beckett and Hibbert (1979), Caseldine (1988b), Housley *et al.* (1999) and Aalbersberg (1999). Most work has concentrated in the Brue valley where studies were related principally to establishing the environmental setting of tracks of Neolithic to Iron Age date and the Iron Age villages at Meare East and West, and Glastonbury. They also gave some insight into the vegetation and land-use on the "dry" land of the Lias limestone "islands" and surrounding hills. The principal sources of information were pollen, plant macrofossils including wood, and insects.

The wetland vegetation was varied in character throughout the area, as noted in a general summary by Straker (2006b). In the Brue valley, the basic vegetation sequence was first recognised by Clapham and Godwin (1948), Godwin (1955) and Beckett and Hibbert (1979). After the mid-Holocene reed swamp and fen wood successions, raised bog was established by *c.*3100 cal BC and the prehistoric tracks run through this environment. The character of the raised bog vegetation is identified by pollen, plant macrofossils and also the insect fauna, with species feeding on heathers and cotton grass with water beetles in acid peaty pools within the raised bog. Robinson (2002) summarises Girling's results from the Meare Heath and Tinneys Gound Trackways (Girling 1982a;b), where scarabeoid dung beetles suggest that domestic animals were driven along the track. The raised bog would have provided good grazing.

The onset of wetter conditions in the Late Bronze to Early Iron Age has been identified in different locations by many workers including Clapham and Godwin (1948), Beckett and Hibbert (1979), Girling (1982a), Housley (1995), and J Jones and Tinsley (2007). Flooding of the raised bog on Meare Heath started *c.*910–750 cal BC (90.9% probability, SRR-914, Girling 1982a). This lasted until *c.*400–200 cal BC (SRR-913) and resulted in an increased percentage of water beetles, notably those with a preference for calcareous water, and the replacement of some raised bog with fen species. On Common Moor, to the west of Glastonbury, the onset of wetter conditions took place after 1260–920 cal BC (Q-2464, Housley 1995).

At Sharpham Manor, one of the sequences investigated by the MARISP project was a largely inorganic flood-deposited clay within a peat sedimentary sequence. The clay is bracketed by a lower date range of 1045–905 cal BC (OxA-16248, OxA-16249, weighted mean) and upper range of 800–500 cal BC (SUERC-9835, SUERC-9839, weighted mean, J Jones and Tinsley 2007). This suggests that it was laid down in the Late Bronze Age or Early Iron Age and that flooding ceased by the Middle Iron Age or before.

The most detailed palaeoenvironmental study is Housley's research into the environment of Glastonbury Lake Village (Housley 1986; 1988; 1995), but as noted below there are other more recent analyses which complement his findings. Drawing together the evidence from his research with the earlier work of Godwin (1955), Housley (1995) concluded that the settlement was sited on a patch of alder-willow-fen carr surrounded by sedge fen fringing a shallow, open freshwater lake, the result of the onset of wetter conditions which drowned much of the fen wood. This may be the indirect result of an increase in the

rate of sea level rise in the second half of the 1st millennium BC (and see below for further discussion of flooding episodes). The raised bog of the present central Brue valley would have been visible to the west of the village. There was most probably local diversity in wetland environments and Housley (1995, 135) sees a "varied mosaic of different plant communities, each needing different water depths, nutrient conditions, types of rooting strata, flow tolerances and of differing potential exploitative value to man".

Aalbersberg (1999) and Aalbersberg and Brown (forthcoming) have re-examined the evidence for setting of Glastonbury Lake Village and carried out new stratigraphic studies and pollen and diatoms analyses. On the basis of the microfossil evidence, they conclude that tidal channels created by marine flooding in the Early to Middle Iron Age remained open in the late 1st millennium BC (Late Iron Age). This has important implications for the setting of Glastonbury Lake Village which could, therefore effectively have functioned as a port with access to the coast.

It is generally thought (for example by Coles and Minnitt 1995) that increased flooding and a rise in water table could have resulted in the abandonment of the lake village, however Aalbersberg and Brown (forthcoming) find no convincing evidence for this and suggest that cultural rather than environmental factors should be examined more closely. New analysis carried out by the MARISP project at Glastonbury Lake Village, identified a phase of increased wetness (at what is anyway a very wet site) indicated by a change in sedimentation in the Late Iron Age, occurring immediately after 200–50 cal BC (OxA-16237, OxA-16238, J Jones and Tinsley 2007). The dating of Glastonbury Lake Village is in some doubt, as artefactual evidence suggests that it was established about 250 BC, whereas radiocarbon dates on bone appear earlier (Coles and Minnitt 1995). The latter dating is supported by radiocarbon dates from peat undertaken for the MARISP project. Until the dating is resolved, the debate on the effect of a Late Iron Age rise in water table on the settlement will continue.

On Meare Heath, raised bog was re-established but Girling (1982a) noted a further Late Iron Age episode of flooding starting probably in the last 200 years BC. The flooding events noted in the inner Brue valley for the last few centuries BC are freshwater events rather than inundations by the sea; however as noted above, these are likely to have been the indirect effects of sea level rise. Whether or not this is also related to climatic deterioration is not always clear.

The environmental context of the Meare lake villages, situated in the raised bog area of the central Brue valley, is discussed by Caseldine (1986; 1988a). Insect evidence for human habitation is restricted to that from Meare West where the house timbers showed notable infestation by woodworm *Anobium punctatum* in the centre of the settlement where the houses were closely spaced (Robinson 2002). The intensity of occupation is also reflected by the percentage of species feeding on moulds in thatch, old hay etc. and debris from food preparation and cereal waste (Robinson 1981, species groups 8 and 9 respectively). Robinson (2002) noted that compared with contemporary sites in the Oxfordshire Thames valley, the occupation appeared to be denser or more intense at Meare West.

The environment at Woolavington Bridge, towards the coast, was raised bog from the Late Mesolithic to the Early Medieval period, but this area was close to the limit of tidal influence (Tinsley 2003). Some 2km further west at Withey Bridge on the Huntspill, the environment was one of salt marsh from the Late Bronze Age onwards (Vickery 1999).

In the Axe valley to the north, marine flooding penetrated through the Bleadney–Panborough gap reaching to the north-west of Glastonbury (Housley 1995; Housley *et al.* 1999). Here, the inundation dates from the late 2nd to mid-1st millennium BC but on the coast the intercalated peats and silts were finally covered by estuarine silts by the later Bronze Age or before.

For the dry land, the pollen diagrams from the Brue valley chart woodland clearance and regeneration in the later Bronze Age with increased evidence for clearance and cultivation in much of the 1st millennium BC. This takes place in regional pollen zone F and is noted in the pollen diagrams for the Abbot's Way (Beckett and Hibbert 1979), Meare Heath (Beckett and Hibbert 1979) and Eclipse tracks (Coles *et al.* 1982), summarised in the excellent paper synthesising prehistoric environmental exploitation in the Somerset Levels by Caseldine (1988b). She notes that elm (*Ulmus*) declines for a third time and lime (*Tilia*) for a second. A reduction in tree pollen is accompanied by an increase in the quantity and range of herbaceous pollen types. A further marked expansion in clearance is evident at the Abbot's Way and Meare Heath in the last centuries of the 1st millennium BC, probably coincident with the on-site evidence for consumption of domestic animals and crops from the Meare and Glastonbury lake villages.

The various analyses prompted mainly by development on the Severn levels in Bristol and South Gloucestershire have provided some insight into the landscape in the mid-Severn estuary. The sedimentary sequence relates to the Upper Wentlooge formation described by Allen and Rae (1987) and comprises intercalated silts and peats with a thicker back fen-type peat in some locations near to the junction with the higher ground of Mercia Mudstone and Lias. There is little evidence for established raised bog on the south bank of the Severn in this part of the valley, unlike on the Welsh side. The silts supported various types

of saltmarsh. The dry ground was, as in Somerset, still largely wooded in the 1st and 2nd millennia BC, though there is little detailed analysis and in general it is not yet possible to identify well-dated episodes of clearance and regeneration as has been done for the hills surrounding the Somerset peat moors. A possible exception is a study from the Aust pipeline near Oldbury where a Middle to Late Bronze Age reduction in lime woodland was noted (Scaife 2006; and Scaife in Jordan 2004). Most analyses have been concerned with establishing the nature of the wetland environment. However, preservation of macrofossils is variable and in many cases analysis has been taken to assessment level only. A successful study of ostracods on the Severn floodplain near Bristol demonstrated estuarine conditions in the latest prehistoric to Romano-British period (Wessex Archaeology 2006).

The Historic Environment Records include reports of many studies from the Severn levels in Bristol and South Gloucestershire, not all of which are published, but some variations in the wetland and settlement patterns are evident.

Carter *et al.* (2003) reported on the stratigraphy from boreholes and excavations and various palaeoenvironmental analyses on the route of the Seabank pipeline in South Gloucestershire. They present a useful overview of landscape evolution in the area and the constraints and opportunities afforded by putative buried soil horizons within the silts of the Upper Wentlooge sequence. The identification of areas of higher bedrock buried beneath alluvium gives an indication of possible areas of potential for prehistoric settlement and emphasises a past variety in the landscape that cannot be seen today.

JP Gardiner *et al.* (2002) describe palaeoenvironmental studies from geotechnical pits, cores and excavations in relation to the Second Severn Crossing and associated roads. Both this publication and Carter *et al.* (2003) are very valuable as they draw together a range of studies from similar parts of the Bristol and South Gloucestershire levels, an area under intense development pressure. JP Gardiner *et al.* (2002) suggest a model for the exploitation of the levels based on pastoralism from the Neolithic to the Romano-British period. The principal late prehistoric settlement was at Hallen, to the north-west of Bristol. Upper salt marsh, dominated by the pollen types of the Chenopodiaceae family predated the Middle–Late Iron Age settlement. The dry land to the east supported oak, hazel, ash and some lime. The saltmarsh was succeeded by grassland and pasture, probably in the period of the settlement, which was then later covered by marine alluvium (Scaife 2001). JP Gardiner *et al.* (2002) suggest that the main preoccupation of the population at Hallen was shepherding on the grassland which was accessible at least in summer months.

The mature mid-late Holocene woods of the dry land in the Bristol area do appear to have had a greater component of lime (*Tilia*) than their more south-westerly counterparts and lime is still a distinctive feature of the woods of the carboniferous limestone of the Avon Gorge. At Temple Back in Bristol, lime and other trees were identified at the base of a largely historic sequence (Scaife 2004) and similarly in the earlier (Neolithic) sequence at Deanery Road (Tinsley and Wilkinson 2005).

Further upstream in the Severn valley in Gloucestershire and Worcestershire, AG Brown (1982; 1987) identified Bronze Age clearance of lime woodland on river terraces at Ashmoor Common, Ripple Brook and Callow End between *c.*1700 and 700 BC. Later, for a long period between 500 BC and AD 1000 (Middle Iron Age to Medieval) clearance or management of alder carr was accompanied by the development of wet meadow vegetation. Both AG Brown (1982; 1987) and Hewlett and Birnie (1996) studied profiles at Longney, in the estuarine zone south of Gloucester. Brown identified floodplain alder woodlands with a component of oak and lime. Hewlett and Birnie (1996) found a 4.5m thick woody peat at Longney, which contrasts with the later prehistoric intercalated peats and clays to be found downstream on the Severn Levels. The alder woodland represented by much of the peat was replaced by a wet sedge vegetation. The calibrated age range (800–200 cal BC, Beta-51686) of the basal date covers most of the Iron Age, but there is a probability of 91.9% that the date falls between 800 and 350 cal BC. The floodplain sediments in this area may also include a general pollen signal for the western edge of the Cotswolds, but because of the distance it will be affected by differential pollen transport.

5.5.5 Triassic and Devonian hills and valleys (south Somerset, Devon and Cornwall)

There are no relevant palaeoenvironmental data from south Somerset, however, recent studies from the Exe valley and central Devon have added useful information relating to local palaeoenvironments.

Fyfe *et al.* (2003a) report on studies from three spring mires on Exmoor's southern fringe (Long Breach valley/spring mire, Gourt Mires and Anstey's Combe). These sites allow detailed reconstruction of the local vegetation and show the scale of variation in vegetation type around the southern moorland edge. Gourt Mires (2400 BC–AD 1000) and Long Breach (3500 BC–AD 1300) show extensive woodland clearance in the Middle to Late Iron Age after 760–370 cal BC (Wk-10623). However, the authors state that there is "no discernible Roman or post-Roman period impact on the vegetation". This suggests stability of

the cultural processes causing detectable impacts on the environment from the Late Iron Age to the Early Medieval period (and see also Fyfe and Rippon 2004). At Anstey's Combe, the sequence runs from the Late Iron Age (*c.*100 cal BC) until *c.*AD 1500. Unlike other sites, in the Late Iron Age the oak-hazel woodland was retained on the steep valley sides.

On Knowstone and Rackenford Moors four local sequences from central Devon cover all or parts of the period (Fyfe *et al.* 2004). These are from Lobb's Bog (Late Iron Age to Medieval), Hare's Down (*c.*300 BC–AD 900), North Middle Combe (*c.*1000 BC–AD 1400) and Windmill Rough (*c.*1000 cal BC to present). These suggest a predominantly pastoral landscape by the start of the Iron Age, with valley-side alder cleared in the Middle to Late Iron Age. The sequence from Middle North Combe shows that the most pronounced anthropogenic change within the cultural landscape took place in the Middle Bronze Age, also confirmed from the site at Moles Chamber on Exmoor (Fyfe 2000). All the sites show that the land use remained as pasture throughout Roman period and continues to the recent period with no obvious change in intensity of use.

Elsewhere in Devon, new analyses on the Blackdown Hills, the Hartland peninsula and in the Clyst valley took place as part of the Heritage Lottery-funded Community Landscapes project. The first palaeoenvironmental data for the Blackdowns come from Bywood Farm and Greenway. At Bywood, a Late Bronze Age to Early Medieval sequence started to accumulate *c.*1270–1130 BC; there are no independent dates from Greenway. The sites show Late Bronze Age woodland clearance with arable cultivation first recorded in the Iron Age and no detectable changes in the Roman period. However, oak and hazel also remain significant after the Iron Age and suggest that woodland persists through the Holocene probably on steeper slopes and under management, possibly as a result of resources needed by the iron industry (Hawkins 2005; A G Brown pers. comm.).

At Kennerland on the Hartland peninsula, a valley/spring peat started to form in the earlier centuries of the Iron Age when the landscape was predominantly open with some arable cultivation and pockets of deciduous woodland. This is an area with a high density of Bronze Age barrows and the possibility of early clearance (Hawkins 2005; A G Brown pers. comm.).

Studies at several sites in the Clyst valley (Helling's Park, Broadclyst Moor and Moshayne) show woodland clearance in the Late Bronze Age–Early Iron Age, associated with cereal cultivation. However, the the late appearance of cereals here may be connected with the removal of a filtering effect by trees after the woodland clearance (Hawkins 2005; A G Brown pers. comm.).

In south Devon at Woodbury Castle hillfort near Axminster, pollen analysis by Dimbleby (in Miles 1975b) on a palaeosol seen in various places beneath the rampart showed variable vegetation of open oak woodland and grassy glades with bracken.

An intertidal peat with submerged forest remains at Thurlestone Rock in the South Hams was the subject of limited work but has produced useful results (Reed and Whitton 1999). Pollen, plant macrofossils and insects indicated open grazed pasture close to the wet fen vegetation. This unusual record for an intertidal peat was most noticeable in the uppermost sample. The peat was of Late Bronze Age date, which again is unusual for an intertidal deposit and suggests very rapid coastal change in the area. Severe coastal erosion is evident today and is clearly not a recent phenomenon.

Tinsley (2000) studied the pollen in the upper 2.3m of a 9m deep peat deposit in a coastal valley at North Sands, Salcombe. The mire vegetation in the Middle Bronze Age (1530–1250 cal BC, Wk-8103) was alder carr and fen which was replaced by an open and wetter plant community and, by cal AD 50–350 (Wk-8102), the carr woodland disappeared. The site appeared to have dried out during or after the Roman period. Tinsley attributed the phase of increased wetness to local hydrological change, possibly associated with human activity. This was indicated by herbs characteristic of disturbance throughout the profile, but particularly in the Bronze Age levels.

5.5.6 Moorland (Isles of Scilly and west Cornwall, Bodmin, Carnmenellis, St Austell area, Dartmoor and Exmoor)

Isles of Scilly Pollen analysis and assessment that covers the later part of the Bronze Age and the Iron Age has been carried out at various locations on the Isles of Scilly. Locations range from the sequences at Higher and Lower Moors on St Mary's (Scaife 1984; with some reinterpretation by Ratcliffe and Straker 1996), the intertidal organic soils on Crab's Ledge, Tresco (Iron Age, Ratcliffe and Straker 1996) and buried soils at Bar Point, St Mary's (Iron Age, Evans 1984), Innisidgen, St Mary's (Dimbleby 1976–7), Halangy Porth, St Mary's (probably Iron Age, Dimbleby *et al.* 1981; Dimbleby in Ashbee 1996, 171–3) and Shipman Head, Bryher (below the rampart of the cliff castle, Ratcliffe and Straker 1996). At Higher and Lower Moors, some regeneration of the birch, oak and hazel woodland is evident in the Middle to Late Bronze Age, with herbaceous and cereal pollen also pointing to some open areas.

The start of the main phase of woodland clearance is dated at Higher Moors to the Late Bronze Age–Early Iron Age (820–410 cal BC, HAR-3724 and 800–

200 cal BC, HAR-3723). The soil pollen analyses noted above all testify to open environments with a little alder, oak, birch and hazel recorded at Bar Point but not at Halangy Porth. The open ground is mainly grazed grassland but at Innisidgen, arable was also suggested. Pollen of heathland plants is rare, but the charcoal of heather and gorse/broom at Bonfire Carn and Porth Killier show that it was used as fuel from as early as the Middle Bronze Age (Ratcliffe and Straker 1996). The Crab's Ledge pollen and plant macrofossils are of grasses and members of the Cheopodiaceae family including annual sea blite, suggesting coastal grassland and saltmarsh (Ratcliffe and Straker 1996).

West Cornwall A summary review of past work in Cornwall west of Truro was carried out for the HEATH project (Straker in Dudley and Herring 2006). This showed convincing, if poorly dated, evidence for heathland development, as well as some pasture and possibly arable, before barrow construction on the Lizard. Greater hazel cover than present today was also noted. The sites studied included Trelan (Balaam in G Smith 1984), Caern Dhu (Crabtree 1980) and Higher Polcoverack (Staines in Goodden 1977, reported in Bell 1984). The only evidence for Penwith is from Carn Euny where Dimbleby (in Christie 1978) investigated the land surface pre-dating the settlement and considered to be 5th century BC or earlier. The early part of the sequence shows mainly wooded conditions with, as in earlier periods, the main trees being oak and hazel. Dimbleby noted a clearance episode which suggested pasture in the local area. By the time of the settlement there was a noticeable decline in oak and hazel and associated increase in grasses with a suggestion of arable and pasture with herbs such as sorrels (*Rumex*), great plantain (*Plantago major*), and members of the Cruciferae, Urticaceae (nettle family) and Umbelliferae. The results provide a contrast to the Lizard with clearance showing no clear evidence for heathland.

Current analysis of new sites on Penwith and Carnmenellis, in progress as part of the HEATH project, should provide better dated evidence for the onset of heathland.

Settlement features at Penhale Round, located on the shillet, but close to the edge of the metamorphic aurole near Indian Queens, provided some information on local vegetation in the 1st millennium BC. Scaife (in Johnston *et al.* 1998) analysed pollen from a gully associated with an Iron Age house which suggested varied background vegetation of woodland copses, heathland, grassland and arable. Greig's assessment from earlier features on another part of the same site suggests establishment of grassland and heath before the later Bronze Age monuments were constructed (Greig 1997).

Bodmin Moor The earliest published pollen analyses were from Parson's Park (Connolly *et al.* 1950) and Hawks Tor (AP Brown 1977) and both suggested a largely pastoral environment in the areas in the Bronze and Iron Ages. However, the dating resolution was poor compared with more recent analyses. A review of the evidence for Bodmin was later summarised by (Caseldine 1980). A reduction in the oak/hazel woodland was evident by *c.*1100 BC though there may have been some woodland remnants on sheltered hillsides.

There is now a good body of evidence for past vegetation and land use from the Stannon–Rough Tor area of Bodmin Moor. Radiocarbon dates for clearance at Rough Tor South (1690–1440 cal BC, OxA-6008) and Tresellern Marsh on East Moor (1260–900 cal BC, Beta-84825) confirm the scale of human activity in the 2nd millennium BC (Gearey and Charman 1996; Gearey *et al.* 2000b). These sites identified a peak in human activity in the Middle Bronze Age with pasture in much of the area, however, there is some evidence for slight woodland (oak/hazel dominated) in the mid-2nd millennium BC.

Likewise in the Stannon area the first permanent grasslands became established in the Early Bronze Age on higher parts of the down after 2020–1760 cal BC (SUERC-3624) causing a reduction in the area of oak-hazel woodland, probably associated with the activities of the cairn builders (Tinsley 2004; Tinsley in AM Jones forthcoming). As at Rough Tor, grazing was intense in the Middle Bronze Age. At Stannon, the wet alder woodland in the valley that had developed in the Late Mesolithic–Early Neolithic period became less dense in the Bronze Age but continued to exist until some time in the Iron Age. Tinsley (Tinsley 2004; Tinsley in AM Jones forthcoming) notes a major landscape change between 1260–1000 cal BC (SUERC-3625) with an expansion in grassland, further increase in microscopic charcoal and establishment of herbs typical today of upland acid grasslands such as tormentil, devil's bit scabious and sheep's bit with a now continuous pollen record for *Calluna* (ling). The presence of ling, a strongly calcifuge plant, from the Early Bronze Age shows that the woodland-supporting acid brown earths established in the early–mid-Holocene had started to degrade. Podzolisation had also started in some places as evident from soil beneath cairn 2. This development broadly coincides with the spread of field systems and house-building in the area (Mercer 1970; Johnson and Rose 1994). The results of Gearey *et al.* (2000b) support these findings.

At Stannon, in the Early Iron Age, there is a notable increase in wet conditions on the bog surface resulting in the establishment of aquatic herbs including marsh St Johns wort, flag iris, bog moss (*Sphagnum*) and other species in pools of open water, which started to develop sometime before 730–380 cal BC (or 550–380 cal BC at 91.3% confidence, SUERC-3626).

The marked reduction in valley alder woodlands was subsequently redressed somewhat, but in the later Iron Age they decreased significantly (Tinsley 2004; J Jones in AM Jones forthcoming).

There seems general agreement that after the Bronze Age there was a decline in the intensity in upland land use, and Gearey *et al.* (2000b) suggest that this may not have been until the Late Iron Age or even Roman period at their sites on Rough Tor and East Moor. Certainly at Stannon, Tinsley (2004 and in AM Jones forthcoming) suggests that the decline is not until at least the Late Iron Age. She feels that the late prehistoric increase in heathland (heathers) could be due to increased soil acidification, reduction in grazing or the use of fire to manage the balance of heather/ grass moorland. Charcoal analysis (Gale in AM Jones forthcoming) showed the increased use of shrubby species such as gorse (*Ulex* sp.) or broom (*Cytisus* sp.), in the Iron Age. This confirms the heathland development suggested by the pollen, however, oak (*Quercus* sp.) and hazel (*Corylus avellana*) charcoal was still more common than gorse and broom.

Gearey *et al.* (2000b) discuss the explanation for the apparent shift in emphasis of settlement from the upland to lowlands at the end of the Bronze Age and the possible role of climatic deterioration among other factors. Their conclusion was that soil deterioration was not far advanced on a landscape scale by the late prehistoric period and that pollen evidence suggested that the quality of the sward remained fairly good at that time. Gearey *et al.* (2000b, 505) found little evidence for climatic deterioration around the Late Bronze Age–Early Iron Age transition in the South West of England but felt that, as the evidence is variable and the dating resolution poor, it could not yet be discounted.

In the later Iron Age at Stannon, around 520–380 cal BC, increasingly wet conditions were evident. However, whether they resulted mainly from deforestation and decreased evapotranspiration, rather than climatic deterioration, is not clear (Tinsley 2004 and in AM Jones forthcoming).

In the De Lank valley, the Bronze Age and subsequent sequence dates from 1890–1680 cal BC (Wk-11549). The vegetation changes are complex and may be largely associated with human activity (J Jones *et al.* 2004). Conclusive evidence for cereal cultivation in the mid–late 2nd millennium BC is at present known only from the relatively sheltered De Lank valley and at Tresellern Marsh.

At Colliford, Maltby and Caseldine (1984) studied soil profiles and pollen beneath barrows, hedges and ridge and furrow, prior to the flooding of the area by the reservoir. The Bronze Age vegetation was open grassland with localised hazel scrub and some woodland and heathland. The authors also noted that the evidence for soil degradation in prehistory had to some extent been reversed in the more modern profiles. Pollen analysis from the Colliford buried soils show open grassland suggesting pastoralism present before barrow construction. Typical species include grasses, ribwort plantain, dandelions, devils-bit scabious and *Potentilla*-type.

On the northern fringes and to the north of the moor, soil profiles beneath the Crig a Minnis, Otterham and Wilsey barrows showed some evidence of podzolisation. Pollen analysis at Crig a Minnis demonstrated heathland development in clearings in possibly secondary woodland (Dimbleby in Christie 1960, 94–96; Dimbleby 1963).

Other studies of pre-barrow soils by Bayley (1975) showed that the landscape on the St Austell granite at Caerloggas and Watch Hill comprised grassland, heath and hazel scrub. In the same general area, Crabtree (in Johns and Herring 1994, 31–2) found similar grassland and heath vegetation in the soil beneath Littlejohns Barrow.

Dartmoor On Dartmoor, in contrast to the Neolithic period, for which good quality pollen data is scarce, the Bronze and Iron Ages fare rather better. This is largely because of the extensive fieldwork carried out by the Dartmoor Reaves and Shaugh Moor projects in the late 1970s and early 80s which have thrown light on the environments during the 2nd millennium BC (Balaam *et al.* 1982; Maguire *et al.* 1983; Fleming 1988; K Smith *et al.* 1981). This provides a baseline from which to view the later centuries.

Caseldine and Hatton (1994) and Caseldine (1999) have summarised the main findings from these projects. By the early 2nd millennium BC, there was open moorland above the reaves comprising acid grassland, though wood was available elsewhere as shown by the pre-stone wooden structures. Within the reave system there was good pastureland with some small-scale arable cultivation within the field systems. The soils, were acidic, owing to the parent granitic substrate, but generally did not show leached horizons or peat or iron-pan development. The palaesols excavated in the Dartmoor Reaves Project (Fleming 1988) showed an active soil fauna which would not be evident in very acid soils. There is, however, some evidence of soil deterioration and peat growth below the Saddlesborough Reave, the onset of which would have been by the 2nd millennium BC. Caseldine (1999) feels that without further question-based research on sites with high dating potential, little progress is likely to be made on understanding the post-reave landscape of Dartmoor.

The Shovel Down Project (Brück *et al.* 2003) aims to test some of the findings of the original reave project (Fleming 1988), specifically the chronology, form, function and historic and contemporary land-

scape context of sub-division of the landscape in the Bronze Age. Environmental work is focusing on generation of regionally-relevant climate reconstruction records (Amesbury *et al.* in press), landscape-scale soil work to examine the differences within and without the field systems, and differences between different forms of field system (co-axial and aggregate enclosure) and local vegetation histories. This last includes pollen analysis and assessment of coleopteran samples from a mire section which incorporates a reave in situ in peat (Fyfe and Davies in prep.). Initial results indicate a clear phase of landscape improvement and subsequent abandonment local to the Shovel Down field system, firmly dated within the Middle Bronze Age.

Many of the other early pollen studies on Dartmoor (see Bell 1984 for a summary) do show local variability and some records are derived from more local sources than others. However, many are not well-dated by today's standards.

A comparison with the upland is provided by Sourton Down, on the northern fringes of Dartmoor. A small valley mire at only 290m OD, revealed a long sequence of local vegetation change starting in the early 7th millennium BC (Straker 1997). In contrast with the Dartmoor massif, the vegetation at Sourton shows little evidence of major human impact before the clearance of local alder fen in the Late Iron Age or Early Roman period (170 cal BC–cal AD 70, OxA-6000). The alder woodland was replaced by sedge fen and the drier ground supported damp grassland with stands of trees and scrub. A 1st century Roman road passed close to the site and increased human presence and use of wood for fuel or building material may account for the changes, however Late Iron Age clearance cannot be ruled out.

Exmoor Until the late 1990s research on Exmoor focused exclusively on pollen analysis from the higher blanket peat sequences (Merryfield and Moore 1974; Francis and Slater 1990; 1992; Straker and Crabtree 1995). This work demonstrates that the timing of blanket peat initiation varies across the upland, from the Late Neolithic through the later Iron Age. By the Middle Bronze Age the upland was predominantly open, as demonstrated by the work from Hoar and Codsend Moor (Francis and Slater 1990; 1992) and Moles Chamber (Fyfe 2000).

More recent work has focused on smaller, more discrete mires, both in valley contexts (such as the Brightworthy palaeochannel in the Barle valley, Fyfe *et al.* 2003a) and from the upland fringes (a series of mires on Molland Common, Fyfe *et al.* 2003a). This more recent pollen work broadly confirms a predominantly open upland landscape by the Middle Bronze Age, but areas such as Molland Common (on the south Exmoor fringe) are characterised by a mosaic landscape, with the potential for localised survival of woodland remnants within the predominantly open landscape. Further clearance is apparent during the Late Iron Age, for example at Moles Chamber, dated shortly before cal AD 80–330 (Beta-140873, Fyfe 2000).

Further pollen and geochemical work in is progress with a focus on examination of the chronology and local landscape impacts of metal extraction and processing on Exmoor, in collaboration with the Exmoor Iron project (Ralph Fyfe, pers. comm.). This geochemical and palaeoecological work is underway from mires close to the large smelting site at Sherracombe Ford, and the mining site at Roman Lode. Although both these sites are major historic period centres, both are likely to have been important during later prehistory.

5.6 Discussion

In common with other periods, many of the more recent studies focus on understanding the diversity of the landscape and local land use by studying several small catchments in a local area. The multiple studies such as on Bodmin Moor and the Somerset and Severn levels also allow a better understanding of the chronology and nature of events such as clearances, woodland regeneration, flooding episodes and heathland development.

The timing of lasting clearance of secondary woodland is variable; generally this was in the 1st millennium BC, but there are variations. The Wessex chalklands and parts of the high moors were cleared by the Middle Bronze Age, as were parts of the Lizard peninsula. Parts of the upper Thames valley were largely open by the Late Bronze Age, and on the Isles of Scilly and in the Clyst valley in Devon, this was the case by the Late Bronze Age–Early Iron Age. In parts of central and north Devon, clearance took place in or by the Early Iron Age, whereas on the southern fringe of Exmoor, this was not until the Middle to Late Iron Age. In the Somerset and Severn levels some areas were still wooded in the earlier part of the Iron Age.

Heathland had developed in parts of south Dorset by the Middle Bronze Age, but the open ground on the high moors supported both pasture and heathland; the balance depended on management by grazing and/or fire.

The integration of a range of palaeoenvironmental analyses in many wetland and upland areas has made it possible to identify episodes of flooding or increasingly wet conditions. In the lowlands, some are the direct or indirect result of sea level change. Better dating for these events will improve understanding of their effect and extent. It is unfortunate that many are during the 1st millennium BC, when there is a "plateau" in

the radiocarbon calibration curve and dating strategies should be designed with this in mind.

There is much scope for further research on climate change. For example, the topic of Late Bronze Age to Early Iron Age climatic deterioration is still a matter for debate, with no clear evidence from the south west. There is an understanding that, for example, some phases of flooding or increased wetness could be due to factors such as reduced evapotranspiration after woodland clearance. New or under-used techniques such as insect (including chironomid) and testate amoebae analyses could be usefully added to existing methods, to better understand climate change in contemporary upland and lowland sequences. Techniques such as oxygen isotope analysis may also be appropriate. Tufa deposits, for example, are well-suited to this and are a useful source where other indicators may not be well-preserved.

Improved dating for on and off-site sequences is essential if further advances in understanding are to be made. This means that far more attention should be paid to designing scientific dating programmes and ensuring that the necessary funding is in place.

Finally, there are several parts of the region where our knowledge of the later prehistoric environment is very poor, most notably the central and northern Cotswolds, Mendip and south Somerset.

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5.7 Radiocarbon dates

Table 5.1: *Details of radiocarbon dates used in the text. Calibrated ranges are at 2σ (95.4%) and were calculated with OxCAL 3.10 (Bronk Ramsey 2005) using the probability method and the IntCal04 calibration curve (Reimer et al. 2004).*

Lab. Ref.	^{14}C age BP	Cal BC	Site	Context	Reference
Beta-51686	2360±60	800–200	Longney	Peat	Hewlett and Birnie (1996)
Beta-84825	2880±60	AD1260–900	Tresellern Marsh A	Peat 40–50cm	Gearey *et al.* (2000b)
Beta-140873	1820±40	AD80–330	Moles Chamber	Peat	Fyfe (2000)
Beta-189162	2800±40	1050–830	Cranborne Chase	Peat	Scaife (forthcoming)
HAR-3723	2360±60	800–200	Higher Moors, Isles of Scilly	Peat	Scaife (1984)
HAR-3724	2540±80	820–410	Higher Moors, Isles of Scilly	Peat	Scaife (1984)
HAR-6186	3350±90	1880–1440	Hengestbury Head	Buried soil	Barton (1992)
NZA-8579	2943±63	1380–970	Latton "Roman pond"	Peat	Mudd *et al.* (1999)
OxA-2998	2370±80	800–200	Market Lavington	Peat	Wiltshire (2006)
OxA-6000	2025±45	170–AD70	Sourton Down	Peat	Straker (1997)
OxA-6008	3275±50	1690–1440	Rough Tor South	Peat at 150cm	Gearey *et al.* (2000a)
OxA-16237	2122±29	350–50	Glastonbury Lake Village	Peat (humin fracton)	J Jones and Tinsley (2007)
OxA-16238	2114±29	340–40	Glastonbury Lake Village	Peat (humic fracton)	J Jones and Tinsley (2007)
OxA-16248	2835±33	1120–900	Sharpham Moor	Peat (humin fracton)	J Jones and Tinsley (2007)
OxA-16249	2809±30	1050–890	Sharpham Moor	Peat (humic fracton)	J Jones and Tinsley (2007)
Q-2464	2890±50	1260–920	SLP - Peat Monoliths, Common Moor, GV34	1.07-1.13m below surface	Coles and Dobson (1989)
SRR-913	2252±45	400–200	SLP - Peat Monoliths, Meare Heath		Coles and Dobson (1989)
SRR-914	2624±45	910–590	SLP - Peat Monoliths, Meare Heath		Coles and Dobson (1989)
SUERC-3624	3550±35	2020–1760	Stannon	Peat	Tinsley (2004)
SUERC-3625	2915±35	1260–1000	Stannon	Peat	Tinsley (2004)
SUERC-3626	2370±35	730–380	Stannon	Peat	Tinsley (2004)
SUERC-9835	2510±35	800–510	Sharpham Moor	Peat (humic fracton)	J Jones and Tinsley (2007)
SUERC-9839	2545±35	810–540	Sharpham Moor	Peat (humin fracton)	J Jones and Tinsley (2007)
Wk-8102	1830±60	AD50–350	North Sands, Salcombe	Peat	Tinsley (2000)
Wk-8103	3130±60	1530–1250	North Sands, Salcombe	Peat	Tinsley (2000)
Wk-10623	2380±60	760–370	Long Breach	Peat	Fyfe *et al.* (2003b)
Wk-11549	3444±34	1890–1680	De Lank	Peat	J Jones *et al.* (2004)
Wk-12941	3085±42	1440–1250	Latton Lands		Stansbie and Granville Laws (2004)
Wk-12942	3076±50	1450–1190	Latton Lands		Stansbie and Granville Laws (2004)

6

Later Bronze Age and Iron Age

Edited by Andrew Fitzpatrick from contributions by Richard Brunning, Andrew Fitzpatrick, Charlie Johns, Steve Minnitt, Tom Moore and David Mullin

6.1 Middle Bronze Age (1500–1000 BC)

Through the end of the Early Bronze Age and the beginning of the Middle Bronze Age the seemingly short-lived settlements of the Early Bronze Age were superseded by more substantial round houses. Parts of the landscape were defined and bounded by field systems. In short, the landscape became domesticated. The agricultural revolution long thought to be associated with the Early Neolithic occurred almost 2000 years later, in the course of the Bronze Age. In most current thinking this domestication represents the key difference between the Early Bronze Age and the Middle Bronze Age and it is fundamental to our current understandings of later prehistory. This period, from the Middle Bronze Age to the end of the Iron Age, is commonly characterised as being dominated, not by temples or tombs, but by settlements.

This assessment of the later Bronze Age is divided between the Middle (1500–1000 BC) and Late (1000–800/700 BC) Bronze Ages, with the emphasis on the Middle Bronze Age as evidence for it is more readily identifiable, and hence better understood.

6.1.1 Chronology

The chronology of the Middle Bronze Age is increasingly well assured. Settlements, burials, metalwork and, increasingly, radiocarbon dates provide a comprehensive framework (Needham 1996; Needham *et al.* 1998). The situation in Cornwall may be seen as typical of much of the South West. Associated groups of radiocarbon dates from settlements such as Trethellan Farm, Newquay (Nowakowski 1991) and individual structures such as those at Callestick (AM Jones 1998–9a) and Trevilson, Mitchell (AM Jones and Taylor 2004) firmly establish that between 1500–1000 cal BC settlements of roundhouses (typically wooden and stone structures set on terraces or in hollows), together with enclosures and fields, were a feature of the lowlands. There is generally a lack of scientific dates for the upland areas from roundhouse sites for this period with the exception of Leskernick (Barbara Bender pers. comm.).

In general radiocarbon dates in the region have been obtained on a site specific basis and there have been few larger schemes, such as the A30 Honiton-Exeter road scheme, that have examined different sites of similar date (Fitzpatrick *et al.* 1999).

6.1.2 Landscape

Some of what have been considered to be "classic" settlements of the British Middle Bronze Age have been found in Dorset and Wiltshire. Sites such as South Lodge in Cranborne Chase (Barrett *et al.* 1991) and Shearplace Hill (Rahtz and ApSimon 1962; Avery and Close-Brooks 1969), both in Dorset, or Thorny Down in Wiltshire (Ellison 1987) have been considered as type sites. Further to the west the site of Trevisker in Cornwall has fulfilled a similar role (ApSimon and Greenfield 1972).

In Dorset and Wiltshire these settlements typically comprise several circular buildings which were accompanied by raised granaries, ponds and fence lines. Sometimes the settlements were enclosed, and some were also surrounded by field systems. In some cases barrows were sited nearby.

A growing number of other settlements can placed alongside these type sites. There is a mixture of enclosed and unenclosed (or open) settlements and at several sites only a single building has been found. Examples from Dorset include Badbury (Papworth 1992), Chard Junction Quarry (Taylor and Preston

2004), Middle Farm, Dorchester bypass (RJC Smith *et al.* 1997), Down Farm (Barrett *et al.* 1991), Poundbury (Green 1987), Eldon's Seat (Cunliffe and Phillipson 1968), Middle Farm, Dorchester, (Butterworth and Gibson 2004), Rowden (PJ Woodward 1991a), and probably East of Corfe River on the Wytch Farm oilfield (Cox and Hearne 1991; Brück 1999a, 164). The settlement at Middle Farm, Dorchester, was apparently unenclosed; at least two roundhouses were set within a field system. Part of what may have been another unenclosed settlement was buried by colluvium and so was not fully explored (Butterworth and Gibson 2004). Comparable settlements from Wiltshire include Bishops Canning Down (Gingell 1992), Boscombe Down East (Stone 1936) and, perhaps, Potterne (A Lawson 2000). Many earlier excavations at enclosed settlements surviving as earthworks examined the enclosures but paid comparatively little attention to the interior (for example, Piggott 1942; 1973a).

The record from Cornwall is also rich. As well as Trevisker (ApSimon and Greenfield 1972), excavations such as at Kynance Gate on the Lizard (I Thomas 1960) and Stannon Down (Mercer 1970) have been complemented over the past 20 years by excavations of settlements of Middle Bronze Age date such as Trethellan Farm, Newquay (Nowakowski 1991), Penhale Moor and Penhale Round (Nowakowski 1993; 1998; 2001), Callestick (AM Jones 1998–9a), Trevilson (AM Jones and Taylor 2004), Pawton (Framework Archaeology pers. comm.), Biscovillack (Cole pers. comm.) and Scarcewater (Andrew Jones pers. comm.). The basic morphology of many other houses has been established by field survey (such as that on Bodmin Moor, Johnson and Rose 1994).

On the Isles of Scilly, Bronze Age settlements on Nornour and Tresco (Butcher 1978; Taylor 2004) as well as East Porth, Samson, Porth Killier, St Agnes, Porth Cressa, St Mary's and Bonfire Carn, Bryher (Ratcliffe and Straker 1996) have also been investigated. On balance, the present evidence suggests that the Isles of Scilly were not permanently settled until the Bronze Age and that the few Neolithic artefacts so far represent seasonal pre-settlement visits from West Penwith (C Thomas 1985; Ratcliffe and Johns 2003).

There is also growing evidence from Devon. At the enclosed settlement of Dean Moor, in the Avon valley on Dartmoor, living, cooking and sleeping areas were identified within buildings, with evidence for grain processing, weaving, and perhaps pottery manufacture (Fox 1957; Fleming 1979, 125). Also on Dartmoor, the Shaugh Moor enclosure, which was completely excavated, contained five stone-walled circular buildings, all of which were, on the basis of phosphate levels and the small quantity of pottery, suggested to be houses. Several timber buildings were also identified (Wainwright and Smith 1980).

Individual buildings were excavated as part of the Dartmoor Reaves Project at Holne Moor, where they lay within the reave system. Both the stone-walled houses and the reaves were found to have had timber predecessors (Fleming 1988).

In east Devon, work in advance of the A30 Honiton to Exeter improvement examined part, or all, of enclosed settlements at Castle Hill, Patteson's Cross and Hayne Lane (Fitzpatrick *et al.* 1999). At Castle Hill a field system was associated with the settlement. The Hayne Lane Middle/Late Bronze Age settlement has been suggested to also have evidence for the pairing of a main house and a smaller outhouse of the sort proposed by Ellison (1981).

In contrast only one Bronze Age settlement in Somerset has been subjected to a large excavation, the coastal site of Brean Down where four phases of Bronze Age occupation were separated by layers of blown sand and hillwash material (Bell 1990). Two of the phases produced evidence of buildings, the earliest (Early Bronze Age) being an oval stone-walled hut, and in the later period two circular huts terraced into the hillside with walls partly of stone and partly of timber.

Other evidence for possible settlements in Somerset comes from finds of pottery and flint rather than structures: at Cannard's Grave (Shepton Mallet), Vinny Combe (West Quantoxhead) and several of the small sand "islands" on the northern edge of the Poldens. The ditches at Southay and Poundisford Park, and the pits at Lower Wilton Farm (Curry Rivel), Odcombe (near Ilchester) and Dimmer are all probably part of Bronze Age settlements but no evidence for houses has been found.

Bronze Age flint and pottery has also been found in Cheddar Gorge in caves such as Chelm's Combe, Soldier's Hole, Sun Hole and Gough's Cave, but there is nothing to suggest that they were occupied for any length of time. Elsewhere in Somerset the sites of the Iron Age hillforts at Ham Hill (Morris 1987) and Cadbury Castle (Barrett *et al.* 2000) have all produced Bronze Age finds.

Larger enclosures

Nearly all Middle Bronze Age settlements can be regarded as individual farms or occasionally, as at Trethellan Farm, of villages. There is little firm evidence for larger settlements but it has been suggested that some larger enclosures acted as regional central places (Ellison 1981). Sites suggested for this category include Norton Camp (Ellis 1989) where a Middle Bronze Age enclosure was discovered defined by a bank and ditch, from which a hoard of eight bracelets and three axes was recovered, and Grimspound, Devon. However, the dating of Norton Camp is not well established (Needham and Ambers 1994). Other examples, though possibly of

Late Bronze Age date, have been suggested to include Hog Cliff Hill in Dorset (Ellison and Rahtz 1987) and Ogbourne Down West in Wiltshire (Piggott 1942) but the evidence is also slight (Needham and Ambers 1994). Apart from the size of the enclosures, there is little to distinguish these sites from other settlements.

Settlement organisation

The pottery found in most of the settlements in Dorset and Wiltshire is of Deverel-Rimbury type and careful studies of the distribution of it and other finds has allowed the recognition of a recurrent pairing of a main house and a smaller outhouse or ancillary building (Ellison 1981; 1987). Building on this work, the meaning of space within settlements has been considered (for example by Ellison 1981 and Barrett 1994a) as has the significance of the, frequently short-lived, occupation(s) of them (Brück 1999a).

In east Devon the smaller building at Hayne Lane had evidence to suggest that it was used for storage, weaving and food preparation. In contrast, evidence for cooking seemed to be found in and outside the larger, probably residential, building (Fitzpatrick *et al.* 1999). In the transect across the east Devon landscape provided by the A30 Honiton to Exeter improvement, the frequent recovery of worked flint, albeit poorly dated, suggests the extensive use of river valleys throughout the Neolithic and Bronze Ages. The charred plant remains from the Bronze Age settlements on this project suggest a regular shifting of settlements within a gradual sequence of woodland clearance, creation of pasture and conversion to arable.

The excavated data from Cornwall also indicate that round buildings were used in different ways (see for example, Trethellan Farm, Penhale Moor and Callestick). Across the lowland landscape, settlements vary in size and form and some, such as Penhale Moor and Gwithian, may have played particular roles in craft specialisation. At Gwithian the first evidence for the manufacture of pottery during the 2nd millennium BC has now been recognised (Nowakowski 2004).

Complete excavation of nucleated sites such as Trethellan Farm has also shown that any divisions between domestic and "ritual" life are artificial with clear evidence for ritual practices involving the closure of buildings and the incorporation of human remains into the "domestic domain" (Nowakowski 1991; 2001). These practices are also recorded at Gwithian (Nowakowski 1989; 2004).

Essentially most of these settlements were inhabited by families or extended families, who were involved with farming (animals and cereals), small-scale secondary metalworking (smithing) and participating in exchange networks with resources such as pottery and stone.

Uplands

In the investigated upland zones of Cornwall a relationship between domestic places and natural rocky outcrops and prominent topographical features has been suggested in the work carried out by Tilley and Bender – principally at Leskernick (Bender *et al.* 1997). Work by Ivor Thomas at Kynance Gate on the Bronze Age and Iron Age roundhouse settlement in the 1950s discovered that the settlement appeared to be arranged around a central pillar or natural outcrop (I Thomas 1960).

In Cornwall there are larger clusters of roundhouses together with their fields, for example at Leskernick (Bender *et al.* 1997), Craddock Moor, Garrow, Stannon on Bodmin Moor (see Johnson and Rose 1994), Trewey Foage (Dudley 1941) and Chysauster (G Smith 1996) in West Penwith. The houses are typically less than 9 metres in diameter, have stone walls, paved thresholds and sometimes have stone-lined drains (such as at Stannon, Mercer 1970).

In comparison with lowland sites, artefacts on these moorland sites are generally notable for their absence. The economic picture would suggest a stock-based pastoral economy. In addition, upland settlements appear to have been left to ruin rather than be formally (and deliberately) abandoned (although see the evidence from Leskernick). There is no evidence for multiple floors, roundhouse refurbishment or middens; this may suggest seasonal land-use during the Middle Bronze Age for some areas of the south-western uplands.

A related pattern might be seen in the evidence from Dartmoor, but there some stone buildings supersede timber ones and a number of stone buildings, for example at Shaugh Moor, appear to have been rebuilt which would also be consistent with seasonal use (Wainwright and Smith 1980).

On Exmoor many roundhouses, sometimes in small settlements of four or five buildings within an enclosure, survive as earthworks (Riley and Wilson-North 2001). By analogy with Dartmoor some may be of Bronze Age date but none has been excavated.

Seasonal occupation may not, however, have been restricted to the uplands or coastal locations. The lowland settlement of Patteson's Cross in east Devon yielded few finds and on the basis of these and environmental evidence it too may have been occupied seasonally (Fitzpatrick *et al.* 1999, 217).

Landscape organisation

For the Middle Bronze Age in Cornwall we have a picture of different landscape zones being occupied in slightly different ways which may be an indication of more varied settled lifestyles: in the uplands, the lowlands and in coastal settings. Equally we

have variety within these zones which suggests that lowland settlements also were varied. Compare and contrast Trethellan Farm (Nowakowski 1991), Gwithian (C Thomas 1958; Nowakowski 2004), Penhale Moor (Nowakowski 1993; 1998) and Callestick (AM Jones 1998–9a). At Gwithian there are well-preserved fields together with plough and spade marks (C Thomas 1958; 1970; Nowakowski 1989; 2004). In the upland zones, roundhouse settlements with fields and enclosures appear to indicate a degree of seasonal use with the absence of artefacts, such as at Stannon (Mercer 1970; AM Jones forthcoming) and possibly Leskernick (Barbara Bender pers. comm.).

Widespread and extensive field surveys at places such as Maen Castle, Sennen (Herring 1994), Bosigran, Zennor, (Herring 1987) and Chysauster, (G Smith 1996): all in West Penwith, together with East Moor on Bodmin Moor (Brisbane and Clews 1979) and St Keverne on the Lizard (Johns 1996), have shown the survival of some field enclosures and banks which are relict rectilinear and co-axial field systems of Bronze Age date. None, however, has been scientifically dated. AMS and radiometric dates from pollen cores, such as that from Rough Tor (Gearey *et al.* 2000a) and Northern Downs, Stannon (Tinsley in AM Jones forthcoming), from the Middle Bronze Age indicate a marked impact on land-use and change on the moorlands from a wooded environment to more open grassland. Most of the Dartmoor reaves are thought to date to this period (Fleming 1987; 1994). These linear land divisions demonstrate the extensive intake of land through boundaries that were set out, perhaps in single operations or piecemeal (Brück *et al.* 2003) over very large areas; some reave systems encompass hundreds of hectares. Although crops were grown on parts of the uplands of Dartmoor, most of the moor seems to have been used primarily for grazing. There is nothing comparable elsewhere in Devon (Silvester 1979), 43–4), though evidence was found for a small coaxial field system around the settlement at Castle Hill and some boundaries were also recorded at Patteson's Cross (Fitzpatrick *et al.* 1999).

In Dorset, Bronze Age field systems have been excavated at South Lodge (Barrett *et al.* 1991), Wytch Farm oilfield, East of Corfe River (Cox and Hearne 1991, 31, 44) where a round house may have stood within the field system, and at Bestwall where a number of apparently isolated houses have been found with a field system (Ladle 2003). The Middle Farm, Dorchester field system included fields, paddocks and droveways, as well as one or more open settlements. How many of the well-preserved celtic field systems that are often thought to date to the Iron Age originated in the Middle Bronze Age is unknown. In Wiltshire, the field systems on Salisbury Plain and Marlborough Downs are thought to originate at this time and it seems that some settlements were enclosed (McOmish *et al.* 2002; A Lawson 2000, 251; Gingell 1992; McOmish 2005).

In Somerset the first evidence for major physical division of the landscape is only really apparent on Exmoor where the traces of the prehistoric landscape have not been masked or destroyed by later activity. Here large areas of prehistoric fields have been identified, consisting of small square or rectangular fields defined by low stone banks, or lynchets where they run across the slope. These field systems are present on Codsend Moor, Hoar Moor, Almsworthy Common, Withycombe Hill, Little Tom's Hill, Great Hill and Honeycombe Hill. They are often associated with small settlements consisting of four or five stone-walled roundhouses, sometimes all contained within an enclosure. None of these fields or settlements has been excavated, so it is not known exactly when they were laid out (Riley and Wilson-North 2001). However, from Codsend Moor and Hoar Moor, pollen evidence has shown that significant clearance of the local woodland for agriculture began in the Middle Bronze Age (Francis and Slater 1990; 1992). This, together with evidence for large-scale Bronze Age land division in elsewhere in the region, suggests that the fields and settlements on Exmoor also originated at this time.

Away from Exmoor, the evidence for land division in Somerset is limited to an earth bank on Brean Down and an extant hedged field-boundary at Shapwick that has been shown to have started as a ditch (and hedge?) in the Bronze Age (Gerrard and Aston forthcoming). Even the wetlands of central Somerset may have witnessed the construction of some physical boundaries, as at Harter's Hill on Queen's Sedgemoor where two or three rows of large oak piles have been traced from the edge of the hill for 100m into the prehistoric wetland with no sign of stopping. Pollen from the Somerset Levels shows that woodland cover was steadily decreasing during the Bronze Age as larger areas were cleared for agriculture. However, there are some short periods when woodland cover was re-established in some places.

The wetlands

The broad valleys of central Somerset were a vast area of wetland during the Bronze Age and the analysis of plant and beetle remains preserved in the peat has allowed us to reconstruct the landscape in this area (Coles and Coles 1986). The Brue valley, where most of the archaeological investigation has taken place, was dominated by a raised bog formed from sphagnum moss, cotton grass and heather. At the eastern end of the valley, and to the south of the Polden Hills on Sedgemoor, the environment was more diverse with wet fen woodland, reedbeds and areas of open water surrounded by sedges in addition to the raised bog.

This wetland environment would have been an important source of food in the form of fish, wildfowl and beavers, and would have provided reed for thatching, wood for making baskets, and otter and beaver pelts for winter clothing. To enter and cross the raised bogs it was frequently necessary to build wooden trackways. Over 19 groups of Bronze Age trackways that span the Bronze Age have been found in Somerset. Some of them are very short, designed to provide sure footing over particularly wet parts of the bog surface; others are several kilometres in length and run from the Polden ridge across the bog to the islands of Meare, Westhay and Burtle.

The most common way of making a trackway was simply to dump armfuls of brushwood down on the bog surface and peg them in place at the sides. The Tinney's Ground tracks are made in this way and represent many phases of trackway construction over a long period always going in the same direction. For other routes, such as the Eclipse track, narrow stems were specially selected to make large hurdle panels which were then laid flat on the bog surface. The most complex structure was the Meare Heath trackway. In the wettest areas on its route the track was built upon a layer of brushwood. On top of this, wooden beams were laid across the line of the track like railway sleepers, and were staked in place through holes at the end of the beams. Split planks were then laid on top of the "sleepers" to form the walking platform.

Burnt mounds

While the interpretation of burnt mounds over much of Britain remains uncertain – cooking places or saunas – some examples in the South West occur within settlements such as South Lodge and Bestwall in Dorset where they do seem to have been cooking places. At Bestwall a range of pots, one of which was very large, appears to have been associated with cooking, perhaps feasting (Ladle and Woodward 2003).

6.1.3 Material Culture

Pottery

In Cornwall Trevisker forms and fabrics dominate the entire Early through to Middle Bronze Age periods (see Parker Pearson 1990). Gabbro clays from the Lizard dominate the ceramic industry, although no extraction or production sites have yet been identified with the exception of the evidence for manufacture now recognised at Gwithian (Nowakowski 2004). The use of Trevisker motifs on vessels for funerary, ceremonial and domestic purposes reveals a very dominant cultural tradition from the Isles of Scilly to Devon. Co-existing with the use of gabbro clays, other fabrics such as local clays and tempers are used for pot manufacture. These have been recognised in funerary vessels such as that from the Early Bronze Age Highgate ritual enclosure (Nowakowski 1998) and granitic wares in domestic pottery assemblages from Penhale Moor (Nowakowski 1998) and Stannon (AM Jones forthcoming).

The relationships between the well-defined Trevisker and Deverel-Rimbury pottery traditions are not well understood. Deverel-Rimbury pottery is well known in Dorset but rare in east Devon though it does occur at Axminster (Quinnell in Weddell *et al.* 1993, 89–92) and assemblages at Castle Hill and the two separate enclosures of Chard Junction Quarry I and II in north Dorset have a mixture of Deverel-Rimbury and Trevisker characteristics (Laidlaw and Mepham 1999; Taylor and Preston 2004). Similarly Trevisker related wares in Somerset, notably at Brean Down (Unit 5B) and Norton Fitzwarren (Woodward in Ellis 1989) also have some characteristics that relate to Deverel-Rimbury wares. Some of these sites also span the transition to plainer Late Bronze Age wares, for example, Castle Hill and Hayne Lane and Chard Junction Quarry I.

In Gloucestershire Middle and Late Bronze Age pottery containing a Malvernian derived fabric has been recovered from Thornhill Farm (Jennings *et al.* 2004) and similar material has also been identified in sites at Cheltenham, Tewkesbury and Sandy Lane. These show exploitation and exchange of the products from the Malvern source much earlier than previously appreciated and the dispersal of its products over a large area.

Flint and Stone

As the Bronze Age progressed flint use became increasingly utilitarian and there is less evidence for special treatment in the Middle Bronze Age (Ford *et al.* 1984; Young and Humphrey 1999). Tool types include a range of scrapers (thumbnail and others), arrowheads (transverse, barbed and tanged), knives and points, but small-blade production continued on a more substantial degree than found in contemporary flint-rich regions. Large "special" forms, such as daggers, are almost non-existent (Lawson-Jones pers. comm.). Most material is likely to have been made from local sources, and chert was also used widely (Fitzpatrick *et al.* 1999, 210–11).

Stone axes ceased to be manufactured and although querns become more frequent as site finds, reflecting the increasing emphasis on cultivation, they have not yet been the subject of a systematic study. Other stone objects include whetstones, rubbers and spindle whorls, as well as metalworking moulds. In so far as it can be assessed, a wide range of stones was used for these objects. A fragment of a granite quern from Cornwall has been found at Bestwall on the Isle of Purbeck (Ladle 2003, 271). Cup-marked stones have

also been found occasionally in "domestic" contexts such as at Trethellan Farm, Cornwall (Nowakowski 1991).

Metalwork

Large numbers of bronze objects have been found in the South West and have been the subject of many studies that have examined the data from different perspectives, often chronological and typological or metallurgical. Notwithstanding the quality of many of these studies (for example, Pearce 1983), they have often been poorly integrated with other areas of investigation, such as the study of other aspects of material culture and the use and deposition of the objects. Nor have the depositional patterns of metalwork in relation to sites and landscapes, including natural features, been explored in detail in the region. The Portable Antiquities Scheme has the potential to contribute to this kind of study, but the data collected to date is, as yet, difficult to access.

There are many regional variations in metalworking but the Middle Bronze Age Somerset tradition thrived to the extent that the main metalworking style in England at this time is called the Taunton phase (Needham 1996). Within Somerset this tradition is represented by numerous hoards from places including Edington, Weare, Spaxton, Wedmore, Badgworth, Norton Fitzwarren, Bishop's Lydeard and Taunton. This phase has, in the past, been called the Ornament Horizon because of the large numbers of metal personal ornaments found in the hoards, including twisted torcs, arm rings, bracelets, finger rings and quoit-head pins (MA Smith 1959). However, the variability within metalworking deposition, even within the South West, is shown by the fact that only a single Middle Bronze Age hoard is recorded from Gloucestershire, from Down Ampney.

Much of this metalwork appears to have been deliberately placed, often as votive offerings. Settlement finds are less frequent but because of the chronological associations that they provide, considerable weight has been placed on them, for example the material excavated by Pitt-Rivers at South Lodge (Barrett *et al.* 1991). Fragmentary copper alloy objects are regular, but rare, finds in domestic contexts for example at Bishops Canning Down, Dean Bottom and Thorny Down in Wiltshire (Ellison 1987; Gingell 1992) and Trethellan Farm (Nowakowski 1991) and Penhale Moor in Cornwall (Nowakowski 1993; 1998). At the last site, small-scale secondary metalworking is likely to have taken place. More unusually, complete bracelets had been placed in the closing deposit at Bestwall, Dorset (Ladle and Woodward 2003).

In Somerset, much of the isolated metalwork has been found in river valleys and can be seen as part of a water-associated cult that became increasingly important towards the Late Bronze Age. The large hoard discovered during peat digging at Edington was placed in a wetland as the wooden box that contained it survived. In contrast there is a noticeable lack of material from the free flowing, and partly tidal, River Severn, with only two metalwork finds recorded from the river in Gloucestershire. This is in contrast with Worcestershire and Shropshire, where more material has been recovered from the river channel (Robin Jackson pers. comm.).

Although Cornwall is rich in sources of tin and copper there is currently no direct evidence of exploitation during the Bronze Age, although hammerstones, principally from museum collections, indicate extraction and mining. Native copper is visible on the cliff faces of the Lizard which suggests that it could have been mined as well as collected from the surface.

Broken stone moulds (found at Trethellan Farm and Gwithian) reveal that small-scale bronze working was a feature of village life (Nowakowski 1991; 2004). A cache of cassiterite (tin) nodules was found at Trevisker while at Tredarvah near Penzance, Trevisker pottery together with scraps of copper alloy objects were found together within a site interpreted as a working hollow (Pearce and Padley 1977). A hollow at Trenowah was associated with Trevisker style pottery and small pits/post-holes containing much cassiterite (Johns forthcoming).

Evidence for metalworking was also recovered from Area F of excavations at the Tewkesbury Eastern Relief Road (Walker *et al.* 2004) where spearhead moulds along with waste material were deposited in a pit.

Wider contacts with continental Europe that may have brought finished copper alloy objects to Britain are evidenced by the two Bronze Age shipwrecks off Salcombe, Devon (Muckleroy 1981). The cargo of one of these boats contained swords that appear to have been made in France. Despite considerable loss through the recycling of objects, goldwork is a feature of the south-west peninsula and hoards comprising bracelets are known from Towednack, Gulval (Middle Bronze Age) and Morvah (Late Bronze Age). The current consensus is that most prehistoric gold objects from Cornwall are of Irish origin (Eogan 1994).

Other materials

Cylindrical clay loom weights are found regularly on settlements, suggesting that weaving was practised widely. Bone points and awls suggest that leather working was also a routine activity. Rare evidence for organic containers comes from the wooden vessels from the Wilsford shaft in Wiltshire (Ashbee *et al.* 1989), interpreted either as a well or as a votive shaft. There is not yet a systematic study of the exploitation of shale from Kimmeridge in prehistory but frag-

ments are found on settlement sites including evidence for shale working at Gwithian (Nowakowski 2004), mirroring the granitic quern from Bestwall Quarry in Dorset and the fragment of shale and Trevisker pot from Kent (Gibson *et al.* 1997).

6.1.4 Farming

In addition to the remains of fields, plough marks, and querns, and increased quantities of colluvium indicating increased cultivation, the evidence for charred plant remains increases in the Middle Bronze Age. Despite this, the quantity of these remains is still small and the number of the sites that have yielded them is also small and their locations scattered. As a result the date and extent of transitions between important crops of cultivation is not yet well understood.

Cereals and plant remains

The principal crops of cultivation were the hulled wheats of emmer and spelt, but emmer is found less frequently in the eastern part of the region, in Dorset and Wiltshire. Spelt wheat can now be seen to have been introduced during this period. Within southern England as a whole, naked barley was replaced by hulled barley at some point in the Middle–Late Bronze Age but it seems likely that naked barley may have continued to be cultivated in the South West for longer than elsewhere (Campbell and Straker 2003). One of the best assemblages from a settlement is from Trethellan Farm where the remains of naked barley and hulled barley together with wheat, oats, small quantities of flax, and the occasional celtic bean were found (Straker in Nowakowski 1991).

This range of cereals has also been found in smaller quantities at other lowland sites in Cornwall, such as Trevilson (J Jones in AM Jones and Taylor 2004) where a large range of wild plants, including seeds of hedge mustard (*Sisymbrium officinale* (L.) Scop) which may have been purposefully gathered for its oil producing qualities, were identified (Straker in Nowakowski 1991). Elsewhere in Cornwall, indirect pollen of the oats or wheat type (*Avena-Triticum*) identified from a peat sequence from the De Lank river and dated to the Early/Middle Bronze Age shows that areas on the north-western edges of Bodmin Moor may have been cultivated (AM Jones and Tinsley 1999–2000).

At Castle Hill, the dominant cereal was emmer, with spelt (which has often thought to have been a Late Bronze Age introduction) and bread wheat also recorded, as were flax and peas. Possible uncultivated sources of food were hazel, sloe, bramble and pignut (Clapham in Fitzpatrick *et al.* 1999). A single grain of barley was recovered from Chard Junction Quarry I in Dorset. Little could be said of the small assemblage from Down Farm, Dorset (just 11 identifiable cereal grains) beyond that it contained wheat and hulled barley (Barrett *et al.* 1991) and this small quantity is typical of other sites on the chalk.

On Middle Bronze Age settlements there is little clear evidence for the storage of cereals in pits. In Cornwall the wide range of vessel types in the domestic Trevisker series would seem to indicate that storage within pots, or other vessels made from perishable materials, was the cultural norm. This is supported by lipid analysis of the Trethellan Farm assemblage that indicates the importance of dairying (Copley *et al.* 2005). Three and four post structures, which may well have been used for storing grain, have been found at a number of settlements: Castle Hill and Hayne Lane in east Devon, at Chard Quarry Junction II and Down Farm in Dorset, and at Thorny Down.

Livestock

The varied geology of the region means that the preservation of animal bone varies markedly. In Cornwall bone is generally poorly preserved at Bronze Age sites and in Devon it is all but absent. Where bone has survived, such as in Middle Bronze Age contexts at Trethellan Farm (Nowakowski 1991) and Gwithian, (C Thomas 1958) it indicates animal husbandry with cattle, sheep/goat and pig. Wild and even partial domesticates such as Red deer (*Cervus elaphus*) have also been found in these contexts. The gathering of wild marine resources, molluscs and fish, is a feature of coastal settlements such as Gwithian and to a lesser degree at Trethellan Farm.

At Brean Down the domesticated animals were mainly cattle, sheep and pigs in addition to a small number of dogs, horses and a single cat. Wild food included deer, shellfish, birds and fish. At Middle Farm, Dorchester bypass, sheep were slightly more frequent than cattle, and these two species dominated the assemblage (RJC Smith *et al.* 1997) but not far away at Down Farm, cattle predominated followed by sheep. Pig were uncommon and deer rare. Although the sample was small, it was suggested that dairying may have been important in cattle husbandry (Barrett *et al.* 1991) and the evidence for this is much stronger at Bishops Canning Down and Dean Bottom on the Marlborough Downs (Gingell 1992, 141–2).

Fishing and marine resources

Large quantities of marine resources (shellfish and estuarine species) have been excavated in Bronze Age contexts at Gwithian as has a large quantity of worked bone points and needles that provides indirect evidence for fishing along with waisted, elongated, flat pebble-tools that have been interpreted as line-winders. This would imply both deep-sea as well as shoreline fishing going on at the site (Nowakowski 2004). At Brean Down on the Severn estuary, shellfish and fish were also eaten. In general, fish bones do

not preserve well so it is likely that they are under-represented, even on soils that preserve mammal bone reasonably well.

The evidence for saltmaking at Brean Down is amongst the earliest in Britain (Bell 1990) while some fragments of briquetage have been identified within the Bronze Age layers at Gwithian (Nowakowski 2004) and some probable fragments have been found at the Trevilson roundhouse (AM Jones and Taylor 2004).

Transport

It is likely, given the movement of raw materials and objects of stone, flint and chert, shale, gabbro clays, copper and tin, that the sea and rivers constituted major routeways during this entire period. No evidence of boats has been found in the region, though elsewhere in Britain sewn-plank boats have been shown to date to this time (Van de Noort 2006). That the sea was certainly used for wider contacts is shown by the two Bronze Age shipwrecks off Salcombe (Muckleroy 1981), the cargo of one containing swords that appear to have been made in France.

6.1.5 Mortuary Practices

Middle Bronze Age funerary practices flow from those of the Early Bronze Age, with cremation burials becoming frequent. There is a distinction between the south-west peninsula and areas to the east.

In Cornwall and Devon virtually all of the radiocarbon dates currently available from barrows fall within the Early Bronze Age; there are no dates from the adjoining parts of west Dorset and west Somerset. Only a very small number of burials (3) have been dated to the Middle Bronze Age: a small barrow at Batton Down, a small ring cairn at Swallowmead, and a flat burial at Rose Ash, all on Exmoor. However, there is also a small number of what may be typologically late Trevisker style vessels known from Cornwall, Devon and Somerset that are not recorded as having come from barrows, yet their complete condition suggests that they derive from burials.

Although the chronology of Trevisker and related wares continues to emerge, and the number of radiocarbon dated sites is small, there is a clear emphasis on the Early Bronze Age for Cornish barrows (Christie 1988; Quinnell 1988; 1997).

Many ring cairns, not all of which need be funerary, are associated with barrow cemeteries. A ring ditch at Markham Lane, Exeter belongs to this period (Jarvis 1976), as may others (Simpson *et al.* 1989), and these may be the earthen equivalents of ring cairns.

This stands in contrast to the well-known barrow and flat cemeteries associated with Deverel-Rimbury pottery in Dorset. Here urned and unurned cremation burials, often in large numbers, were frequently made to the south and east of barrows, many of which date to the Early Bronze Age. Well known sites include the eponymous cemeteries, and Knighton Heath, Latch Farm and Simons Ground, the last three located near Poole and Christchurch harbours (Piggott 1938; Calkin 1962; Barrett *et al.* 1991; White 1982). Similar evidence comes from Wiltshire, where the burials were sometimes accompanied by biconical urns, such as at Shrewton 5a (Green and Rollo-Smith 1984) and Woodford G12 (Gingell 1988). Although less frequent, there is comparable evidence from Gloucestershire where the cremation burials at the cemetery around the margin of Bevan's Quarry round barrow (O'Neil 1967) were contained in Deverel-Rimbury style urns. A small enclosed cremation cemetery at Shorncote Quarry (Barclay *et al.* 1995) also contained at least 15 Deverel-Rimbury Bucket Urns. Some of these cemeteries are in close proximity to contemporary settlements (Bradley 1981).

The same might be thought to apply in Somerset but there have been no significant excavations in the last 30 years. Surviving barrows, which can only be surmised to have continued in use in to the Middle Bronze Age, are mainly concentrated on Mendip, Exmoor and the Quantock Hills, in addition to a small group from the Blackdown Hills.

However, not all the people of the Middle Bronze Age were buried in barrows. Apparently isolated unurned cremation burials are also found, such as at Thomas Hardye School, Dorchester (RJC Smith 2000), while unaccompanied crouched inhumations have been identified at Middle Farm, Dorchester bypass (RJC Smith *et al.* 1997, 80), in Cranborne Chase (Barrett *et al.* 1991, 173–4, 211–4) and not far away at Old Sarum (Powell *et al.* 2005). At Mendip Lodge Wood, Priddy there were 70 to 80 pits many of which contained cremation burials, some of which were accompanied by urns (Read 1923; 1924). These flat burials, both cremation and inhumation, may represent a more common but less easily detected rite. That there were other ways of disposing of the dead is suggested by the recovery of Bronze Age skulls from the Severn Estuary, in particular in the intertidal zone on the Welsh side of the river (Bell *et al.* 2000). On the English side, a skull was recovered from Avonmouth Docks in the early 20th century, which may have been associated with the deposition of a rapier (Bell *et al.* 2000, 72). The recovery of skulls, the most recognisable part of the human body, from wetland and riverine contexts in the Middle and Late Bronze Age is becoming increasingly recognised across Britain and appears to have formed one aspect of mortuary practices during this period (Wells and Hodgkinson 2001).

6.2 Late Bronze Age 1000–*c.*700 BC

6.2.1 Chronology

The Late Bronze Age has been defined primarily in relation to metalwork (Needham 1996) and there is an abundance of metalwork hoards. In some ways this can overemphasise changes from the Middle Bronze Age as there is much continuity. However, the Late Bronze Age is less well-known and this assessment attempts to briefly highlight the differences from the Middle Bronze Age.

In part these differences are due to the weakly developed chronology of the phase which makes material of this period difficult to identify, and in many ways this is a product of changes in funerary practices. In contrast to the Early and Middle Bronze Age, Late Bronze Age burials with accompanying grave goods are very rare. Part of the explanation also relates to changes in pottery styles to less distinctive pots. The term "Post Deverel-Rimbury Plain Wares" is dull, and so are many of the pots it describes. It is also possible that pottery was used less extensively than in the Middle Bronze Age.

Many settlements also appear to have been unenclosed, making them harder to locate, while in the uplands of Cornwall, and perhaps Devon also, there was an apparent "abandonment" *c.*1000 BC, possibly due to a major change in the organisation of land tenure resulting in the creation of "commons" of upland grazing, perhaps caused by climatic deterioration (Herring forthcoming; Quinnell 1988; 1994).

As a result there are few closed and well-dated groups on which to build a dated sequence of pots. Such a sequence is now slowly being established from settlement contexts but there are few long stratigraphic sequences that have what would now be regarded as sufficient radiocarbon dates. The Late Bronze Age sequence at Cadbury Castle, is well documented and studied (Barrett *et al.* 2000), but it was excavated before radiocarbon dating became routine, while the well-stratified sequence at Brean Down also has relatively few dates.

6.2.2 Landscape

The apparent abandonment of the uplands in Cornwall is echoed in changes on the chalk downlands of Wessex. In Wiltshire, large ditches and banks that often run for great distances, the so-called "Wessex Linear Ditches", cut across Middle Bronze Age field systems (Bradley *et al.* 1994; McOmish *et al.* 2002; Birbeck 2006). Small enclosures that are sometimes associated with the linear ditches, and which contain few features, may be cattle pounds, but morphology is not a reliable guide as some sites that had been thought to be "cattle kraals" have proved on excavation to be settlements (Gingell 1992). It is possible that, in part, these changes may reflect a greater emphasis on cattle. Considerable emphasis has been placed on the role of cattle as a means of displaying status in the Late Bronze Age (for example, by Barrett *et al.* 1991) and the very large faunal assemblage from Potterne is dominated by cattle bones (A Lawson 2000). Due to the small sample available, it is not possible to identify any changes from the crops grown in the Middle Bronze Age, though it is possible that that the change from naked barley to hulled barley happened during the Late Bronze Age.

6.2.3 Settlement

For the reasons given above, Late Bronze Age settlements have proved difficult to identify. However, in Cornwall, an ongoing review of pottery by Henrietta Quinnell is identifying more Late Bronze Age sites, some of which such as Maen Castle, St Michael's Mount and Trencrom are defended, or at least enclosed. Recent work at Threemilestone near Truro has also produced evidence of Late Bronze Age activity but in a lowland and undefended/unenclosed situation (Gossip and Jones forthcoming).

A Late Bronze Age radiocarbon date and pottery from Trevelgue Head indicates activity in coastal zones during the earlier part of the 1st millennium BC (Nowakowski and Quinnell forthcoming). There is also a Late Bronze Age pit at Killibury, immediately preceding the first phase of enclosure (Miles 1975a), and a Late Bronze Age phase at Bodrifty (Dudley 1956), suggested by some of the pottery, which both indicate activity that has otherwise been hard to characterise. There are similar difficulties in interpreting the remains at Dainton (Silvester 1979; Needham *et al.* 1980) and at Mount Batten, Plymouth, where the settlement evidence is fragmentary, despite the large quantity of contemporary metalwork from the site (Cunliffe 1988). There is also some evidence for buildings, and associated metalwork from Cadbury Castle which predates the establishment of the hillfort (Barrett *et al.* 2000). The Late Bronze Age activity at Brean Down on the Somerset coast is well published and to be understood in the wider context of the exploitation of coastal resources (Bell 1990; Bell *et al.* 2000). Eldon's Seat in Dorset also lies close to the coast and has a similarly long occupation sequence, stretching back to the Middle Bronze Age (Cunliffe and Phillipson 1968).

Extensive excavations provide some hints as to what might be expected in some inland areas. At Shorncote, activity with numerous circular buildings extended over 10ha with no apparent single focal point (Hearne and Heaton 1994; Hearne and Adam 1999). In contrast there is little evidence for settlements on the Cotswold limestone. This may relate

to differing practices in the two areas: the upland being used for seasonal grazing, for example, but the relationships between the upland and lowland sites of this period are not well understood. The four round houses at Dunch Hill, were unenclosed (Andrews 2006) and, in what may be a similar disposition to Shorncote, a small number of seemingly isolated round houses have been found at Coburg Road, Dorchester (RJC Smith *et al.* 1992).

A few well-defined sites are known. In Devon, the enclosed Hayne Lane Middle/Late Bronze Age settlement has been suggested to show evidence for the pairing of a house and smaller outhouse (Fitzpatrick *et al.* 1999), while the enclosed settlement at Chard Junction Quarry II appears to have been similar. At both Hayne Lane and Chard Junction Quarry I it was difficult to distinguish Middle and Late Bronze Age phases, though whether this was due to one single, long, phase or separate but identical phases deliberately sited one on the other is not clear.

Elsewhere in southern England, the Late Bronze Age origin of some hillforts has been demonstrated but in the South West the situation at sites that have been suggested as large enclosures is not clear. The internal arrangement of the enclosures at Hog Cliff Hill (Ellison and Rahtz 1987) is not well understood (Needham and Ambers 1994) and there is little material that is certainly pre-Iron Age.

What appears, on the evidence currently available, to be a quite localised type of site is represented by a distinctive series of midden sites between Salisbury Plain and the Marlborough Downs. These contain prodigious quantities of material. At Potterne, the most fully examined of these sites, excavation of less than 1% of the 3.5ha deposit, which is up to 2m thick, yielded over 1 tonne of pottery and 135,000 animal bones. The preferred interpretation of the Potterne deposit is as the build up of material in cattle pounds, including the deliberate dumping of settlement debris, over a period of 500 years (A Lawson 2000). An explicitly ritual interpretation has been preferred for the vast quantities of similar material at nearby East Chisenbury, where the deposit covers 3.5–4ha and is 200m across (G Brown *et al.* 1994; McOmish 1996). Although similar sites are known elsewhere in Britain, the only concentration of them is in north Wiltshire.

6.2.4 Burials

Cremation was practised less regularly in the Late Bronze Age, and formal inhumation burial is rare. There are, however, indications that methods of disposing of the dead which included the burial of only parts of the body, and which are well-known in the Iron Age, were practised in the Late Bronze Age. Recent work also hints at a greater variety in mortuary practices.

Fragmentary human remains have been found in Late Bronze Age contexts at Dainton (Needham *et al.* 1980): 179), Brean Down (Bell 1990, 238), Burderop Down and Rockley Down (Gingell 1992), East Chisenbury (G Brown *et al.* 1994) and Potterne (A Lawson 2000) and at Chalbury Camp (Whitley 1943, 103) and perhaps Down Farm (Barrett *et al.* 1991, 214). These fragmentary remains are thought to derive from excarnation and similar finds are known from a number of sites that date to the Bronze/Iron Age transition with perhaps a slight emphasis on those of Iron Age date (Brück 1995).

Occasional inhumation burials that may date to the Late Bronze Age are also known, such as at Tinneys Lane, Sherborne (Pearce and Reed 2003) and a very poorly recorded burial at Hendford Hill, Yeovil (Taylor and Collingwood 1926, 231–2).

The peat of the Somerset moors is normally so acidic it destroys bone material, but at Greylake on Sedgemoor it is less acidic and human bones from the Late Bronze Age have been found accompanied by sheep jaw bones, pottery and a bronze axe in what was then an area of shallow water, surrounded by sedges and reeds. The site was marked out by oak posts which projected above the water.

At Huntsman's Quarry (Patrick Foster Associates 2000), the primary fills of two small penannular ring ditches (external diameters 5.25 and 6.1m) contained fragments of human bone dated to 1260–840 cal BC (GU-4782) and 1270–910 cal BC (GU-4745). The dates encompass the Middle and Late Bronze Age but as Middle Bronze Age cremation burials are known from Gloucestershire, for example at Shorncote where a similar, but undated, small ring ditch was also found (diameter 4m, Barclay *et al.* 1995), a date in the Late Bronze Age for Huntsman's Quarry remains seems possible.

6.2.5 The material world

Pottery

Late Bronze Age pottery is less highly decorated and less abundant that Middle Bronze Age material. Known as Post-Deverel-Rimbury Plain Wares, these pots are often simple and large bag- or bucket-shaped urns. They are best known from Brean Down Unit 4, Cadbury Castle, and Potterne, which provides some of the largest stratified groups. In contrast, the quantity of pottery from the extensively excavated sites at Hayne Lane and Shorncote is small, suggesting that vessels made from wood or leather may have been more important in this period than in the Middle Bronze Age. A very rare, and large, find of potting debris was found at Tinneys Lane, Sherborne (Pearce and Reed 2003).

Other categories of material

Most of the materials used in the Middle Bronze Age such as querns, whetstones, bone tools and bangles made from Kimmeridge shale, continued to be used. Flint was used throughout the Late Bronze Age but, in common with the rest of southern England, it was less sophisticated than in earlier periods (Ford *et al.* 1984) and seemingly less frequent. Amber beads, of material from East Anglia or further afield, appear more regularly and glass beads, perhaps imported from continental Europe, appear for the first time but are very rare (A Lawson 2000). There is evidence, in the form of briquetage, for Late Bronze Age saltmaking on Lundy (Quinnell 2004b).

Metalworking

As with the Early Bronze Age, tin streaming and working are assumed to have been practised, though actual evidence is again slight (Pearce 1983; Penhallurick 1986). However, metallurgical analyses suggest that metal from the South West continued to form part of the metal pool along with metal brought from across the Channel, the latter demonstrated most clearly by numerous finds of imported Armorican axes which may have served as ingots or a form of currency (Northover in Cunliffe 1988). In Cornwall, copper ingots are known from Kenidjack, Gillan (Tylecote 1967) and St Michael's Mount (Herring 2000).

The deposition of large quantities of metalwork in hoards is a characteristic of the Late Bronze Age. A Somerset metalworking tradition again gives a name to one of the metalworking phases: the Stogursey phase. The type-hoard was found in 1870 and consisted of 20 sword fragments, 29 socketed axes, 37 fragments of socketed axes, two palstaves, two gouges, two daggers, a chape, 20 complete or fragmentary spearheads and 34 bronze fragments.

Other hoards include the one from the interior of the hillfort at Nottingham Hill, Gloucestershire which appears to have been deposited in a wooden box (Hall and Gingell 1974).

Many very valuable artefacts, such as the two swords from Pitney, Somerset, were undoubtedly deposited in very wet environments. It is only at Greylake that a structure has been found with such metalwork, but this may be because the bronze objects from the river valleys are almost always chance finds rather than from excavations. The most impressive recent discovery has been the large ceremonial bronze shield excavated at the foot of Cadbury Castle hillfort. It had been ritually "killed" by repeatedly driving another object through it (Coles *et al.* 1999).

Metalworking can be demonstrated at Mount Batten, Plymouth (Northover in Cunliffe 1988) and a single cassiterite pebble was found at Dean Moor (Fox 1957) but fragments of the clay moulds used in casting are being identified increasingly frequently in settlement contexts. Sometimes these form large deposits, as at Dainton (Needham *et al.* 1980), but more frequently they are represented by a few pieces, often for swords or spears. Occasionally they appear to have been buried deliberately, as at Threemilestone (Gossip and Jones forthcoming), but they can also be refuse, for example at Threemilestone (Gossip and Jones forthcoming), Tinneys Lane, Sherborne, Sandy Lane, Leckhampton and Shorncote (Leah and Young 2001; Hearne and Adam 1999).

Stone moulds also continued to be used and are occasionally found on settlement sites, for example at Burderop Down, Wiltshire (Gingell 1992; Needham 1981). Fragments of copper alloy objects occur in small quantities on many settlements, such as Burderop Down, while gold objects found at Brean Down and Potterne reflect an increase in the archaeological visibility of gold at this time. At Potterne, small numbers of lead and iron objects were found in Late Bronze Age contexts and provide evidence that iron working was begining in this period. The iron objects are often fragmentary, and also small, making their uses difficult to identify. However, it was not until well into the Iron Age that iron was used regularly for large objects.

6.3 The Iron Age (*c.*700 BC–AD 43)

Throughout the 20th century Iron Age archaeology in the South West was predominantly focused on forts, reflecting a wider perception of these as the focus of Iron Age settlement and social organisation. Although resulting in substantial research on these monuments there was far less investigation of lowland sites and this is reflected in the often limited discussion of non-hillfort settlement in surveys of the 1980s.

Since 1990, one of the major impacts of PPG16 on the archaeology of the 1st millennium BC has been to shift the geographic focus of archaeological investigation and to demonstrate a significant increase in the quantity of evidence when compared to the Bronze Age. As a result, the differences within the region, for example, settlement form and land use, have become more apparent and have been set out in the recent assessment *Understanding the British Iron Age: An Agenda for Action*, prepared by the Iron Age Research Seminar(Haselgrove *et al.* 2001).

6.3.1 Chronology

In contrast to the Late Bronze Age, Iron Age chronology is relatively well-established, drawing on a mixture of pottery, metalwork and radiocarbon dates. Most recent syntheses have divided the Iron Age into three phases: Early, Middle and Late (Cunliffe 2005).

However, the chronology of the 1st millennium BC is far from straight-forward, partly due to the differing pottery classifications that have been used for major assemblages. Additionally, in many instances, variations in the adoption and use of material culture, settlement patterns and landscape differences mean that chronological boundaries are likely to vary from region to region and even site to site.

The plateau in the radiocarbon calibration curve in this period creates further problems, with dates from early 1st-millennium BC sites that are often relatively broad, spanning many centuries.

Determining the transition from the Late Bronze Age to the Early Iron Age is also more difficult than might first appear. Recent reviews suggest the Late Bronze Age ended *c.*800 BC with an "earliest" Iron Age from 800–600 BC (Needham *et al.* 1998; Needham 2007) although there are, however, seemingly many similarities between the two periods, primarily in the forms of settlements; this may also account for some of the difficulties in identifying Late Bronze Age activity.

A two-fold division of the Iron Age into Earlier and Later has been used by a number of recent writers. This is largely due to a need to revise the dating of the transition from the Early to the Middle Iron Age. For example, assessment of radiocarbon dates associated with pottery of "Middle Iron Age form" from the Severn-Cotswold area indicates that the traditional date of *c.*450–400 BC for the transition may be too early and that a date around the middle of the 4th century BC is more realistic (Moore 2007). Similar comments have been made about Cornwall where Quinnell divided the Cornish Iron Age into an Earlier Iron Age, to *c.*400 BC, and a Later Iron Age (Quinnell 1986, 112).

Aspects of settlement also changed from the 4th century BC onwards. Smaller enclosed settlements appeared, as did more ostentatiously defended forts, with the less complex early hillforts apparently declining. All of these changes indicate potentially widespread changes in society around the 4th century BC. This modification of the chronology of the Iron Age between an Earlier and Later Iron Age also reflects a redefinition of the beginning of the Middle Iron Age in other parts of southern Britain (Cunliffe 2005).

This period from the 4th century BC to the 1st century AD is increasingly referred to as the "Later" Iron Age rather than the Middle Iron Age identifying the "Late" Iron Age only as a specific, cultural element of the 1st centuries BC/AD. The reasons for this are the continued use of Middle Iron Age handmade pottery forms into the late 1st century AD in many areas and the limited presence of what have traditionally been seen as Late Iron Age attributes, such as imported Roman pottery. It is increasingly apparent that recent definitions of the Late Iron Age largely reflect changes in the south-east of England which were, in many ways a cultural phenomenon, restricted to a selection of communities, as much as a chronological shift.

For the purposes of this assessment the end of the Iron Age is taken to be marked by the Roman conquest, though both the date and nature of conquest varied across the South West, as did the processes of Romanisation (both before and after the Conquest).

The quality of local chronologies to assess the extent of these changes in the South West varies markedly, partly due to the variable size of collections (Morris and Champion 2001). Dorset has produced a number of key assemblages, such as the Early Iron Age material from Eldon's Seat (Cunliffe and Phillipson 1968) but perhaps more importantly, large groups from sites that were occupied over several centuries, such as Gussage All Saints (Wainwright 1979a), Hengistbury Head (Cunliffe 1987) and Maiden Castle (Sharples 1991a). Cadbury Castle provides a similar key sequence in the south-east of Somerset (Barrett *et al.* 2000; Clarke 2001), complementing to some extent the Bronze Age sequence from Brean Down (Bell 1990). Early material from Wiltshire has been well studied on account of the pottery from the distinctive midden sites such as All Cannings Cross (Cunnington 1923), East Chisenbury (G Brown *et al.* 1994; McOmish 1996) and Potterne (A Lawson 2000) which straddle the Bronze Age–Iron Age transition.

The quality of absolute dating is, however, varied. There is an increasing number of radiocarbon dates from Dorset, Gloucestershire and Somerset, some of which provide useful short sequences (for example, Mudd *et al.* 1999), but there are no well-dated stratified sequences of dates, and there are very few dates from Devon (Fitzpatrick *et al.* 1999). In Cornwall there are also small groups of dates from sites such as Trevisker (ApSimon and Greenfield 1972), Penhale Point (G Smith 1988a), Carn Euny (Christie 1978), Trenowah (Johns forthcoming) and the Bryher (Johns 2002–3).

These can now be complemented by a dated sequence from Trevelgue Head that spans the entire range of south-western decorated wares. This is the largest Iron Age assemblage in Cornwall and the 19 dates, most of which fall within the 4th to 1st centuries and are all on carbonised residues on pots, form the largest group from a south-western site. The dating of the Trevelgue assemblage represents a major advance in our current understanding of pottery manufacture and technology in the region (Nowakowski and Quinnell forthcoming).

Figure 6.1: *Iron Age roundhouse being excavated at Threemilestone, Truro in 2004. Photo: James Gossip, Cornwall County Council.*

6.3.2 Settlements

While Iron Age studies have traditionally focused on hillforts, it has become increasingly clear that southern Britain was primarily a land of farmers. Wherever the environment could support it, the landscape was typically one of arable, pasture and managed woodland, dotted with farmsteads. When viewed in relation to the Bronze Age, there is more diversity across the region and the differences may be seen more clearly.

Cornwall

The characteristic Cornish Iron Age sites are enclosed settlements known as rounds, open settlements such as Chysauster and Carn Euny, subterranean passages known as fogous, cliff castles, hillforts with stone defences such as Chun and Trencrom or with multiple widely spaced ramparts such as the two sites called Castle an Dinas and also Warbstowbury.

Settlement studies have focused on prominent enclosures such as rounds, hillforts and cliff castles rather than the less easily detected unenclosed settlements. However, evidence from West Penwith suggests that there were also large numbers of open settlements; a suggestion borne out by the results of the National Mapping Programme which has identified several likely open settlements in the Camel estuary area. This has been reinforced by the excavation of an unenclosed Late Iron Age settlement at Threemilestone which has evidence for the planned layout of houses. There are several rounds nearby, one of which has been excavated and appears to be contemporary with the unenclosed settlement (Schweiso 1974; Gossip 2005).

Rounds were in use from the beginning of the Later Iron Age to at least the end of the Romano-British period, although most excavations indicate that rounds are predominantly Roman in date. Geophysical surveys and aerial photographs have shown that rounds were often embedded in field systems and were presumably farms. The only completely excavated round is Trethurgy, where the activity is mainly Roman (Quinnell 2004a), but the round at Threemilestone has been shown to be Iron Age. Some of the excavated rounds also contain extensive evidence for metalworking (see, for example, Cole forthcoming; Lawson-Jones 2003).

While open settlements such as Threemilestone and Bodrifty in West Penwith may be typical, enclosure was still important as the so-called pound wall at Bodrifty is thought to have been added to the site *c.*150 BC.

Fogous are mainly restricted to West Cornwall and the Meneage part of the Lizard peninsula (Christie 1979; Gossip forthcoming; Startin forthcoming). There are three traditional interpretations of their function: storage, ritual or refuge (Maclean 1992), and all three may be relevant. Pottery indicates that they may date to the 5th century BC though they are usually associated with settlements or rounds that are later in date.

Devon

In Devon, the relatively abundant Bronze Age evidence on Dartmoor has tended to overshadow how little is known of its Iron Age (Silvester 1979; Fitzpatrick *et al.* 1999, 218). Rural settlements in particular, are poorly known. On Dartmoor Kestor is probably of Early Iron Age date (Fox 1954a;b) but the first securely dated settlement, at Gold Park (Gibson 1992), was only excavated in the 1980s. Sites elsewhere are sparse; there are finds from Foale's Arrishes (Radford 1952) but excavations at Milber Down (Fox *et al.* 1949–50) examined little of the interior, and the Holcombe settlement (Pollard 1974) dates to very late in the Iron Age. Both the Gold Park and Kestor settlements lie within extensive field systems that also contain a number of pounds or enclosures.

Between them, the three Iron Age settlements found on the A30 Honiton-Exeter Improvement in lowland east Devon span much of the Iron Age. The settlement at Blackhorse was occupied for several centuries, originating as an open settlement before its final Late Iron Age enclosed phase. Langland Lane and Long Range were both open settlements. Although the quantity of material culture from these farms is not as great, these sites appear to have more in common with sites to the north and east than with Cornwall (Fitzpatrick *et al.* 1999).

Somerset

The situation in Somerset is similar as, with the notable exception of the Lake Villages, relatively little is known about non-hillfort settlements. However, extensive field survey around Cadbury Castle together with aerial photographs, suggest a great density and variety of Iron Age settlements (Tabor 2004a), echoing the conclusion of work on sites on the levels (Miles and Miles 1969).

Some sites such as Bradney, Bawdrip, were enclosed by a bank and ditch but most of the published evidence comes from open settlements. The example at Christon, which was badly damaged by construction before its recording, is perhaps the most extensively published non-wetland settlement, but because of the circumstances of discovery most of the data comes from pits (Morris 1988). In contrast a small 6th–4th century settlement or farmstead with four roundhouses that lay within an open environment, probably of grassland, is known at Cannard's Grave, Shepton Mallet (Birbeck 2002). There also is fragmentary evidence for other settlements from excavations of sites of later date, for example at Camerton (Wedlake 1958), but others have been identified because of the presence of storage pits such as those along the Ilchester-Odcombe pipeline (Newman *et al.* 2001), and such settlements are likely be increasingly recognised in development-related work.

Gloucestershire

In Gloucestershire, in addition to the wealth of new material provided by developer-funded archaeology, a number of significant research projects have come to fruition. These include the important excavations at Frocester (Price 2000) and the first volume of the report on the hillfort at Crickley Hill (Dixon 1994).

The upper Thames valley has seen the greatest amount of excavation with large-scale stripping for gravel extraction enabling unenclosed settlements and Late Bronze Age/Early Iron Age landscapes to be examined. Unenclosed settlements of Early Iron Age date exist around Lechlade at Roughground Farm (Allen *et al.* 1993), Butlers Field (Boyle *et al.* 1998), Sherborne House (Bateman *et al.* 2003) and The Loders (Darvill *et al.* 1986). These sites comprise single roundhouses, most commonly post-built, and lie within field systems. In many cases these settlements were associated with pit alignments and ditches.

In the Severn valley, excavation at Hucclecote has revealed an unenclosed settlement, with radiocarbon dates ranging between the 8th and 4th centuries (A Thomas *et al.* 2003, 30). In addition, there are fragmentary hints of Early Iron Age occupation at Frocester (Moore 2006b; Price 2000), Saintbridge (Darvill and Timby 1986), Crypt Grammar School, Gloucester (Dunning 1933) and Dumbleton (Coleman and Hancocks forthcoming; Coleman *et al.* 2003). On the western side of the Severn our understanding of the Early Iron Age of the county is poorer.

Other early settlement on the Cotswolds consists of possibly unenclosed, sites at Stables Quarry and Kings Beeches (Gray and Brewer 1904; RCHME 1976, 107; Piper and Catchpole 1996). Recent excavations of an apparently unenclosed Early Iron Age settlement at Bourton-on-the-Water (Barber and Leah 1998; Nichols 2001a;b; Piper and Catchpole 1996) may emphasise the unenclosed nature of most non-hillfort settlement in the region. The location of the Bourton site reflects those in the Thames and Severn

valleys: it is located on a gravel terrace above the floodplain of the River Windrush.

Through excavation, cropmarks and fieldwalking, we now have a picture of a densely settled region in the Later Iron Age. Small, household-sized enclosures (less than 1ha in size), usually rectilinear in shape, became increasingly common and are found throughout the region, particularly on the north Cotswolds and in the Severn valley (Moore 2006b). A number of such enclosures have seen excavation, most extensively at Frocester (Price 2000), and at Birdlip (Parry 1998), Guiting Power (Saville 1979), The Bowsings (Marshall 1995) and Preston (Mudd *et al.* 1999). Dating evidence from these sites and comparison with similar enclosures in southern Worcestershire (Moore 2007) suggests that they appeared from the 4th century BC onward, with many being occupied into the 1st century AD and some, like Frocester, continuing into the Roman period. In some areas these appear to form distinct clusters of enclosures, for example near Birdlip and in the Temple Guiting area, stressing that many of these enclosures were part of larger communities or occasionally shifted across the landscape (Moore 2006a).

The evidence from the upper Thames valley also indicates a densely settled and intensively farmed landscape, predominantly of unenclosed settlements that are known from cropmarks (Hingley and Miles 1984). Excavated examples include Cleveland Farm at Ashton Keynes (Coe *et al.* 1991), Warren's Field, Claydon Pike (Miles *et al.* 2007; Hingley and Miles 1984) and Thornhill Farm, Fairford (Jennings *et al.* 2004; Palmer and Hey 1990). Even on these unenclosed sites, there appears to have been an emphasis on bounding the household community with large, visibly impressive enclosure ditches around a number of houses, for example at Warren's Field (Miles *et al.* 2007; Hingley and Miles 1984) and Stubbs Farm. Excavations and cropmarks around Preston have also revealed segmented boundary ditches (one part of a longer boundary feature), associated with an enclosure dating to the 4th–2nd centuries BC (Mudd *et al.* 1999, 40).

Our knowledge of settlement patterns in the Severn valley has developed considerably through widespread but small-scale investigations. This is particularly true around Bredon Hill in north Gloucestershire, with Later Iron Age pottery and features recorded at Dumbleton (Coleman and Hancocks forthcoming; Coleman *et al.* 2003; Marshall 1990; Saville 1984a), Alstone (Cox 1985), Wormington (Marshall 1990) and Aston Somerville (Brett and Coleman 2000).

Elsewhere, agglomerated settlements of smaller enclosures and trackways exist at Hailes-Stanway, which has yielded Later Iron Age pottery (Clifford 1944; Webster and Hobley 1964), and dense clusters of probably Later Iron Age enclosures, for example at Broadway (Moore 2006b; CNS Smith 1946).

Settlement further south in the Severn valley may have been similar, but the evidence is not abundant. Frocester indicates a type of settlement that may have been common: a single ditched enclosure later embellished with multiple ditches, which may represent the increasing status of the inhabitants (Price 2000). Other possible Iron Age enclosures exist at Longford near Gloucester (Moore 2006b) and there are examples of what might be termed "unenclosed" roundhouses within smaller enclosures at Abbeymeads (Atkin 1987) and a less well-defined spreading, Later Iron Age settlement at Gilder's Paddock (Parry 1999). The overall impression is that Later Iron Age occupation was as dense in this area as that around Bredon Hill.

Banjo enclosures (enclosures from whose entrances antennae-like ditches run out) are also known in the region. Excavation elsewhere has suggested that the ditches defined a droveway that allowed the collection and corralling of livestock. Evidence that they were permanently occupied settlements is ambiguous in southern England, although clear in West Wales (for example, Woodside Camp and Dan-y-Coed enclosure, Williams and Mytum 1998).

There is a suggestion that some of the large complexes of banjo-shaped enclosures known through cropmarks across the eastern Cotswolds may have served similar roles to those in central southern England and their form also appears to indicate an emphasis on controlling livestock. Such complexes occur at Ashton Keynes on the Gloucestershire-Wiltshire border, Eastleach Turville, Barnsley and Northleach-Broadfield, all of which possess a variety of enclosures and trackways (Darvill and Hingley 1982; Moore 2006b). At Northleach a number of banjo enclosures cluster with other enclosures and linear features, the similarities between them suggesting they form a larger settlement unit. This clustering of banjo and other enclosures on the interface between the Cotswold uplands and the upper Thames valley perhaps indicates either a cultural restriction or a particular subsistence role, though there has been no investigation of these enclosure complexes.

Dorset

Although Dorset is typical of the region in the emphasis of early work on hillforts, it is unusual in having seen several modern research excavations on Iron Age sites: Gussage All Saints, Hengistbury Head, and Maiden Castle as well as several other classic excavations.

The most comprehensively excavated settlement is Gussage All Saints, where the intention was to examine a typical Iron Age settlement and to complement work on hillforts and earlier excavations at

the nearby type site of Little Woodbury in Wiltshire. Gussage All Saints was shown to have been occupied for several centuries, and though few buildings could be identified, large numbers of storage pits were excavated (Wainwright 1979a). Although the emphasis placed on the enclosure itself changed through time, the boundary was always marked (Bowden and McOmish 1987).

Several settlements have been excavated in the south of Dorset, on the Isle of Purbeck including the Early Iron Age sites at Eldon's Seat (Cunliffe and Phillipson 1968), Rope Lake Hole (Sunter and Woodward 1987) and Manor Farm, Portesham (Valentin 2003). Later settlements include Compact Farm (Graham *et al.* 2002).

Settlements are also known on the heathlands around Poole Harbour with partially excavated examples at Worgret (Hearne and Smith 1992) and at several sites in the Wytch Farm oilfield (Cox and Hearne 1991) and on the islands in the harbour (Calkin 1949; Cox 1988a; Cunliffe and de Jersey 1997). An Early Iron Age settlement is also known at Hengistbury Head in Christchurch Bay (Cunliffe 1987) and several Iron Age settlements, mainly of Late Iron Age date, are known in the hinterland of Poole and Christchurch Harbours (Calkin 1965; Jarvis 1984; Cunliffe 1987; Cunliffe and de Jersey 1997).

Further to the north on the chalklands, Iron Age settlements at the earthworks at Rotherley and Woodcuts in Cranborne Chase were excavated by Pitt Rivers (1887; 1888; Barrett *et al.* 1991; Brailsford 1958), while subsequent excavations have included the classic Early Iron Age enclosed settlement at Pimperne (Harding *et al.* 1993).

Later Iron Age banjo enclosures are also known, including those on Cranborne Chase such as Gussage Cow Down, and also in adjoining parts of Wiltshire but none has yet been excavated (Corney 1989).

Elsewhere in Dorset, settlements are known at Halstock (Lucas 1993), Oakley Down (L Brown *et al.* 1996), Poundbury (Green 1987), Sturminster Marshall (Valentin 1994), Tolpuddle Ball (Hearne and Birbeck 1999) and at Whitcombe (Aitken and Aitken 1991).

Wiltshire

Work on Iron Age sites in Wiltshire also started relatively early, with the earlier 20th century seeing a series of excavations: Casterley Camp (Cunnington and Cunnington 1913), Lidbury Camp (Cunnington and Cunnington 1917), All Cannings Cross (Cunnington 1923), Fifield Bavant (Clay 1924), Swallowcliffe Down (Clay 1925), Yarnbury Castle (Cunnington 1933), Highcliffe (Stevens 1934), and Winterbourne Dauntsey (Stone 1935). These examined, not just defended sites such as Lidbury Camp and Yarnbury Castle, but also a range of settlements, open and enclosed. The number and diversity of the sites examined established them as one of the key groups for the study of the Iron Age nationally.

This importance was buttressed by the application of open area excavation at Little Woodbury, which for the first time revealed the post-built houses and pits that are typically of many, but by no means all, Iron Age settlements (Bersu 1940; Brailsford 1948; 1949; Evans 1989). Since then settlement excavations have been undertaken regularly in Wiltshire, on either a larger scale, such as at Ashton Keynes (Coe *et al.* 1991; Newman 1994), Boscombe Down West (Richardson 1951), Groundwell Farm (Gingell 1982), Groundwell West (Walker *et al.* 2001), Longbridge Deverill Cow Down (Hawkes 1994) and Tollard Royal (Wainwright 1968), or a smaller scale (see for example, Graham and Newman 1993; Mckinley 1999; Poore *et al.* 2002; Rawlings *et al.* 2004). Unusually, few defensive sites have been examined recently.

As a result of the depth of study in Wiltshire and Dorset (Champion 2001), often treated as part of the chimera that is Wessex, these areas have provided some of the key data sets for important Iron Age studies whether of human remains (Wilson 1981; Wait 1985), animal bones (Hambleton 1999), metalworking (Ehrenreich 1985; Salter and Ehrenreich 1984; Foster 1980) or pottery (Morris 1994; 1996; Cunliffe 2005). A range of surveys and syntheses have been undertaken (Cunliffe 1984; Barrett *et al.* 1991; Corney 1989; McOmish 1989; 2001; Fitzpatrick and Morris 1994a; Chadburn and Corney 2001) and these sites have provided the basis of much of the reinvigoration of Iron Age studies in the 1980s and 1990s (Bowden and McOmish 1987; 1989; Hill 1989; 1995a;b; 1996; Parker Pearson 1996; Fitzpatrick 1997; 1998).

The Somerset Lake Villages and wetland sites

The evidence for increasingly regional diversity within the South West is clear but the Somerset "Lake Villages" deserve special mention as the waterlogged finds from them make them of national, indeed of European, importance. They are the most extensively excavated and best-preserved Iron Age sites in the South West, although it must be remembered that their locations and wealth of finds make them untypical (Bulleid and Gray 1911; 1917; 1948; 1953; Gray and Cotton 1966; Tratman 1970; Orme *et al.* 1979; 1981; 1983; Barrett 1987; Coles 1987; Coles and Minnitt 1995).

Glastonbury Lake Village was built on an artificial island of timber, stone and clay which lay in a swampy area of open water, reeds and fenwood. In its early stages the site comprised five or six houses, one of which burnt down, and a series of clay spreads that provided bases for outdoor work. The island was later

extended and more houses built. The site appears to have been permanently occupied despite its location meaning that everything had to be brought in by boat.

At its maximum Glastonbury Lake Village consisted of about 15 houses and had a population of, perhaps, 200. The houses were circular with walls of vertical posts in-filled with wattle and daub; roofs were thatched with reeds or straw. Many of the clay floors were constructed for hearths, some for cooking and warmth, others for industrial purposes. The site was surrounded by an irregular palisade which was probably more structural than defensive and there was a landing stage on the eastern side. It is usually thought that the site was abandoned as rising water levels meant that the island could not be maintained (but see 5.5.4 on page 109).

The Meare settlements consisted of two areas of occupation known as Meare Village West and Meare Village East. They were very different from the Glastonbury Lake Village as they lay on two small humps of raised bog about 60 metres apart, separated by a very wet reed swamp and just a short distance from dry land. Despite the drier conditions at Meare there is little evidence for substantial buildings: circles and arcs of stakes are thought to represent temporary shelters. The site may have been occupied seasonally between periods of flooding.

These sites provide the only significant evidence for prehistoric carpentry and timber buildings in the country and also unparalleled evidence about the lives of their occupants (Evans 1989). Food was primarily from farming the nearby dry land and inluded spelt wheat, barley, beans and peas, and sheep, cattle, pig and horse. Wild animals, such as wild boar, and roe and red deer, were hunted and wild plants, nuts and berries were collected. Bones from otter, beaver, fox and polecat were all found and, unusually for the Iron Age but perhaps not surprisingly in a location such as this, freshwater fish were also eaten. The bones of sea birds suggest contact with the coast. Personal adornment is represented by beads, brooches, finger rings, armlets, toggles and tweezers. The exceptional preservation has also provided evidence for industrial activities including bone and antler working, bronze casting, iron smithing, shale working, wood working, spinning and weaving. The large number of bone and antler weaving combs from Meare suggest that braid production may have been important (Tuohy 2004). Meare is also one of the few sites in Europe with evidence for glass working. Small yellow annular beads and globular beads of clear glass inlaid with yellow spirals or chevrons were made and and have been found widely, some reaching the north of Scotland. This specialist production and widespread trading seems at odds with the remote location.

The sites lay only about 5km apart and appear to have been contemporary (Glastonbury Lake Village: *c.*200–50 BC, Meare: *c.*300–50 BC) but the relationship, if any, between them is unclear.

Other evidence for the exploitation of wetlands comes from the Avon levels. Excavations at Hallen revealed a 3rd- or 2nd-century BC unenclosed, and possibly permanent but short lived settlement. Other evidence from Northwick indicates the Avon levels were used seasonally for cattle pasture with little indication of arable crop production (JP Gardiner *et al.* 2002). A radiocarbon date from a fish trap at Oldbury also indicates a Later Iron Age date (Allen and Rippon 1997). The increased coastal activity around Poole and Christchurch Harbours (Cunliffe 1987; Cox and Hearne 1991) might also be seen in this light.

The reasons for what appears to be an expansion into previously marginal areas in the Later Iron Age are not clear but they may hint at a widespread population increase and possibly the development of specialised, industrial or farming communities as seen at Glastonbury (Coles and Minnitt 1995) or the increased exploitation of resources such as salt and shale (Cox and Hearne 1991) or localised marine incursions.

Cave Sites

Although roundhouses were the almost universal dwelling, several Mendip caves were also occupied or used in this period. Wookey Hole is of particular importance and finds suggest that activity, and perhaps occupation, there was contemporary with the lake villages (Balch 1914; 1928). There was also activity or occupation in Reads Cavern (Palmer 1922; 1923; Langford 1924; 1925; Tratman 1931). There is Iron Age material from Charterhouse Warren Farm swallet (Levitan *et al.* 1988) and possible Iron Age metalworking evidence at Wookey Hole, Rowberrow Cavern, Chelm's Combe and Saye's Hole (Colcutt *et al.* 1987; Moore 2006b). Similar material is also known from Kent's Cavern, (Silvester 1986). While Roman activity in caves has been reassessed on a national basis (Branigan and Dearne 1992) later prehistoric activity has not reviewed in the same way. Much of the evidence for the use of Mendip caves comes primarily in the form of human remains and limited evidence that they were used for metalworking, with the deposition of currency bars also significant (Hingley 2005). Although some caves may have been used for settlement, some uses of these liminal places may have been explicitly ritual.

Forts

Long considered as type sites of the Iron Age, hillforts are the largest and most dramatic later prehistoric monuments in the South West. They range in size from less than one hectare up to 88 hectares, a factor that must reflect varied political and social organisation, and changes through time. Only a handful of hill-

forts in the region have undergone systematic excavation but where this has happened a complex sequence of construction, repair and renewal has been revealed as well as evidence for attack and defence; there is, again, considerable diversity.

The larger forts, particularly in the eastern parts of the region, were enormous undertakings involving a large number of people in their construction, certainly more than those who occupied the forts. Once completed, maintaining the defences required a significant on-going commitment of labour.

Traditionally hillforts have been seen as the residences of an elite – kings or chiefs – but current opinion is shifting to the view that they were occupied by farmers. Whilst hillforts produce weaponry, most finds relate to domestic, farming, craft and industrial activities (Cunliffe 2005; Hill 1996).

A broad chronological progression in hillfort size and fortification can be discerned. Early forts often have quite slight defences and relatively little evidence for houses, though there are often four-post structures, presumably granaries. As a result these sites have been distinguished as hill-top enclosures (for example, by Cunliffe 1984). Examples include Bathampton Down (Wainwright 1967), Bindon Hill, (Wheeler 1953) and Norbury (Saville 1983b). Ham Hill (Gray 1925; 1926; 1927), Hog Cliff Hill (Ellison and Rahtz 1987), and perhaps Ogbury (Crawford and Keiller 1928), may also belong in this category.

Early hillforts, with substantial defences, seem to appear from the 6th century BC onwards. These are smaller than the hill-top enclosures and often have a single ditch and rampart, examples include Maiden Castle, which reoccupied the site of a Neolithic causewayed enclosure (Wheeler 1943; Sharples 1991a), Chalbury Camp (Whitley 1943) and Yarnbury Castle (Cunnington 1933). These sites are relatively numerous.

Subsequently, in the Later Iron Age, probably from the 4th century BC onwards, there were significant changes. It seems that many early hillforts passed out of use. Others were either enlarged and additional defences added, for example at Maiden Castle and Yarnbury Castle, with the original fort forming one element of a larger site, or additional ramparts were added, for example at Cadbury Castle (Barrett *et al.* 2000). These sites have been termed "developed hillforts." It seems likely that only a small number of these sites were occupied and that they were distributed fairly regularly across the landscape.

While these broad trends are relatively well established across much of southern England, and considerable detail could be added in terms of the construction of defences and gateways, there is some diversity in the region, with some areas having distinctive variations.

Cornwall Cornish "hillforts", which might perhaps more usefully be called enclosures, vary in their position on hills, with many on high slopes (not hilltops) in their size and shape, the number and form of their banks and ditches, their entrances, intensity and form of occupation (Johnson and Rose 1982).

Hillforts clearly served a defensive function but display and symbol were also important motivating factors. Designed to exclude people they also served to impress. Some may have been permanently occupied (such as Killibury), but others have sketchy evidence for settlement and need not have been domestic. This is borne out by geophysical surveys of forts on similar geologies; Golden hillfort revealed little evidence for occupation but in contrast, Carvossa appears to have been occupied intensively (Laura Cripps pers. comm.). Many forts are on hills that also have important earlier barrows and other ceremonial/ritual remains.

Cliff castles/promontory forts such as Trevelgue, The Rumps or Maen Castle seem even more likely to be non-domestic and several functions have been suggested, including ritual/ceremonial and trading stations. They vary in form and size, suggesting a great variety in the ways these sites were occupied during the Iron Age. The main phase of occupation of cliff castles was in the Later Iron Age, perhaps *c.*400 to *c.*100 BC. On the Isles of Scilly there are two definite cliff castles, Shipman Head, Bryher and Giant's Castle, St Mary's and a possible one, Burnt Hill, St Martin's. In this island location, these sites could reflect contemporary territorial divisions.

Devon Few Devon hillforts have been examined and work has been small-scale, sometimes rescue excavations, as at Berry Down (Gallant and Silvester 1985), Dumpdon (Todd 1992) and Woodbury Castle (Miles 1975b; Fletcher 1988), or where the main focus of the work has been on other periods, such as at Neolithic and Roman Hembury (Liddell 1930; 1931; 1932; 1935; Todd 1984). Only Blackbury Castle hillfort has been excavated relatively extensively (Young and Richardson 1955). These forts, which are mainly in east Devon, have similarities with the hillforts of Somerset and Wessex (Miles 1975b, 185).

Hill-slope enclosures predominantly occur, as their name implies, on the sides of hills. They are quite numerous in Devon, particularly in northern Devon, and are often well-preserved (Fox 1952a; 1960; Whybrow 1967) but few have been excavated (Silvester 1978; Reed and Manning 2000) and in consequence they are relatively poorly understood. The adjoining parts of Exmoor and West Somerset also have few classic hillforts but rather more hill-slope enclosures (Riley and Wilson-North 2001; Riley 2006). Hillslope locations are less easily defen-

sible than hilltops, so these sites presumably served different purposes from hillforts (Fox 1960). As so little work has been carried out on these quite common monuments, their date, which could span the Bronze Age to Roman periods, internal arrangements and functions are uncertain. Some were perhaps settlements; others may have been for the pounding of stock.

Somerset Although a few sites might have Late Bronze Age origins, such as Norton Fitzwarren (Ellis 1989), most Somerset hillforts emerge in the Early Iron Age. Some, such as Brent Knoll and Cow Castle were located in highly defensible positions on the tops of steep-sided hills but others were more easily approached, such as Maesbury. The sites may reflect a greater focus on land ownership and territories.

Cadbury Castle is one of the most extensively investigated hillforts in Britain (Barrett *et al.* 2000) and illustrates something of their histories. The first defences were a single bank and ditch enclosing an area of 7.5ha. The rampart was an open timber framework filled with earth and limestone rubble from the outer ditch. In the 4th century BC the site was strengthened by two or three additional ramparts and substantial gates protected the entrances. A large population lived in the round houses which appear to have been repaired or rebuilt on a number of occasions, sometimes on the same spot. Contemporary with these houses were large numbers of storage pits. Long-established roadways spread out over the hilltop. Extensive survey around the fort indicates widespread contemporary settlement (Tabor 2004a).

By far the largest hillfort in Somerset is Ham Hill. Its defences follow the edges of a plateau, enclosing an area of 88ha. A fan-shaped extension to the north is more strongly defended with two ramparts, two ditches and an outer bank. Finds from quarrying indicate extensive activity dating back to the Late Bronze Age (Morris 1987) and an extensive programme of geophysical survey combined with air photographs has revealed a complex arrangement of enclosures, roadways, pits and roundhouses. Although several excavations have been carried out they have been on a small scale in relation to the vast size of the site (Gray 1925; 1926; 1927; G Smith 1990; Adkins and Adkins 1991; McKinley 1997).

Gloucestershire On the Cotswolds the hilltop enclosures at Norbury (Saville 1983b) and Bathampton (Wainwright 1967) are suggested to be Late Bronze Age or earliest Iron Age (Cunliffe 2005; Saville 1983b). The smaller enclosure at Kings Weston, Bristol (Rahtz 1956) is of Early Iron Age date, and the associated, undated Cross Dyke, enclosing a larger area, may represent an early 1st millennium phase (Moore 2006a). These large enclosures have been interpreted as storage centres and the rectilinear structures at Norbury may be granaries. However, they can also be compared to rectangular domestic structures at Crickley suggesting that some of these enclosures may have also had dense occupation (Dixon 1976; Moore 2003).

It seems that around the 8th–6th centuries BC a number of small hillforts appeared with pottery related to the All Canning Cross style. These include the enclosures at Shenberrow (Fell 1961), Cleeve Cloud, Crickley Hill (Dixon 1994) and Leckhampton (Champion 1976). More recently, Early Iron Age pottery has been recorded from outside the ramparts at Burhill hillfort (Marshall 1989), indicating extramural settlement or an unenclosed settlement prior to the hillfort.

The Later Iron Age saw the appearance of new hill-top enclosures after the abandonment, possibly caused by violence, of some of these early sites. Crickley Hill was abandoned by the 5th century BC after a final act of destruction (Dixon 1994, 107, 220) with Leckhampton also seemingly burnt. Around the 4th century BC new hill-top sites emerged at Uley Bury (Saville 1983b) and Bredon Hill (Hencken 1938). To the south, along the Avon gorge, Stokeleigh Camp (Haldane 1975) and Blaise Castle hillfort (Rahtz and Clevedon-Brown 1959) were also occupied, although little can be said about the nature of occupation.

Of the many hillforts known on the west side of the Severn in the Forest of Dean, few have seen investigation although Lydney was occupied in the Later Iron Age (Wheeler and Wheeler 1932). Earthwork survey at Welshbury hillfort (McOmish and Smith 1996) suggests some affinity with the smaller, elaborate Later Iron Age enclosures to the west in Wales and this may indicate a somewhat different social organisation in this area with smaller communities placing greater emphasis on defining their social space in elaborate enclosures.

Dorset The most extensively excavated hillfort is Maiden Castle (Wheeler 1943; Sharples 1991a;b), followed by Hod Hill (Richmond 1968); the excavations at Hambledon Hill were restricted to the complex of Neolithic sites. Smaller excavations have taken place at Charlbury Camp (Whitley 1943), Hog Cliff Hill (Ellison and Rahtz 1987), Pilsdon Pen (Gelling 1977; Thackray 1982) and Poundbury (Green 1987). Waddon Hill has also been examined, albeit primarily for the early Roman military site (Webster 1979). An early hilltop enclosure at Bindon Hill has also seen limited excavation (Wheeler 1953).

In addition, the Royal Commission Survey of Dorset provides a systematic review with a number of useful surveys (RCHME 1952; 1970; 1971; 1972; 1975) which

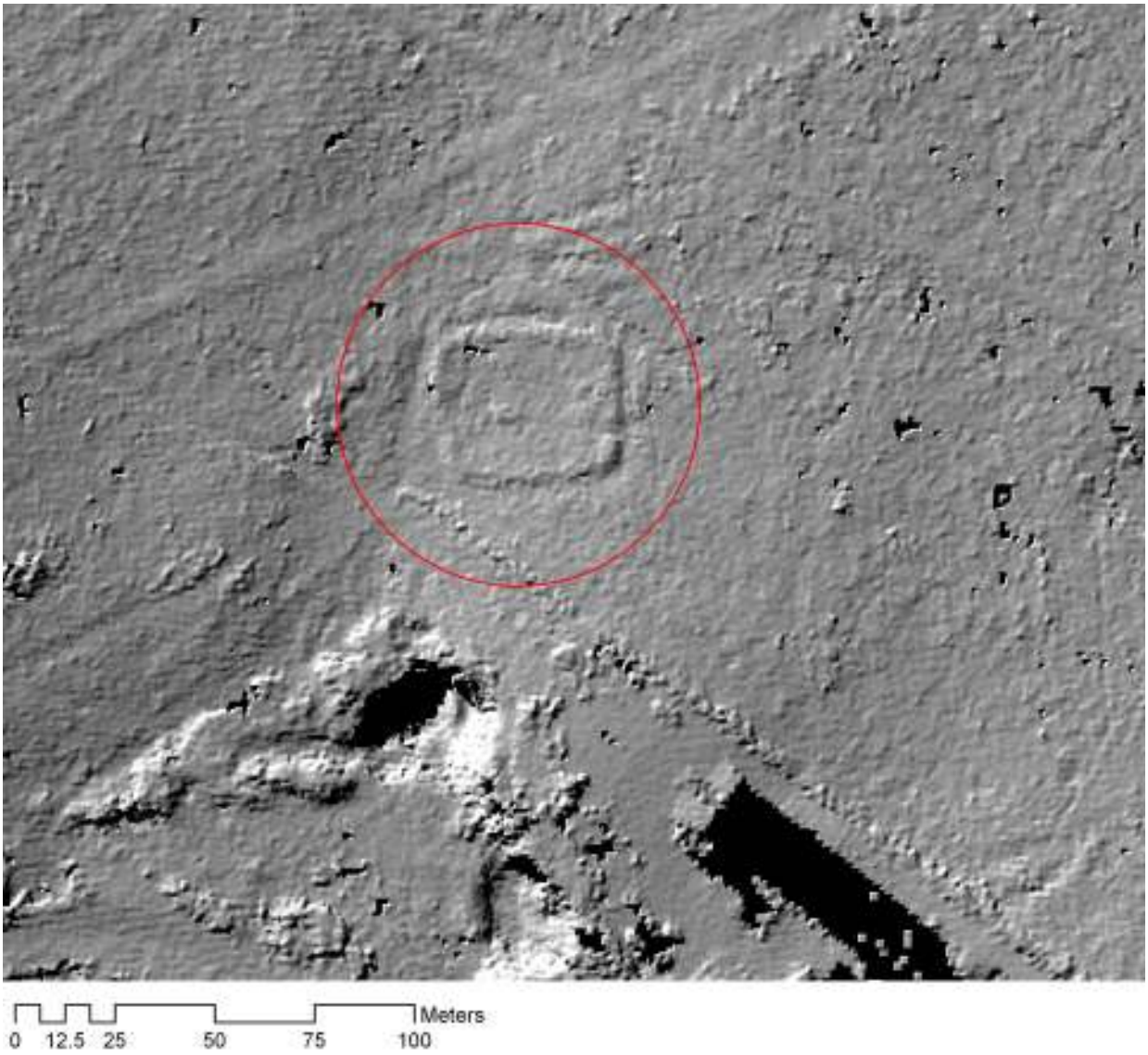

Figure 6.2: *Lidar image of a probable late prehistoric defended enclosure in the Forest of Dean. The lidar is able to "see through" the overlying woodland. © Gloucestershire County Council and the Forestry Commission.*

have been augmented by a few more recent surveys, such as at Hambledon Hill, though important sites such as Hod Hill, which has evidence for intensive settlement, still have not had aerial photographic evidence transcribed.

The sequence outlined at Maiden Castle is, in broad terms, typical of many sites. A small Early Iron Age fort, occupying the same site as a causewayed enclosure was later incorporated within the much larger circuit of the developed hillfort. This single circuit of defences was then elaborated by the addition of further ramparts and ditches and the two entrances were protected and aggrandised by a complex series of outworks. Excavation within the interior has been limited but it has demonstrated long lived and apparently intensive activity. In contrast to the contemporary occupation around Cadbury Castle, there is little evidence for settlement in the area around Maiden Castle, suggesting that it may have had a large and permanent population (Sharples 1991a).

Wiltshire Despite the prominence of Wiltshire sites in Iron Age studies nationally, there have been few excavations on Wiltshire forts since early work at defended sites such Lidbury Camp (Cunnington and Cunnington 1917) and Yarnbury Castle (Cunnington 1933; Cunliffe 1984), instead work on prehistoric monuments in the county has focused on those of Neolithic and Bronze Age date. Only the promontory fort at Budbury Camp in the north-west of the county (Wainwright 1970) and on a small-scale, Malmesbury (Longman 2006), have seen recent excavation, though

a number of surveys have been undertaken (McOmish *et al.* 2002), and there has been extensive work to the east in Hampshire (Cunliffe 2000a) and Berkshire (Lock *et al.* 2005).

Many hillforts seem to pass out of use in the 2nd or 1st centuries BC but it is clear that several in the South West were occupied and also defended at the time of the Roman conquest. The presence of Roman military bases within several hillforts, for example Hod Hill, Waddon Hill and Hembury suggests this (Todd 1985) and there is evidence for conflict that can be associated with the later phases of the Roman conquest at Cadbury Castle (Barrett *et al.* 2000) and perhaps Maiden Castle, though the cemetery by the east entrance interpreted by Wheeler (1943) as a "war cemetery" was in use before the Roman conquest (Sharples 1991b).

Oppida

To what extent hillforts were superseded by oppida is a matter for debate. These Late Iron Age defended sites are often seen as having urban characteristics, with the evidence that they provide for trade and exchange being emphasised.

The earliest of the sites considered as oppida in Britain is Hengistbury Head in Christchurch Harbour. The site is essentially a promontory fort, the defences of which may predate the Late Iron Age activity. Extensive evidence for cross-Channel exchange has been found, principally in the form of Armorican pottery and coins, Roman wine amphorae, and raw glass. There is also a smaller amount of evidence for exchange within the South West, primarily in the form of the metals of copper, tin and lead. Glass, shale and salt were produced on the site (Cunliffe 1987). The evidence for trade is clear (Cunliffe and de Jersey 1997) although it has been questioned whether the site was a permanent settlement or was used as a seasonal enclave by Gaulish traders (Fitzpatrick 2001). From the late 1st century BC activity seems to have moved from Hengistbury to nearby Poole Harbour (Cox and Hearne 1991; Cunliffe and de Jersey 1997; Markey *et al.* 2002).

The Late Iron Age activity at Mount Batten, Plymouth, may be related to the exchanges in which Hengistbury Head was involved, though the evidence is much less abundant. However, unlike Hengistbury Head, the site also provides evidence for cross-Channel exchange through the Late Bronze Age and much of the Iron Age (Cunliffe 1988). Mount Batten may have been the site referred to by classical writers as *Ictis* (Cunliffe 1983) though St Michael's Mount is often thought to fit the description better (Herring 2000).

It is tempting to over-emphasise the novelty of cross-channel contact in the Late Iron Age but there is, albeit much less prominent, evidence through much of the Later Iron Age (Fitzpatrick 1985; Cunliffe 1990; Taylor 2001b). At Carn Euny decorative motifs with Breton affinities are suggested to appear in the 5th or 4th centuries and there are similar sherds at Trevelgue. There was also trade and exchange within Britain. To take Cadbury Castle, Somerset, as an example, it has produced decorated pottery from Mendip, Devon and Cornwall as well as shale from the Isle of Purbeck, amber from the Baltic or East Anglia, and whetstones from near Plymouth. There are also quern stones from Pen Pits (15km to the north-east), Beacon Hill (21km to the north) and other Mendip sources (Barrett *et al.* 2000).

Further west from Mount Batten there are no obvious oppida unless Gear on the Lizard peninsula and Castle Canyke at Bodmin are possible candidates. A substantial enclosure at Ilchester, Somerset, has been suggested as a possible oppidum (Leach and Thew 1985; Ellis and Leach 1994) but there is little other evidence to support this.

Otherwise the only evidence for these sites comes from Gloucestershire. Salmonsbury appears to be the earliest of these new sites, probably occupied as early as the 1st century BC and continuing into the 1st century AD (Haselgrove 1997, 61). It consists of a low-lying, large enclosure encompassing some 23ha with apparent antenna ditches marking possible stock corralling areas. The enclosure was intensively occupied, including conjoined roundhouses and smaller internal enclosures (Dunning 1976).

Bagendon is the most impressive of the sites. A large dyke system enclosed an area of between 80 and 200ha and forms a "territorial oppidum" similar to those at Colchester and Verulamium (Cunliffe 2005, 191). Bagendon seems to have appeared somewhat later than Salmonsbury; the dyke system was probably created in the 1st century AD with a flourish of activity in the immediate post-conquest period. Suggestions that the site is entirely post-conquest (Swan 1975) seem unlikely and suggestions that Bagendon developed on the periphery of dense Middle Iron Age settlement (Moore 2006a) indicates that more study is needed to determine the exact nature of this earlier activity in order to understand more fully the nature of oppida development in the region.

The nearby enclosure at Ditches emerged first in the 2nd or 1st century BC (Trow 1988) with the Bagendon dyke system and Ditches enclosure representing part of a wider complex. Only limited investigation has taken place in the interior (Clifford 1961; Moore *et al.* forthcoming; Trow 1982) revealing an industrial area at the entrance including coin minting. Both sites have revealed high status occupation in the early 1st century AD, with imported Gallo-Belgic and Samian pottery with the subsequent building of an exceptionally early villa at Ditches in the late 1st

century AD (Trow *et al.* forthcoming; Trow 1988) further indicating the inhabitants' high status and rapid adoption of Romanised lifestyles.

The role of the Bagendon complex is less clear. Sites like Bagendon cannot be regarded as "urban" as most of the interior appears not to have been intensively occupied and instead the evidence suggests a scattered set of activities rather than one single centre. The apparent high-status nature of the finds from the site has led it to be variously regarded as a royal centre or, perhaps, "park" (Darvill 1987b, 168; Reece 1990, 77). However, it seems likely that Bagendon performed a variety of roles as well as possibly being the centre for new elites. The focus of Bagendon around a valley and the presence of large antenna ditches at sites like Ditches and Salmonsbury also indicate an emphasis on controlling cattle or horses.

The variety of ditches and banks at Minchinhampton have also been argued to represent a late Iron Age territorial oppidum (Clifford 1937b; RCHME 1976). Parry (1996), however, argues convincingly that many of the earthworks are of Medieval date; probably wood enclosure boundaries.

Houses

The timber round house, with a low wall and a conical thatched roof is one of the icons of the Iron Age and numerous examples have been excavated in farms and forts throughout the region. While round houses are common, there is considerable variety in detail (Allen *et al.* 1984). Most houses were are post-built, but others seem to have had mass walls of turf or dwarf walls of stone which bore the weight of the roof, and in Cornwall many buildings were of stone. Some buildings have penannular drainage gullies; others do not. Some buildings are set in small compounds.

Assessment of houses in the northern part of the region (Moore 2006b) suggests there is tendency to post-built structures in the earlier 1st millennium BC with a shift to houses increasingly bounded by gullies in the Later Iron Age, although a great deal of structural variation has been noted even within relative small areas of the region.

There is also variation in size, with some Early Iron Age examples being particularly large, up to 14m in diameter, with multiple rings of posts. The example from Pimperne, Dorset, provided the evidence for the principal reconstructed round house at Butser Iron Age Farm (Harding *et al.* 1993; Reynolds 1979). Other large and early houses include Longbridge Deverill Cow Down, Wiltshire, where a house that was burnt down has provided important information on the internal arrangement within the house (Hawkes 1994). Some of these houses have what have been called "dressers" on their right hand side.

Most contemporary and later houses were smaller, often *c*.6–8m in diameter. Many have central hearths and some, for example at Hod Hill, have what might be cupboards immediately inside the door (Richmond 1968).

It has been suggested that the shape of the large Early Iron Age houses and the use of space in them, with activities apparently being undertaken in one half of them, embody cosmological referents (Fitzpatrick 1997). Examination of doorway orientation in the northern counties of the region has concurred with studies elsewhere, in noting an emphasis on SE or E orientation (Moore 2006b). However, regional and site-by-site variations in house orientation should not be ignored, with sites like Glastonbury Lake Village showing a particular emphasis on non-easterly orientations (Moore 2006b; Parker Pearson 1999) potentially reinforcing recent suggestions (Pope 2003b) that the cosmological factors behind house orientation may be complex.

Landscape

As it is today, the wider landscape of the South West was varied in the Iron Age and, perhaps for the first time, it is possible to see the exploitation of distinct environments. The differences between, for example, the river valleys of lowland Gloucestershire, the uplands of Dartmoor and the Quantocks, or the heathlands of Dorset are reflected in the types of settlement and the activities carried in, and from, them.

Ongoing landscape characterisation work, based on and often refining the 1994 historic landscape characterisation for Cornwall (Cornwall County Council 1996) has helped identify likely patterns of Iron Age farmland and rough grazing. Field systems are extensive in West Penwith and extend onto cliff-tops and other margins. That at Maen Castle pre-dates the cliff castle and thus may be Late Bronze Age–Early Iron Age (Herring 1994, 40–56) and there are suggestions of a similar situation at Gear, St Martin-in-Meneage. Traces of other field systems survive and geophysical and aerial photography surveys have identified other areas of irregular and block-shaped field systems throughout lowland Cornwall.

Field boundaries have been excavated at Penhale Round (Nowakowski 1998) and Trenowah (Johns forthcoming) but whether they were used for arable and/or pasture is poorly understood. Buried soils have also been difficult to locate, though at Trethurgy an old land surface belonging to an earlier enclosure phase was found and a pit under the rampart produced a 2nd century BC date (Quinnell 2004a). The very substantial lynchets of well-sorted ploughsoil in West Penwith indicate fairly intensive arable cultivation. The Foage lynchet produced a buried soil with pollen of mixed

heath, grass and scrub communities (Herring 1993b). Excavations at Stencoose, St Agnes revealed a field system, dated to 300 BC–AD 300, defined by ditches, but probably originally with earthen banks (AM Jones 2000–1), and perhaps similar to those at Chysauster in West Penwith and Watergate on Bodmin Moor (G Smith 1996; Johnson and Rose 1994).

However, our understanding of the contemporary land-use in upland zones is limited. There are traces of seasonal settlement on Bodmin Moor at Garrow and Stannon where Bronze Age structures were reused in the Iron Age, probably in transhumance (Herring forthcoming). It is possible that the Iron Age settlements of Kestor (Fox 1954a;b) and Gold Park (Gibson 1992) on Dartmoor (Silvester 1979) and those on the Quantocks (Riley 2006) were used in a similar way. The exploitation of wetland areas such as the Severn levels (JP Gardiner *et al.* 2002) is also likely to be have been seasonal.

Although celtic field systems have long been assumed to be of Iron Age date, limited excavations have shown many appear to be Romano-British, or to have least continued into that period (McOmish *et al.* 2002). As a result, although some of the numerous well-preserved field systems on the chalklands of Dorset and Wiltshire are Iron Age in date (Crawford and Keiller 1928; Bowden 2005; RCHME 1952; 1970; 1971; 1972; 1975; Crittall 1973; Fowler 2000), it cannot be assumed that they all are.

Substantial land boundaries are also seen in a number of areas. Excavations suggest that, on the chalklands of Wiltshire, many Wessex linear ditches that were probably created in the Late Bronze Age continued to be maintained well into the Iron Age (Bradley *et al.* 1994; McOmish 2002; Kirkham 2005b; Tilley 2004). Some major boundaries, the extensive dyke systems such as Bokerley Dyke, Dorset (Bowen 1990), may also be of Iron Age origin though this is not proven and its setting, appearing to be a major territorial boundary or possibly defence, differs from the dyke systems around the oppidum of Bagendon and other settlements in Gloucestershire.

Not all boundaries provided physical barriers; some were "porous." In a number of places the Early Iron Age landscapes of the upper Thames valley appear to have been divided up by pit alignments, with examples excavated at Ashton Keynes/Shorncote (Hey 2000) and around Lechlade, at Butlers Field, (Boyle *et al.* 1998), Memorial Hall (A Thomas and Holbrook 1998) and Roughground Farm (Allen *et al.* 1993). In some cases these pit alignments and other land boundaries combined to form larger landscape divisions, cutting off spurs in the river (Boyle *et al.* 1998).

Evidence from the upper Thames valley suggests that in a number of cases the same boundaries might be marked in different ways, with ditches on higher ground and pit alignments in low lying areas. One possibility is that pit alignments were used to define territories on the floodplains where ditches were less necessary, perhaps allowing cattle to pass through on common pasture and that they were intentionally designed to retain water (Rylatt and Bevan in press).

Excavations and cropmarks around Preston (Mudd *et al.* 1999) have also revealed segmented boundary ditches, associated with a polygonal enclosure dating to the 4th–2nd centuries BC, one of which forms a long boundary feature possibly using Bronze Age barrows as landscape markers (Mudd *et al.* 1999, 40). These segmented ditches appear peculiar to the region and seem to form field systems further south at Shorncote (Brossler *et al.* 2002) and around Lechlade (Bateman *et al.* 2003; Boyle *et al.* 1998). The role of these segmented ditches is unclear, some replacing earlier pit alignments and they may mark changing agricultural needs and the increasing definition of social and territorial boundaries (Moore 2006b).

Farming

The agricultural subsistence basis of Iron Age communities is gradually becoming well defined. Charred plant remains, often the residues from crop processing that were used for tinder, show that many Iron Age communities practiced mixed farming with a range of crops grown. The principal varieties were emmer, barley and spelt wheat; some changes in the choice of crops are apparent.

Naked barley was largely replaced by hulled barley through the course of the Iron Age and there was also a shift from emmer wheat to the hardier and more adaptable spelt wheat. Some crops were grown less frequently: rye, oats (whose presence may often be as a weed of cultivation) and occasional flax. Beans are frequent, though not common, discoveries and they may have been grown for their nitrogen fixing qualities as much as a food stuff (Campbell and Straker 2003). The detail provided by weeds of cultivation and charcoals allow interpretations of the landscapes of individual sites to be created (such as that by Fitzpatrick *et al.* 1999).

The pits that were probably used to store the seed grain, four-post (or more) structures that were probably used to store processed cereals, and querns to grind the grain have been found on many farms and forts. It is likely that many pits had wicker linings.

This pattern of crops, along with the keeping of cattle, sheep and pig is common to much of southern England in the Iron Age (Hambleton 1999). Cattle and sheep were smaller than most modern breeds, their sizes being analogous to Dexters and Soays. Horses, about the size of modern Exmoor ponies, were used for riding and to pull carts and chariots, as numerous metal harness and vehicle fittings attest. Cattle, however, may have been the main beasts of

traction. Evidence for dairying has been provided by absorbed lipid residues in pottery from Maiden Castle (Copley *et al.* 2005).

Some regional variation may be anticipated, though the evidence is still slight. The plant remains from the settlements on the A30 in east Devon show a continued emphasis on emmer even though spelt wheat is also present (Fitzpatrick *et al.* 1999; Campbell and Straker 2003). However, whether this reflects a genuine regional difference or is merely a product of the small data set cannot yet be determined. These sites did not have storage pits though four-post structures, presumed to be granaries, were present and the plant remains suggested that the crops were stored in them before they had been fully processed.

Variation in animal husbandry might also be expected, with a greater emphasis on cattle in low lying areas and sheep on higher land. Again, the evidence for this is, as yet, slight. One example comes from the Later Iron Age site at Thornhill Farm which appears to show an emphasis on cattle, and possibly also horse, husbandry in the upper Thames valley (Levine 2004). There is a hint that feral horses were broken at Gussage All Saints (Wainwright 1979a).

Singular landscapes such as the Somerset Levels do, however, provide a clearly different pattern (Coles and Minnitt 1995). In addition to the typical cereals and animals, extensive evidence for fishing and fowling was found. Generally, however, the evidence for the eating of fish is rare in Iron Age Britain, although fish bones were found, along with shell fish, at coastal sites such as Caerloggas, Cornwall.

6.3.3 The Material World

Pottery

Pottery has provided the basis of most Iron Age chronologies, which have been outlined earlier, and many attempts at defining cultural groupings. Of these schemes, Cunliffe's definition of a sequence of geographically discrete style-zones still remains of fundamental importance, providing a robust and secure sequence (Cunliffe 2005).

There is inevitable variation in our knowledge in time and place across the South West but, with the addition of stratified and radiocarbon dated sequences (such as that from Trevelgue Head, Nowakowski and Quinnell forthcoming) or the dating of individual closed groups in areas that were previously poorly served, the basis will progressively become more robust.

In addition to research on residues that has indicated the contents of some vessels (Copley *et al.* 2005), a considerable amount of work has been undertaken on the provenance of pottery, primarily through petrological studies. Peacock's pioneering study on Glastonbury Ware (Peacock 1969a) which identified, for the first time, a variety of different sources for what appeared to be a single stylistic tradition dating from the 4th century BC onwards, has been followed by several studies. A similar complexity has been revealed amongst the pottery produced in the Malvern Hills area (Morris 1983; 1994; Peacock 1968). Between the 4th century BC and 1st century AD this material was exchanged as far as 40km from its sources. Through the Later Iron Age, Malvern wares in particular, became an increasingly important component of pottery assemblages, with an increasing dominance of regional over locally manufactured pottery at sites such as Birdlip (Parry 1998) and Gilder's Paddock (Hancocks in Parry 1999).

In Dorset the increasing dominance and standardisation of products of the Poole Harbour pottery through the course of the Later Iron Age has largely been determined using visual examination (L Brown 1997). In other areas the adoption of the potters' wheel has been seen as indicating a key chronological marker and also the emergence of specialist potters. Most production, however, remained quite local (Morris 1994; 1996). Particular topographic locations may also have been chosen to provide sources of clay because of their landscape setting, as much as for the material itself (Harrad 2004; Moore 2006b).

As yet production sites have remained elusive, and indeed few sources of clay, even those for the distinctive fabrics from The Lizard, Cornwall have been located (Harrad 2003; 2004), though possible potters' tools, including a decorative stamp from Meare Village West have been recognised (Gray and Cotton 1966).

Pottery has also been used as tool for intra-site analysis, notably in Clarke's (1972) work on Glastonbury Lake Village, even if the conclusions of that particular study have been rejected (Barrett 1987; Coles and Minnitt 1995; A Woodward 2002). Assessments of form and function have also been made of Durotrigian pottery (Pope 2003a).

Lastly, while pottery is the most common form of container to survive from the Iron Age, the Somerset lake villages provide valuable evidence for containers of wood and bark (Earwood 1988). The wooden bowls were hand turned rather than lathe turned, and there is also a rare example of a wooden plate from Wookey Hole (Pugsley 2005).

Metalworking

It is a characteristic of the Iron Age in Britain that for much of it iron objects remain rare. Indeed the quantity of metal objects, both of bronze and iron, declines after the Late Bronze Age. Only in the later Iron Age does iron become increasingly frequent.

The Devon/Cornwall area has been identified by trace element analysis as one of, if not the, major source for iron in Wessex during the Early Iron Age.

Iron with high cobalt and high nickel contents is the "most prevalent" in Wessex and the only source of this currently known is the Great Perran lode "near Trevelgue", although there is no certain link demonstrated between the ore type and and that lode (Ehrenreich 1985; Salter and Ehrenreich 1984, 16–17). The recent excavations at Trevelgue Head have, however, yielded evidence for iron working on an industrial scale (Nowakowski and Quinnell forthcoming). It is likely that iron was exchanged in ingots of partly-worked iron known as currency bars and there is a concentration of these ingots in the north of the region (Hingley 2005). The relative quantity of this distinctive form of iron identified in Wessex decreases during Middle and Late Iron Age, suggesting that south-western sources were supplanted by others nearer to Wessex (Salter and Ehrenreich 1984, 17). There is also evidence for large-scale production at Gussage All Saints (Wainwright 1979a). Elsewhere smithing debris is a common find on Iron Age farms and forts, suggesting that low-level iron working was a relatively widespread skill, but also one that, as the finds from the Mendip caves hint, one that may sometimes have been undertaken in liminal places.

The study of impurity patterns in copper alloys indicates that the South West also appears to have been a major source of bronze (Cunliffe 1987; Northover 1984; 1988). As with the Bronze Age, tin streaming and working are assumed to have been practised, though actual evidence is slight and ingots are often poorly dated (Penhallurick 1986; Fox 1995). However, crucible and clay moulds are relatively frequent finds on settlements (see for example, Cox and Hearne 1991) suggesting that at some levels this skill was quite widespread. The manufacturing debris from Gussage All Saints is the largest assemblage of this material from Britain and points to the specialist production of high status objects, in this case horse harness and cart fittings (Foster 1980; Fell 1988). There is possible evidence for the exploitation of galena, which might yield silver or lead from Charterhouse-on-Mendip (Todd 2007).

The use of flint tools in the Iron Age should not be overlooked even if they were used less frequently and apparently manufactured less skilfully (Ford *et al.* 1984; Saville 1981b; Young and Humphrey 1999; Humphrey 2003b). Flints were used *de novo* in the Iron Age for the manufacture of shale objects on the Isle of Purbeck (Calkin 1949; Cox and Hearne 1991).

Returning to metalwork, the number of fine, display, objects deserves mention. These include a decorated scabbard from West Buckland, Somerset (Stead 2006) and distinctive south-western groups of metalwork including Late Iron Age decorated mirrors, with examples from Birdlip, Holcombe (Fox and Pollard 1973) and Portesham (Fitzpatrick 1996), bronze bowls (Fox 1961) and neck rings (Megaw in Sieveking 1971). The Portable Antiquities Scheme has already seen an increase in the reporting of less eye-catching metal objects (Saunders 2002; Tyacke 2002).

Manufacturing

In addition to metalworking and pottery, there is some evidence for specialist production of materials and objects (Roche 1997). Evidence for salt production is common around the Isle of Purbeck (Farrar 1974; Cunliffe 1987; Morris 1994) and the same area also produces evidence for the exploitation of shale which was used principally for bangles (Calkin 1949; 1955; Cunliffe 1987; Cox and Hearne 1991). Meare is one of the few Iron Age sites in Europe with evidence for glass working (Henderson 1989) and it is clear that "raw" glass was imported to Hengistbury Head from continental Europe to be made into objects in the Late Iron Age (Henderson 1991). Loom weights and weaving combs are common finds on settlements and it seems that textile production was widely practised as a domestic activity (Tuohy 1999; 2004).

Coinage

The first coinage in the region comprises coins from Gaul in the Late Iron Age. Early British issues, both in gold and potin (a high-tin bronze), were probably used only in particular spheres of exchange and not as a form of general purpose money. Only during the course of the 1st century BC did distinctive regional issues appear, some of which may be identified as tribal but some are more local (Haselgrove 1993). It is these coins that provide us with the first names from the South West, probably those of kings or chiefs such as BODVOC, and the distributions of series of coinages can be compared to those of distinctive types of pottery and burials, sometimes also thought to indicate tribal groupings (Sellwood 1984).

At a broad level the distribution of individual coinages is relatively well defined (Sellwood 1984; Haselgrove 1994) and it indicates that coinage was not issued, and used only rarely, in Cornwall and Devon. Much detail remains to be defined but the major coin issuing areas were in Dorset, often equated with the tribe of the Durotriges, and Gloucestershire, equated with the Dobunni. Both coinages circulated in Somerset. The situation in Wiltshire is more elusive (Robinson 1977; 1997). The Portable Antiquities Scheme is also leading the discovery of new types of coins, and the revision of the known distributions of better known types (such as by Rudd 2006; Haselgrove *et al.* forthcoming).

Apart from the early coinages (which were not issued in the South West) only the coinage of the Dobunni (van Arsdell 1994) and particular issues found in northern Wiltshire (Robinson 1977) have been published systematically.

6.3.4 Social Life

Religion

It has been recognised that the distinction in contemporary western thought between ritual and daily practice may have little relevance for much of the Iron Age (Bradley 2005). In the last 20 years a series of seminal studies (such as that by Cunliffe 1992) showed that many settlements in Britain have evidence for cosmology embedded in the architecture and practices of daily life. These studies have changed the study of the Iron Age.

The orientation of the entrances to houses, farms and forts have been shown to be aligned regularly on the rising sun (Oswald 1997; Hill 1989) and the deliberate burial of all or parts of people, animals and objects within settlements has been shown to have as much to do with ritual as rubbish (Hill 1995a; 1996). Many of the key studies have been based on Wessex but it is clear that their implications reach more widely. The recognition of placed or structured deposits on Iron Age settlements throughout the South West is increasingly common, though the criteria for these interpretations vary.

Presumably because of this incorporation of religious activity into daily life, few shrines are known, and those that are, date to the end of the Iron Age. Perhaps the most convincing example comes from Cadbury Castle where a small rectangular structure with a porch is interpreted as a shrine (Downes 1997; Barrett *et al.* 2000). Other possible examples include the small enclosure at Uley West Hill that preceded the Roman temple (A Woodward and Leach 1993) and, less certainly, there are hints of a predecessor to the Romano-Celtic temple at Maiden Castle (Drury 1980). There is also a building in the Harlyn Bay cemetery (Whimster 1977a). It should be noted that the large structure within the Pilsdon Pen hillfort that was tentatively interpreted as a *Viereckshanze* (Gelling 1977) is better interpreted as a more mundane, and much later, rabbit warren.

Finds of Late Iron Age pottery and coins at Roman temple sites may hint at Iron Age origins, for example at Wycomb (Timby 1998) and Hailey Wood (Moore 2001) in Gloucestershire but many could well have been deposited in the early Roman period, as seems to have been the case with the Iron Age coins from Bath (Cunliffe and Davenport 1985, 279).

However, finds of Iron Age metalwork from watery contexts are still best interpreted as votive offerings, though the rarity of finds from such a major river as the Severn is noteworthy (Fitzpatrick 1984). The Salisbury hoard of miniature Iron Age shields and cauldrons, which included a remarkable collection of objects that also span much of the Bronze Age, is without compare anywhere in Britain or Europe (Stead 1998).

Burials

Until relatively recently the burials of the people of Iron Age Britain were notable for their apparent absence and could be treated as a "negative type-fossil as it were" (Hodson 1964, 105). Today, the picture is very different (Whimster 1977a; 1981) and Iron Age mortuary practices in the South West can be thought to have included:

- excarnation
- excarnation followed by secondary burial
- "formal" inhumation burial within settlements
- inhumation burials in graves dug specifically for that purpose
- occasionally cremation burial
- probably, the disposal of the dead in watery places

Of these methods, excarnation appears to have been the most common means of disposing of the dead for much of the Iron Age. In southern England, parts of human bodies are often found in storage pits within settlements (Whimster 1977b; Whimster 1981, 4–36; Wilson 1981; Wait 1985, 83–121), suggesting that some corpses were exposed until the flesh had decayed and/or been picked clean by birds and animals. In some cases after the flesh and muscle had decayed sufficiently for the major limbs to be separated, parts of the body were buried within settlements in a form of secondary burial (Carr and Knusel 1997). The finds of human remains from the Mendip caves may also be related to this way of disposing of the dead.

At the same time, however, complete corpses were also buried within pits in settlements and in settlement enclosure ditches. It is extremely rare for grave goods to have been placed with the dead in these contexts but there is considerable complexity within the burial rites (Hill 1995c, 11–13, 105–8). The idea that the remains found within settlements are those of social outcasts or the unclean rather than typical burials is questionable (Fitzpatrick 1997, 82).

Within the South West these practices have been best studied in Wiltshire and Dorset but there is also evidence from Gloucestershire (Moore 2006b) and Somerset. Examples from Gloucestershire include Frocester, Salmonsbury (Dunning 1976), Ditches (Trow *et al.* forthcoming; Trow 1988), Bagendon (Clifford 1961) and Little Solsbury (Falconer and Adams Bryan 1935). This might be true also of the human remains found in the swallow hole at Alveston. There also appears to have been an emphasis placed on deposition in boundary features. At Glastonbury Lake Village four complete adult human skulls, three male and one female, bearing sword cuts were found in close proximity to the timber palisade surrounding the village. The interpretation of the large number of human remains found along with weapons and other

objects at Spettisbury hillfort is not clear (Fitzpatrick 1984).

Two distinctive inhumation rites are clearly recognised: one in Cornwall and the Isles of Scilly, and the other in Dorset. Both isolated burials and cemeteries are known from these areas. How frequent inhumation burial was elsewhere is not clear as its recognition is largely dependent on context or radiocarbon dating.

To take Gloucestershire as an example (Moore 2006b), inhumation burials certainly of Iron Age date are rare, but there are possible Late Iron Age examples from Barnwood (Clifford 1934) and Bagendon (Rees 1932; Staelens 1982, 29). However, an unaccompanied crouched inhumation from Lynches near Baunton was only shown to be Later Iron Age in date by radiocarbon dating (Mudd *et al.* 1999). This single date allows it to be suggested that, in common with other parts of southern England, other isolated crouched inhumations in Gloucestershire, for example those from the ramparts at Uley Bury (Saville 1983b, 12) and examples from Norbury (Saville 1983b, 42) and Shipton Oliffe (Timby 1998), may be Iron Age. Other crouched inhumations are known from the Iron Age settlements at Roughground Farm (Allen *et al.* 1993), Bourton-on-the-Water, Frocester and Salmonsbury and also from storage pits at Guiting Power (Gascoigne 1973) and Kemble (King *et al.* 1996). A Late Iron Age cemetery has recently been excavated at Henbury (Cotswold Archaeology 2005). A similar pattern may be anticipated in northern Dorset and also in Somerset.

Of the well-defined, distinctive burial rites, that of South-Western Cist Burial started in the Middle Iron Age. Found in Cornwall and the Isles of Scilly, the burials are usually flexed or crouched inhumations in oval or rectangular graves in small cemeteries though some larger ones, such as Harlyn Bay (Whimster 1977a) are known. Many graves are stone-lined cists. Grave goods are rare and are often costume fittings, though some decorated mirrors were placed with the dead (Whimster 1977b; Whimster 1981, 60–74; Nowakowski 1991, 229–32).

"Durotrigian" burials are found in Dorset – and mainly in south Dorset. The dead were often buried in a crouched position, usually on lying on their right-hand side, with the head towards the east. The graves were often oval and shallow (Wheeler 1943; Aitken and Aitken 1991; Mckinley 1999). Joints of meat, and pottery, are the most common grave goods but almost half of the burials do not have grave goods (Whimster 1981, 37–59, figs 22–3; A Woodward 1993, 216–19). There is little evidence that this rite appeared before mid-first century BC.

A few burials include objects (swords or mirrors) that are found in other regional burial rites in England and are suggestive of a particular status. Across Britain, burials with swords that are certainly of Iron Age date are only found with inhumation burials. Mirrors are found with both cremation burials and inhumations. The Bryher burial is unique in having both a sword and shield, and a decorated mirror (Johns 2002–3).

Burials with mirrors are known at Birdlip along with a range other grave goods (Staelens 1982) and also at Portesham though this burial was probably made shortly after the Roman conquest (Fitzpatrick 1996). At High Nash, Coleford a sword and shield boss appear to derive from a warrior burial, probably dating to the 1st century AD (Webster 1989; 1990) and there are hints of a possible Late Iron Age bucket burial at Rodborough. A burial with a sword, but also tools, is known from Whitcombe (Aitken and Aitken 1991). All of these finds date close to the Roman conquest of the South West.

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6.4 Radiocarbon dates

Table 6.1: *Details of radiocarbon dates used in the text. Calibrated ranges are at 2σ (95.4%) and were calculated with OxCAL 3.10 (Bronk Ramsey 2005) using the probability method and the IntCal04 calibration curve (Reimer et al. 2004).*

Lab. Ref.	^{14}C age BP	Cal AD	Site	Context	Reference
GU-4745	2900±60	1270 – 910	Huntsman's Quarry	human bone fragments	Patrick Foster Associates (2000)
GU-4782	2860±70	1260 – 840	Huntsman's Quarry	human bone fragments	Patrick Foster Associates (2000)

7

Romano-British Environmental Background

Vanessa Straker, Anthony Brown, Ralph Fyfe and Julie Jones

7.1 Introduction

This is not a full review of all the palaeoenvironmental studies carried out in the region, but a general summary with most emphasis placed on the environment in which Romano-British communities lived. It does not provide a comprehensive review of crop and animal husbandry in the region. Reviews of environmental archaeology carried out or commissioned by English Heritage are in progress or complete and will give an account of knowledge in these areas. Those wishing to follow this up should consult the English Heritage website (http://www.english-heritage.org.uk and follow the links Research & Conservation → Archaeology & Buildings → Scientific Techniques → Environmental Studies → Regional Reviews). At the time of writing, the reviews on insects (Robinson 2002) and wood and charcoal (W Smith 2002) were available as PDF files. Reviews of plant macrofossils, pollen, animal bones and geoarchaeology from southern England are in preparation and will be placed on the website when available. Rob Scaife very kindly made available a draft of his pollen review for this resource assessment. The excellent review of environmental archaeology in South West England by Martin Bell (1984) is still a very useful source of information. There are also reviews of environmental evidence in the Urban Archaeological Assessments for Bath (not yet published) and Bristol (Brett 2005), which are of relevance for this period. Urban deposits have not generally been referred to, but will be included in the reviews noted above. The inclusion of "grey" literature has not been comprehensive.

The Roman period saw the introduction and more widespread presence of exotic food plants such as fruits, herbs and spices. A wider range of arable weeds is also found, though Robinson (2007, 360) noted that weeds of Mediterranean origin such as corn cockle (*Agrostemma githago*) arrived shortly before the Roman conquest. Many of these plants have since become part of the British flora. An example from Claydon Pike (upper Thames valley) is given below, but there are many other examples from the region. The review of plant macrofossils noted above (Campbell in prep.) will be a useful source for this information.

The introduction to the Late Bronze Age and Iron Age section (on page 103) includes a summary of sources of evidence and conditions for preservation which are not repeated here, but are equally relevant for this period, apart from site-specific references.

There are fewer studies of off-site sequences than for earlier periods, though some upland and lowland wetland sequences do cover the Roman period and have the potential to give information on the local or wider environment, depending on the catchment size.

7.2 Area reviews

A brief summary of present knowledge is given for each of the physiographic sub-regions in the South West.

7.2.1 Chalk downland, heaths (Wiltshire and Dorset)

There are very few studies from this area that cover the Roman period. Molluscs from a colluvial and alluvial terrace sequence at Winterbourne in the Kennet valley, *c*.300m to the north east of Silbury Hill, provided local information for an area with evidence of settlement and farming (Allen 1996). The floodplain vegetation was open pasture with possible cultivation on valley slopes. Plant macrofossils and molluscs suggest mixed farming, the arable principally being cultivation of spelt wheat. As the excavation was along

a pipe trench, the animal assemblages are too small for meaningful interpretation.

A change in local land use between the 1st and late 3rd to early 4th centuries AD was demonstrated by mollusc studies at Dorchester (County Hall site). By the later phase, the Early Roman pasture and arable adjacent to the Roman town had become a more semi-urban farm or garden environment with localised patches of unkempt grass and walls (Allen in RJC Smith 1994, 71–3).

7.2.2 Jurassic and Carboniferous uplands (Cotswolds and Mendip)

The few studies of Roman vegetation and environment from the Cotswolds indicate the use of grassland; both managed and for grazing, though arable must also have been important to supply the villa estates. There are no pollen studies and information comes from insects and plant macrofossils.

The plant macrofossils from below a construction layer for Ermin Street, to the south of Cirencester, give an idea of the local landscape prior to road construction. In this area, the road was built over open damp grassland, with a wet marshy area. There are also species such as chickweed, stinging nettle, fat hen and henbane which suggest some soil enrichment and disturbance (Pelling 1999, 475).

Insects indicative of pastureland were recovered from a well at Barnsley Park villa (Coope and Osborne 1967). Mineral-replaced seeds and arthropods from the fills of a late Roman latrine pit in the ritual complex on West Hill, Uley were largely the remains of animal fodder in the form of cut hay from managed grassland, of a type similar to unimproved hay meadow. Whether the hay was grown locally or brought from some distance is not known. The most likely use for this was as feed for the goats and sheep associated with the cult of Mercury around which the complex was centred (Girling and Straker 1993). The mineral-replacement of the un-charred seeds and arthropods took place in short-lived semi-liquid conditions rich in calcium and phosphate, which preserved evidence that would not have survived otherwise.

The largely limestone soils and sediments of the Mendip Hills afford few opportunities for palaeovegetation studies, but a shallow basin fen peat on dolomitic conglomerate was sampled at Rowberrow Hill, Shipham (Scaife 1998; forthcoming). This is undated but a Roman or later date is postulated for the open herbaceous environment which is strongly arable with some pasture. The site is located near the Roman villa at Star. Studies on the effect of Roman lead mining are noted below.

7.2.3 Upper Thames valley

Most of the insect evidence for the Roman period in South West England comes from the Cotswold Water Park area (the hinterland to the south and south east of Cirencester). The integrated insect and plant macrofossil evidence has allowed detailed reconstruction of local environmental conditions for some settlements.

Robinson (2007, 360) comments that at Claydon Pike, one of the principal sites in the Cotswold Water Park, Phase 2 extended into the 1st century AD and remained essentially Iron Age in character. Evidence for landscape character associated with the 2nd- and 3rd-century AD settlement (Phase 3) has the benefit of good preservation of a range of waterlogged and charred environmental remains (particularly insects, pollen and plant macrofossils). The insect assemblage is of a fully "Roman" character with an increase in synanthropic beetles which Robinson (2007) relates to a greater intensity of occupation. Ditched boundaries, necessary because of the raised water table, were lined with trees and shrubs including osier and ash. The grassland flora was species-rich hay meadow, which in wetter areas graded into fen meadow. Specialised grassland management for hay, would have provided nutritious winter fodder for stock. The hay meadow plants included meadow buttercup (*Ranunculus* cf. *acris*), yellow rattle (*Rhinanthus* sp), knapweed (*Centaurea nigra*) and ox-eye daisy (*Leucanthemum vulgare*). The beetles included species that feed on vetches (*Vicia* spp), clovers (*Trifolium* spp) and plantains (*Plantago* spp.). Overall, the evidence was indicative of the presence of some domestic animals in a settlement surrounded by a large area of hay meadow. Robinson (2007, 361) speculates whether the scale of production could also have been to supply needs outside the settlement. Unlike in the Iron Age, the crop repertoire of hulled wheat and barley included flax and introduced horticultural crops providing fruit, flavourings and spices such as coriander, celery, dill, and pear. The meat and fish component of the diet was also more varied.

The Late Roman (4th century AD) environment in the Cotswold Water Park area experienced more extensive flooding than earlier centuries. The background presence of ancient woodland remained low, and although the cultivated plants remained as diverse as in the previous two centuries, more grassland around the settlement was grazed with less evidence of managed hay meadows (Robinson 2007, 362).

Lambrick (1992) considered the increase in floodplain alluvium in the upper Thames valley during the Roman period to be evidence for erosion on the valley sides due to arable intensification in the Late Iron Age and Roman periods.

7.2.4 Coastal lowlands (Somerset, Severn and Avon Levels)

For Somerset, the regional picture from pollen analysis shows that, by the Roman period, the dense oak-hazel woodland with lime, elm and other species, which had established on the higher ground from the Middle Mesolithic, was much reduced.

Radiocarbon dates on peat in various places show that peat was still growing in the Roman and Medieval periods, however, later peat cutting, combined with peat wastage has largely removed it (AG Brown *et al.* 2003a; Housley *et al.* in press). The raised bog on Shapwick, Meare and Ashcott heaths in the Brue valley extended as far west as the bridge over the Huntspill at Woolavington. Further west, the coastal floodplain supported saltmarsh (Tinsley 2003). The wetland environment of other parts of the inland areas varied, with alder and sedge swamp in the Glastonbury area, for example (Brunning *et al.* 1995; Housley 1988; 1995; Housley *et al.* 1999).

Excavation on the banks of the Huntspill river showed that peat accumulated until at least the end of the Iron Age. A saltern was constructed on the surface of the raised bog which had replaced earlier fen woodland. The top of the peat bed was truncated due to erosion associated either with the Roman use of the saltern, or to later inundation. Salt marsh communities developed during the period of use and after abandonment (J Jones 2003; Tinsley 2003). Early Roman salt production at Puxton Dolemoor took place on a high intertidal salt marsh and was followed by a ditched enclosure system (see below on the current page and Rippon 2006). Raised bog peat was used as fuel for brine evaporation at East Huntspill (Leech *et al.* 1983).

In the Axe valley, salt marsh developed on the marine clay which accumulated on top of prehistoric peat. Studies including measurement of chemostratigraphic markers such as lead showed that at Nyland Hill, the salt marsh was reclaimed during the Romano-British period (Haslett *et al.* 1997a). Macklin (1985) examined the effects of mining on Mendip by studying the heavy metal chemistry of sediments in the Axe catchment downstream of the hills. High levels of lead in the alluvial silts were correlated with Roman or earlier mining.

Romano-British reclamation has also been noted at several sites in Gloucestershire (for example by Allen and Fulford 1990), but the chronology of the changing environmental conditions has been studied in most detail on Puxton Dolemoor, Banwell and Kenn Moor in North Somerset (Rippon 2006). A detailed discussion of Romano-British reclamation in the North Somerset Levels and its wider context was published by Rippon (2006); some elements are summarised below.

Rippon (2006) reports the specialist analyses of pollen (Tinsley), plant macrofossils (Jones), molluscs (Davies), diatoms (Cameron) and foraminifera (Kreiser) from the ditches of an Early Roman enclosure system at Puxton Dolemoor, which was dug into the top of the pre-existing high salt marsh. The micro and macrofossils show that the waters of the drainage system were tidal, and the reclaimed saltmarsh included sea blite (*Suaeda maritima*), glassworts (*Salicornia* spp.), oraches (*Atriplex* spp.) and probably also sea aster (*Solidago virgaurea* type). The later Roman (mid 3rd century AD) reclamation on Banwell and Kenn Moors was on a larger scale and the ditches contained freshwater, as did the later ditch fills at Puxton (Rippon 2006, 33). The fields supported wheat and barley, and the grazing of cattle and sheep. However further to the south, the lower Brue valley remained unreclaimed and, as noted above, salt production continued. The reclaimed Roman landscape of the North Somerset Levels did not survive beyond the later 4th century AD, when higher saltmarsh vegetation colonised the alluvial silts that accumulated for a few more centuries.

Kenn Moor also provides the only evidence so far from the Severn levels, for the management of grassland to produce hay (Jones in Rippon 2000). Unusually, the evidence comes from charred plant macrofossils, rather than insects or waterlogged macrofossils. Typical hay meadow dicotyledon-rich grassland taxa were recovered from a farmstead complex. Charcoal rich lenses in ditch fills associated with an adjacent corn drier preserved charred cereal remains with evidence for the parching of barley and spelt wheat spikelets (Jones in Rippon 2000). A mixed farming system with both arable cultivation and management of meadows for hay and fodder production is evident. Hay meadows would have been carefully managed to provide vital sources of nutritious winter fodder.

Further north in the Severn levels, glimpses of the former Roman landscape have been provided by many evaluations and excavations in Bristol and South Gloucestershire. The works associated with the Second Severn Crossing, for example, afforded opportunities to study the late prehistoric and Roman environment (Lawler *et al.* 1992; JP Gardiner *et al.* 2002). The Seabank pipeline provided stratigraphic sections through the floodplain south eastwards from Seabank power station and north eastwards parallel to the break of slope (Carter *et al.* 2003; Masser *et al.* 2005).

Masser *et al.* (2005) summarise the evidence from 1st and 2nd century AD sites on or beside the Severn floodplain on the Avonmouth levels. They consider that on the basis of present evidence for Late Iron Age and Early Roman sites, land use may have been more settled than JP Gardiner *et al.* (2002) postulated, as the evidence for abandonment due to increasingly severe flooding in the later 2nd century AD is not universal.

Indeed, at Farm Lane, deposits containing Roman pottery were immediately below the modern topsoil at +6.1m OD and Masser *et al.* (2005) comment that here there is no evidence for any significant sediment accretion in historic times. The ditched field system at Crook's Marsh Farm, the only site on the alluvium yet known to have been occupied in the late 4th century AD, shows occasional incursions of sea water. This suggests that a piecemeal reclamation strategy was sufficient to allow farming to continue and that occasional marine flooding did not result in abandonment (Masser *et al.* 2005). The settlement may have been situated on a coastal levee and been at a slightly higher altitude than locations further inland. Masser *et al.* (2005) note that a major episode of reclamation and colonisation is evident in the Late Roman period for other areas on the Severn floodplain.

7.2.5 Triassic and Devonian hills and valleys (south Somerset, Devon and east Cornwall)

Most information from south Somerset comes from on-site contexts producing ample evidence for mixed farming with cultivation of hulled barley and particularly spelt wheat. The settlements at Fosse Lane, Shepton Mallet and Ilchester are especially rich in this regard (Leach and Evans 2001; Leach 1982; 1994). The only insect remains studied are from Catsgore and indicate local pasture (Girling 1984). Hillman (in Leech 1982a) interpreted the large charred grain assemblage from Catsgore as evidence of spelt kilning.

Three military sites in south Devon have provided some evidence for aspects of living conditions, the local environment and use of local resources. The flora and fauna (plant macrofossils, insects and ostracods) in the 1st-century AD fortress ditch at Friernhay Street in Exeter were wetland species living in the increasingly wet conditions in the ditch, but seeds and beetles also indicated the proximity or arable and pasture. The presence of woodworm presumably relates to timber buildings inside the fortress (Straker *et al.* 1984).

At Woodbury Great Close near Axminster, pollen and plant macrofossils (Straker and Jones 1993), beetles (D Smith 1993) and ostracods (Robinson 1993) preserved in the anoxic sediments in the 1st-century AD fort ditch, demonstrated that open ground, devoted to both pasture and/or meadowland and arable, was close nearby. It was not possible to say whether any pasture for grazing of horses, for example, existed inside the precinct. The ditch contained standing water, at least in its lower levels, which supported a varied aquatic flora and fauna.

The sections of ditch examined both at Woodbury Great Close and at Exeter give an overall impression of an environment more in keeping with rural Roman sites than large urban centres. It would, however, be instructive to examine further sections of both fort ditches for spatial variation.

More extensive studies have been carried out on the military base at Pomeroy Wood *c.*25km to the north east of Exeter (Fitzpatrick *et al.* 1999). These include the 1st-century AD waterlogged organic deposits in a well (3047) in the interior of the base which give insight into the local conditions. The insect remains include four species of pests of stored grain and one of beans and, in particular, beetles characteristic of stable manure and dung. Robinson (1999a) concluded that the waste material dumped in the well is consistent with stable waste of horses given infested grain amongst their fodder. One of the grain pests, *Sitophilous granarious*, was also found in the 1st-century AD fortress ditch in Exeter (Straker *et al.* 1984). Robinson (1999a) comments that these grain pests tend to be found in military contexts where large amounts of cleaned grain were stored and vulnerable to attack. They are not usually found in rural settlements. Beetles typical of pasture and ungrazed grassland including clover and vetches also found their way into the well. The plant macrofossils (Clapham 1999) support this interpretation and include cereal chaff and weeds of short and probably well grazed grassland, as does the pollen (Scaife 1999b). The well was likely to have been close to where horses grazed and were housed. A later Roman well (3791) relating to the civilian settlement, contained a very different insect fauna with no grain pests and showed proximity to a timber building infested with woodworm and grazed pasture, a fauna considered by Robinson (1999a) to be typical of low-status rural Roman settlements.

The extent of local and regional woodland is addressed by the pollen analysis from well 3047, which concluded that oak and hazel were the principal elements of the local and regional growth, with occasional ash and beech, but due to the complex taphonomy of the well fill, the extent of the woodland was unclear (Scaife 1999b). Charred plant macrofossils and a lot of charcoal were also discarded in the well. The charcoal amplifies the pollen evidence for availability of woody plants, though it cannot be assumed that it was all growing locally. Charcoal from the well was mainly oak and hazel roundwood, but ash, alder, birch and Pomoidae (hawthorn group) were also present. Extensive charcoal analyses from other contexts represented the three main phases but although the site became a civilian settlement in the 2nd century AD, Gale (1999) comments that the character and type of fuel remained similar and were supplied from managed woodland, with a greater range of species than found in the well alone. Heathland species (bracken, cross-leaved heath and ling) were preserved as both charcoal and charred seeds; Clapham (1999) speculated that the heathland plants

could have been collected from local habitats or been collected from the Blackdown Hills to the north or heathlands to the south. The resource was therefore readily available.

Recent research into the past environments of the Blackdown Hills was carried out as part of the Community Landscapes Project (2000–2004), funded by the Heritage Lottery Fund, Exeter University and Devon County Council. Peat deposits from several valley or spring mires span the Roman period and at Bywood Farm extend to the Post-Medieval period. Woodland persisted throughout the Holocene, probably on steeper slopes and under management. The fact that oak and hazel woodland remained significant components of the landscape after the Iron Age may be related to iron working and related woodland management and/or the maintenance of wood pasture. There is continuation of the arable cultivation first noted in the Iron Age with no discernable change in activity in the Roman period (A G Brown pers. comm.; AG Brown *et al.* 2004; Hawkins 2005).

In central Devon, four local sequences from Knowstone and Rackenford Moors span the Roman period (Fyfe *et al.* 2004). These are from Lobb's Bog, Hare's Down, North Middle Combe and Windmill Rough. All show that the land use remained as pasture throughout Roman period.

Few Roman rural industrial sites have been excavated in the South West, other than those concerned with iron smelting or smithing. One such was excavated close to the present beach at Duckpool, near Morwenstow on the north Cornwall coast. The industrial activity included casting of lead, pewter and possibly also copper-alloy objects and the extraction of purple dye from dog whelk shells (Ratcliffe 1995). Light (1995) described the oblique clipping of the shells in order to extract soft body parts for dye extraction. The Duckpool evidence is the only known incidence of this practice in Roman Britain. The terrestrial molluscs suggest that the landscape setting of the industries was similar to the present day dry open environment of short-turfed grassland (Robinson 1995). The main difference is that sea level rise and coastal erosion now places the site at the back of the present beach.

7.2.6 Moorland (west Cornwall, Bodmin, Carnmenellis, St Austell area, Dartmoor and Exmoor)

On Penwith, a buried soil beneath a boundary wall of Romano-British date at Foage, Zennor is assumed to be Roman or earlier (Herring 1993b). The local vegetation was open herbaceous grassland with bedstraw, scabious, plantains, meadowsweet, buttercups, tormentil and species in the Caryophyllaceae, Compositate and Umbelliferae families. Pollen of heathers and oak, elm, holly and birch amounted to only 5–10% total land pollen, so any scrub, hedges or heathland was very limited.

Sites such as Porthleven (Tinsley and Jones in Lawson-Jones 1999) and Marazion Marsh (Healey 1999) suggest that woodland persisted for longer in the Cornish coastal valleys than on the open ground. At Porthleven, the mire vegetation varied between carr woodland, open water and scrub, as water level fluctuated. The evidence for human activity in the valley increased over time and the woodland decreased from some time in the early centuries AD. The cliff-top heathland vegetation, first noted in the Late Neolithic–Early Bronze Age continues throughout the entire vegetation record.

On Bodmin Moor, pollen analyses from Rough Tor and Tresellern Marsh on North Moor show renewed woodland clearance after some regeneration at the end of the Bronze Age (Gearey *et al.* 2000b). The amount and diversity of anthropogenic indicators increased during the 1st millennium AD, suggesting that the use of the moors intensified in the later Iron Age to the Early Medieval period. Gearey *et al.* (2000b) identified a range of taxa including black knapweed (*Centaurea nigra*), dandelion type (Lactuceae), *Cirsium*-type, Rubiaceae, devil's bit scabious (*Succisa pratensis*), members of the Apiaceae family and plantains (*Plantago* spp.) typical of herb rich meadows on poor soils in the uplands. Management by cutting once or twice a year, in combination with seasonal grazing is a possibility. Gearey *et al.* (2000b) suggest that later prehistoric and Roman activity on the moor could have been more extensive and significant than is generally acknowledged on the basis of recognisable field monuments.

Data from Exmoor and a little from Dartmoor also show clearance and farming in the later 1st millennium BC and the first few hundred years of the historic period, with little or no discernible change in the environmental record during the Roman period (Merryfield and Moore 1974; Francis and Slater 1992; Fyfe 2000; Fyfe *et al.* 2003b; Fyfe and Rippon 2004; Rippon *et al.* 2006; West *et al.* 1996; West 1997). Gearey *et al.* (2000b) postulate that in some local areas human activity on the uplands could have been as intense and varied as during the Bronze Age.

Extensive evidence of Roman iron working on Exmoor has been identified by the Exmoor Iron project. Geochemical studies on sequences at Roman Lode and North Twitchen Springs are in progress to examine its impact (Ralph Fyfe pers. comm.).

The vegetation record from valley/spring mires at Long Breach (*c.*3500 BC to *c.*AD 1300), Gourt Mires (*c.*2400 BC to *c.*AD 1000) and Anstey's Combe (*c.*100 BC to *c.*AD 1500) shows the scale of variation in vegetation type around the southern fringe of Exmoor

(Fyfe *et al.* 2003b). The authors state that there is "no discernible Roman or post-Roman period impact on the vegetation, suggesting cultural stability from the Late Iron Age to the Early Medieval period". There is some increase in wetter heath at Long Breach and the question remains whether this is due to human activity or some climatic deterioration in the Roman to Medieval period.

7.3 Discussion

As for other periods, evidence for past vegetation is scarce from the Cotswolds, Mendip and chalklands. For the uplands, on Dartmoor in particular there has been little recent work covering this period.

Some pollen diagrams do span the Roman period, however high resolution analysis and dating has not generally been done on the parts of the sequences covering this period.

There is still a need for good quality multidisciplinary historic period palaeoenvironmental studies from many parts of the region. Studies from the upland areas of the west of the region are still limited principally to pollen analysis. Inclusion of insect, plant macrofossil, chironomid and testate amoebae analyses where appropriate would add much local detail to present knowledge. Inclusion of geochemical studies is also pertinent for some areas, particularly those with a mining history to better understand the impact of mineral extraction on the local landscape.

Buried soil analyses give an indication of local vegetation and land use, but should be backed up with other local analyses to establish the extent of spatial variation.

Bearing in mind the limitations of the data, a few general points can be made.

The main episodes of woodland clearance had taken place by the 1st century AD. In much of the east and central part of the region, mixed farming was widespread, with the retention of some woodland in areas, such as the Blackdown Hills and Forest of Dean, associated with iron working. Some areas are likely to have supported arable on a larger scale, notably parts of Somerset and Gloucestershire where there is a high density of Roman settlements and soils well-suited to arable. For the Cotswolds, however, the small amount of evidence presently available is for grassland. In much of Cornwall, Dartmoor and Exmoor, the land use is likely to have been principally pasture with some arable in suitable locations. Management of grassland for hay is only reported for the upper Thames valley (Cotswold Water Park), the North Somerset levels (Kenn Moor) and the Cotswolds (Uley), though may have been more widespread than the present scarce data suggests. The first evidence of coastal reclamation is found in the Roman period, notably in North Somerset in the central part of the Severn levels.

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8

Roman

Edited by Neil Holbrook from contributions by Peter Davenport, David Evans, Neil Holbrook, Tony King, Peter Leach and Chris Webster

8.1 Introduction

The start of Roman Britain in the South West is traditionally dated to the campaigns of the Roman army under the future emperor, Vespasian in the years following the invasion of AD 43 under the imperial command of Claudius. This is based on the statement of Suetonius that Vespasian's forces fought 30 battles, took 20 *oppida* and the Isle of Wight. The reference to the Isle of Wight is the only geographical location given and has led to the assumption that this campaign was located in the south and west. The traditional picture of the invasion is being challenged even to its landing place and the discovery of a legionary tombstone in Oxfordshire has led some to question the location of the campaigns of Vespasian (Sauer 2005). There is also increasing evidence that Roman "interference" in Britain began in the reign of Gaius, or perhaps even earlier (Creighton 2001), and the presence of pre-conquest Roman imports at sites such as Hengistbury Head is well-known (Cunliffe 1987).

Archaeologically the earliest indication of a Roman presence in the region is a dated lead panel (AD 49, RIB 2404.1); a date that has been questioned, but that is now supported by Claudian pottery from the fort at Charterhouse-on-Mendip (Todd 1995; 2007). Other early material comes from Dorset, for example, Lake Farm and Hamworthy but the construction of the legionary fortresses at Exeter and Gloucester appears to date to the 50s AD. Away from the military sites and centrally planned *civitas* capitals there is little evidence of change, and earlier settlement forms persisted. It appears that more "Romanised" forms of settlement develop later, such as roadside settlements (perhaps from the 2nd century AD) and villas (primarily a 3rd- and 4th-century AD phenomenon). These changes within the Roman period are clearly in need of reconsideration as there has been a tendency in the past to examine each in isolation (the military, the towns, the villas...) with little consideration of their relationships through time and space.

While the origins of Roman Britain are not as clear cut as they might seem at first, defining the end is even more fraught with problems. For example, what is the relationship between the later Roman prosperity of the eastern half of the region and such factors as the drainage of the Somerset and Severn Levels, salt production, the Dean and Mendip mining and other production industries, or the Poole Harbour industries? There is also the question of the region's presumed inclusion within the late province of *Britannia Prima*. In the 5th century AD two basic schools of thought exist: a short chronology comprising a total systems collapse, (see for example, Esmonde Cleary 1989) and a long chronology which sees the continuance of Roman ideas for several centuries, albeit without new material culture which would ease its identification (such as proposed by KR Dark 2000). Many of these questions are discussed later but they have their origins in the Roman period itself. The question of what exactly we mean by Roman has been partly addressed by Faulkner (2002; 2004) and will not be re-addressed here, but it is crucial to our understanding of the eschatology of Britain's role in the Roman world.

8.2 The Material World

8.2.1 Rural settlement

There have been many excavations of rural sites within the region but historically most have concentrated on high status settlements, principally villas, although this is changing as development-led excavation has started to redress this imbalance. In addition, many of the villa excavations were focused on the recovery of the ground plan of the main residential buildings, and the reconstruction of their structural history, rather than

exploring their social and economic context. The ground plans do allow comparison of size, perhaps a reflection of wealth, while the publication of the mosaic corpus volume for our region has further emphasised the exceptional representation and quality of these sites (Neal and Cosh 2006). In contrast, a change of emphasis towards a better understanding of agricultural, social and economic life has so far had only limited application and will only be advanced through defining a wider set of research aims.

Full modern publication of work upon these high status sites is a rarity, notable exceptions being Gatcombe (Branigan 1977), Halstock (Lucas 1993), Great Witcombe (Leach 1998), Roughground Farm, Lechlade (Allen *et al.* 1993), Kingscote (although its precise status is still uncertain, Timby 1998), Frocester (Price 2000) and Great Bedwyn (Hostetter and Howe 1997). New discoveries continue to add to the extensive corpus of villa sites across the region, which has the highest density of identified sites in Roman Britain, although their marked absence in Devon (west of the Exe) and Cornwall persists. The only recent discovery in this area is at Crediton (Griffith 1988). Major new sites in Somerset include Dinnington (excavated by Time Team in 2002 and 2005, and now the focus of a research project by Winchester University), Hinton St George and Lopen near Ilminster, Yarford north of Taunton and Iford to the south of Bath. Recent work and new discoveries in Wiltshire are usefully summarised by Walters (2001), to which new sites near Malmesbury (Hart *et al.* 2005), Groundwell Ridge and Bradford-on-Avon can be added. The last two are now the subject of on-going research projects (Corney 2003 and English Heritage website). New sites in Dorset include Shillingstone and Minchinton, and in south Gloucestershire Badminton, Horton and Hawkesbury. New sites continue to turn up in the Gloucestershire Cotswolds (Holbrook 2006), most notably Turkdean (Holbrook 2004).

There has also been a number of significant investigations of non-villa rural sites, notably on the higher ground of the Cotswolds, Cranborne Chase, Salisbury Plain, Mendip and the Quantock Hills, of both nucleated and more isolated single settlements. Despite these, detailed investigations on the scale applied at Catsgore (Leech 1982a; Ellis 1984) – still a type-site for nucleated Romano-British agricultural settlements – are rare. This is doubtless a reflection of the nature of the great majority of modern site investigations, determined by development threats and a tailored response. Adequate publication of work on many such sites still lags far behind the range and scale of their field investigation, an extensive source of data vital to any understanding of the history and dynamics of rural settlement and land-use in the region.

Wider, more integrated, surveys such as those undertaken on Salisbury Plain (Fulford *et al.* 2006), in South Somerset and North Dorset (Leech 1982b), on the Somerset and Severn Estuary Levels (Rippon 1997a; 2000) and recently completed on the Quantocks and their environs, by English Heritage (Riley 2006) and Winchester University, have the potential to set both high status and other rural settlements in their wider agrarian, social and economic contexts. Methodologically in-depth, closely defined surveys such as that at Shapwick (Aston and Gerrard 1999; Gerrard and Aston forthcoming) and the South Cadbury Environs project (Tabor 2002; 2004b) in Somerset have demonstrated the potential to resolve key questions at the micro level but within a multi-scalar context. Several of the above have seen the use of large-scale geophysical surveys in tandem with excavation which has produced dramatic results. Other work, in Somerset (Leech *et al.* 1993), Gloucestershire (Holbrook 2003), Wiltshire and Cornwall (AM Jones 2000–1) has shown the high potential for this use of large area geophysical survey.

Because of the concentration on the plans and structures, the origins of villas in the South West require much more investigation. The few sites extensively excavated in modern times have shown the potential for adding to both our understanding of the Iron Age to Roman transition and of the early post-Roman period. Outside Devon and Cornwall, the concentration of villas around towns such as Cirencester, Ilchester and Dorchester, with their floruit so markedly in the 4th century, is especially notable and these need to be tied into broader, social, enquires into urbanisation (and de-urbanisation), wealth accumulation and population movement.

The chronologies, transitions and context of non-villa settlements are equally problematic. The potential for further research and excavation of sites known predominantly through field survey on Cranborne Chase, Salisbury Plain, the upper Thames valley (Leech 1977) and on the uplands and marginal lands of Devon and Cornwall (Griffith and Quinnell 1999) is underlined through the extensive excavation of Trethurgy in mid-Cornwall (Quinnell 2004a). This is a high priority for, with a few notable exceptions – Bradley Hill (Leech 1981b; Gerrard 2004a) and Catsgore (Leech 1982a; Ellis 1984), sites on Purbeck such as Ower (Sunter and Woodward 1987), Bestwall (forthcoming, see http://http://www.bestwall.co.uk) or Worth Matravers (Graham *et al.* 2002), Butcombe (still largely unpublished), Chisenbury Warren (Fulford *et al.* 2006), Birdlip Quarry on the Cotswolds (Mudd *et al.* 1999), sites in the Gloucestershire Severn valley around Tewkesbury and Gloucester (A Thomas *et al.* 2003; Walker *et al.* 2004) and Claydon Pike in the upper Thames valley (Miles *et al.* 2007) – so little is known of the lesser status rural settlements, villages, farmsteads,

Figure 8.1: *The discovery and excavation of a mosaic in a previously unknown villa at Lopen in Somerset during 2001 generated huge public and media interest. Photo: Somerset County Council.*

hamlets and other forms of settlement in which the majority of the population of the region must have lived. For Devon we still lack the complete plan of any rural settlement, and for the south-west peninsula as a whole, the data from Trethurgy has emphasised the potential for investigation of settlements with a high degree of survival of internal structural detail as stone has been used as the primary building material.

Rural settlement dynamics need to be set within a wider geographical, economic, social, demographic and temporal context (for Cornwall, see Herring forthcoming). There is a particular need for more work on the Roman/Post-Roman transition focusing on settlement forms, ownerships, communications and land-use/field-systems which may have continued functioning at different levels within this period.

8.2.2 Urban Settlement

The region contains one *colonia* (Gloucester: *Glevum*) and four, or five, *civitas* capitals: Exeter (*Isca Dumnoniorum*), Dorchester (*Durnovaria*), Cirencester (*Corinium Dobunnorum*), Ilchester (*Lindinis*) and just possibly Bath (*Aquae Sulis*). Other sites which might fall under the catch-all term of small town/market centre include Bath (*Aquae Sulis*), Shepton Mallet, ?Keynsham/Bitton(*Traiectus?*), Sea Mills (*Abonae*) Bourton-on-the-Water, Wycomb, Dymock, Coln St Aldwyns/Quenington, Wanborough (*Durocornovium*) and Mildenhall (*Cunetio*). Very small or uncertain towns include Tewkesbury, Dorn, Sandy Lane (*Verlucio?*), Camerton (Wedlake 1958), Easton Grey, Nettleton Shrub, Old Sarum (*Sorviodunum*), Badbury Rings (*Vindocladia*), Pomeroy Wood, Honiton or Woodbury, Axminster (*Moridunum?*) and perhaps Catsgore (Leech 1982a; Ellis 1984). The recently discovered site at Hall End, Wickwar appears to be another roadside settlement (Young 2003).

The known distribution, as outlined above, is biased towards the northern and eastern end of the region, with very few towns (in the broadest sense) west of Ilchester and Dorchester and with the main concentration in north Somerset and Gloucestershire; a pattern which does not seem to relate to physical landscape types. While, to some extent, this reflects the traditional (and more recent) concentration of archaeological work in these areas, no new sites have been discovered during extensive and intensive survey in several areas and it seems likely that the known distribution reflects long-accepted views on the different nature of societies in the east and west (or north and south?) parts of the region. To this extent understanding towns will have significant role in understanding the subtleties of societies that in one case welcomed towns and, in the other, rejected them.

This raises questions of definition, and more work needs to be undertaken to clarify what we mean by "town" (or more realistically agree the broad parameters within which various understandings of "town" can be discussed). This is particularly pressing for the so-called "small towns". For example, why is Camerton usually described as a town and Catsgore as a village? Both lie on a road, have industry and evidence of social differentiation. Similar questions can be raised over other "villages", on Salisbury Plain and elsewhere. Differentiation between a village and a small town will only come through an understanding of which activities actually went on in a given place, rather than a concentration on morphology. Some detailed study, including excavation, has been undertaken in an *ad hoc* way (for example Corney 2001; Leach and Ellis forthcoming; Timby 1998) but there is a need for more and, of course, full publication of work already done.

The definition of larger towns, for our purposes, *civitas* capitals and *coloniae*, is a simpler proposition, but there are still uncertainties. Ilchester (Leach 1982; 1994) is now largely accepted as a late sub-*civitas* capital, but how it acquired this status is unknown; did this have as much to do with its pre-Roman status as any economic, administrative or patronage issues? Did its late elevation require the construction of the usual structural elements of an earlier *civitas* capital, principally a forum and basilica? We equally have little idea of the relationship of economic to administrative status or, on this fringe area of urbanisation, the relationship between wealth (expressed in later Roman Somerset and the Cotswolds in massive building schemes in the countryside) and the size and sophistication of towns. Published and unpublished work in Cirencester (Holbrook 1998; Darvill and Gerrard 1994), Bath (Cunliffe 2000b), Ilchester (Leach 1982; 1994) and Shepton Mallet (Leach and Evans 2001) may go some way to answer this. In Gloucester (see Hurst 1988; 1999b;c) there are many important excavations dating back to the 1960s which still await publication and in particular we still know little about the later history of the *colonia*, especially in the 4th century.

In other parts of the region, the character and success or otherwise of the *civitas* capitals is unclear. Exeter, for instance "does not have the usual trappings of an urban centre; few substantial buildings have been located, the material culture is relatively 'poor', there is very limited epigraphic evidence and there is no evidence for villas/supporting agricultural economy in the hinterland. Major excavations are underway in the town but watching briefs in the supposed suburban area have been uninformative" (Peter Weddell, pers. comm.). This leaves questions such as was Exeter really atypical, did it reflect the character of the region, or was it a failure as an urban foundation?

The same, with less justification, could be said of Dorchester (see PJ Woodward *et al.* 1993 for an overview). While the topography of the town is slowly coming to light (such as the forum gravelling over a large length of recent service trenches in High East Street), little enough of its character is yet known. Its hinterland is better known and there is the clear possibility that the relationships of town to country over time can be studied in the future.

We are getting to grips with Bath (see Cunliffe 2000b); its origins and economy in the earlier Roman period are becoming clear, and there appears to be a change in the later Roman period. Dating of this and the later sub- and post-Roman changes are less clear. Bath, of course, is atypical and its status is unknown. Work at Shepton Mallet (Leach and Evans 2001) is very helpful and points up the importance of Somerset (real or is it chance?) in providing opportunities to study the late- to post-Roman transition. Ilchester (Leach 1982; 1994) is perhaps one of the most important potential sites for a range of these studies.

Several of the small towns have been examined in recent years, with Shepton Mallet one of the most extensively excavated in the country (Leach and Evans 2001; Leach and Ellis forthcoming). Others that have seen modern publication include Kingscote and Wycomb (Timby 1998), Mildenhall and other sites in Wiltshire (Corney 2001) and Woodbury, Axminster (Silvester and Bidwell 1984; Weddell *et al.* 1993; Cole and Linford 1993).

Towns were presumably foci for trade, and finds and environmental issues are fundamental to an understanding of this topic. The identification of small ports on the Severn coast, and rivers leading to it, in the medieval period suggests we should be able to identify some for the earlier ones: Sea Mills (Ellis 1987), Crandon Bridge (currently being written-up by Stephen Rippon at Exeter University) and Combwich might repay closer attention. Ports might also be expected on the Camel estuary around Padstow and perhaps in Barnstaple Bay (although no trace of Roman activity has so far come to light beneath the medieval towns of Barnstaple or Bideford (Holbrook 2001). On the Channel coast, Hamworthy, Seaton, Topsham, Mount Batten, St Michael's Mount (Herring 2000) and probably somewhere on the Fal estuary are all likely ports.

8.2.3 Technology and Production

Lead

It is probable that galena deposits on Mendip were exploited in the pre-Roman period, but the main phase of the lead industry there begins just after the conquest (Todd 1996; 2007). Fort construction at Charterhouse-on-Mendip dates from the late 40s AD, linked to surface extraction and digging of pits

into mineral-rich veins from AD 50/75 onwards (Todd 1996; 2007; Whittick 1982). The highly characteristic series of ingots confirms the growth of the industry during the 1st and 2nd centuries AD, and their distribution indicates export mainly to the east and south via a road running from Mendip to Salisbury, Winchester and Bitterne, whence to Gaul and beyond (RIB II 2404.4–13; *Britannia* 27, 1996, 446–8, nos 11–13; Elkington 1976; Todd 1996; 2007). Official involvement is thought to have declined by the 3rd century AD, and exploitation passed to private interests. As a consequence, later Roman evidence in the Charterhouse area is less clear, but is still definite (Todd 1996; 2007). More conclusive is the large quantity of Late Roman lead products, including coffins, water pipes and pewter (Elkington 1976, 195–7). It is possible that the lead and silver deposits on Exmoor and at Combe Martin might have been exploited although evidence is currently lacking.

Tin

The early date for lead exploitation contrasts with the mainly late Roman evidence for tin extraction in Cornwall, probably due to the easy availability of tin from Iberia in the 1st and 2nd centuries AD (Todd 1987, 231; Penhallurick 1986). Direct evidence for Roman tin streaming is lacking, except at Boscarne, near the early Roman fort of Nanstallon, which may imply an early official interest in the mineral, never followed up (Penhallurick 1986, 210–11; Fox and Ravenhill 1972, 90–1). Recent work on Dartmoor is also now trying to prove the Roman date of working widely assumed to have taken place (Thorndycraft *et al.* 2004). There are, however, Roman finds near the tin grounds, such as at Reskadinnick and, of course, the small villa at Magor (Penhallurick 1986, 158). Better evidence comes from artefacts, notably the tin vessel (96% pure) from near Caerhays Castle, containing a coin hoard dating to the 270s (Penhallurick 1986, 187). The artefactual evidence, including the small assemblage of ingots, suggests a greater level of activity from the 2nd century, and especially in the later Roman period (Penhallurick 1986, 200–13), the Trethurgy Round tin ingot being a good example (Quinnell 2004a, 72–3, fig 47; Penhallurick 1986, 228–9, fig 128).

Iron

Primary iron-ore working (as opposed to secondary working) is focused mainly on the Forest of Dean, but recent fieldwork has cast new light on the regionally important iron industry on Exmoor (Riley and Wilson-North 2001, 78–81; Wilson-North pers. comm.). Iron working also occurred widely on the Blackdown Hills from an early date, production sites stretching as far west as Gingerlands, Cullompton (Griffith and Weddell 1996; Reed 1997; Bill Horner pers. comm.). In the Forest of Dean, the clearest evidence comes from the two adits into ore-bearing strata at Lydney (Wheeler and Wheeler 1932, 18–22), from Newent, which appears to be an early Roman industrial settlement of *c.*47ha, with evidence for iron working, similar to that at Weston-under-Penyard (Herefordshire) on the north side of the Forest (Walters 1992, 82–4), and from villas such as the Chesters, Woolaston, where late Roman furnaces have been excavated (Fulford and Allen 1992). At the Chesters, ore was brought in from nearby, whilst the furnaces were fuelled by charcoal from managed woodlands. The villa-based iron working seems to have replaced the larger industrial settlements in the Late Roman period, probably at a smaller scale and as part of a mixed economy with farming (Fulford and Allen 1992, 200–5; Walters 1992, 91, 95). A fourth centre of iron making lay in South Gloucestershire around Mangotsfield where iron-making settlements have been partially examined (Holbrook 2006).

Coal and Stone

Coal was present at the Chesters villa, of local origin and probably used as a domestic fuel, not for iron-smelting (Fulford and Allen 1992, 191). The distribution of Roman coal finds in the South West is confined largely to Somerset, Gloucestershire and western Wiltshire, and the coal is derived from the local coalfields in the Forest of Dean and the Bristol and North Somerset area, as might be expected (Dearne and Branigan 1995; AHV Smith 1996; 1997). Use of coal seems to have been locally significant and becomes more widespread in the Late Roman period, but did not replace wood or wood-charcoal throughout most of the region.

Stone for building was much more readily exploited, and was clearly more significant economically. The higher quality stone sources in the region, notably Purbeck, Ham Hill, Chilmark stone, Lias limestones and oolitic limestone from the Cotswolds and the Bath area, were all fully exploited from early in the Roman period, as building material and architectural and other details on both public and domestic buildings clearly testify (Blagg 2002; Palmer 1996; Williams 1971). Purbeck was exported out of the region for fine-grain uses such as inscriptions (e.g. RIB I 91, Chichester, 1st century AD), as was oolitic limestone for monuments and sculpture (for example, Classicianus's tombstone, London, 1st century AD, Grasby and Tomlin 2002, 47–9), but generally usage was local to the quarries for most building stones, due to transport costs. Similar considerations applied to ceramic building materials such as roof and floor tiles, as the well-documented inscribed tiles of the Cirencester and Gloucester region demonstrate very well (McWhirr and Viner 1978).

Figure 8.2: *A so-called Chester type trumpet brooch (late 1st/early 2nd century) from Dymock and the mould in which it was cast. Photo: Toby Catchpole, Gloucestershire County Council.*

Other stone products included querns and millstones from sites in the Forest of Dean (Shaffrey 2006), Mendip and also at Pen Pits on the Somerset/Wiltshire border.

Shale suitable for working into artefacts is present in Britain only in Purbeck, and consequently this became a widely distributed specialist product of the South West. Iron Age production is well attested, utilising specialised flints as tools and making use of simple lathe technology. The use of the lathe increased during the Roman period, and led to the large-scale production of armlets, tableware and other artefacts (Sunter and Woodward 1987, 6, 145). Larger items such as table legs were hand-carved. Excavation of production sites in the Purbeck area (Sunter and Woodward 1987) shows that production was often combined with stone working, pottery and salt production, so that Purbeck and the Poole Harbour area can be regarded as a region that was probably more dependent on these industries than on agriculture. This combination of desirable products led to a thriving export trade, mainly by sea, as far as northern Britain and Gaul.

Salt

Poole Harbour was a major centre of salt production, as sites such as Ower (Sunter and Woodward 1987, 6–8) testify but other coastal zones in the South West region also have evidence for salt production, notably the coastal parts of the central Somerset Levels where over 100 sites are recorded in the HER (Leech and Leach 1982, 70–1; Rippon 1997b, 65–77). Development work has also produced more evidence in the North Somerset Levels at sites such as St Georges, Weston-super-Mare (Vince Russett pers. comm.). There is also evidence for saltmaking on Lundy (Quinnell 2004b), a location which would appear unlikely for large-scale production due to lack of fuel and transport difficulties.

Pottery

It was also the Poole Harbour area that was the location the most successful pottery production in the region. South-East Dorset Black Burnished Ware (BB1) was made from the conquest period, deriving from pre-Roman traditions, until the late 4th century

AD (Tyers 2004). At its greatest extent in the 2nd and 3rd centuries AD, the pottery was distributed throughout southern Britain and had a strong presence on Hadrian's Wall and the Antonine Wall, probably due to military contracts (Allen and Fulford 1996; Holbrook and Bidwell 1991, 88–114). Remarkably, the pottery was hand-made and relatively primitively fired, but was successful due to its thermal qualities as cooking ware (Farrar 1973). Production sites have been recently excavated at Ower (Sunter and Woodward 1987, 44–123), Worgret (Hearne and Smith 1992) and Bestwall (Ladle 2004). Black Burnished wares were also made during the late 1st to mid-3rd centuries AD elsewhere, perhaps the Ilchester area, (South-Western BB1), but only achieved a more localised distribution (Tyers 2004; Swan 1984, fiche 4: 582–95; Williams 1977, 192–3). The suggestion that some of this material was being made on salt mounds in the Somerset Levels has not been borne out by recent excavations (Richard Brunning, pers. comm.). The burnished ware tradition also influenced several forms produced in South Devon, mainly in the late Roman period (Tyers 2004; Holbrook and Bidwell 1991, 177–81).

The other significant pottery production area was in North Wiltshire, where Savernake-type grey wares were produced at several sites in the vicinity of Mildenhall (*Cunetio*) in the early Roman period and achieved a fairly prolific but regional distribution in Gloucestershire, the Bristol area and Wiltshire (Tyers 2004; Timby 2001; Hodder 1974). There was also an extensive grey-ware industry in North Somerset (Rahtz *et al.* 1992, 148; Watts and Leach 1996, 98–99) but the only kilns located have been at Congresbury (Usher and Lilly 1963/4; Scammell 1969: there is 280kg of pottery, yet to be published, in North Somerset Museum), although others clearly exist (Jane Timby, pers. comm.). It is possible that Roman production was set up on sites where Iron Age pottery had been produced, but by immigrant potters from the east who were following the Roman army westwards in order to supply the military market (Swan 1975). Military supply was also the motivation for the manufacture of highly distinctive pottery types at Kingsholm and Gloucester during the 1st century AD (Timby 1991).

Severn Valley Wares, previously considered also to have been set up to supply the military, are now seen to be pre-Roman in origin and separate from the Kingsholm/Gloucester types (Timby 1990). The manufacture of Severn Valley wares ranged from Somerset to Shropshire on several kiln sites of 1st- to 4th-century AD date; the distribution in the South West region was largely confined to Gloucestershire and the Bristol area (Tyers 2004). Red-slipped mortaria and other forms are known from Shepton Mallet (Scarth 1866) and there are other industries, such as South Devon Ware and South West White Slipped Ware that are poorly understood as yet.

8.3 Social Life

8.3.1 Ethnicity and identity

Understanding of the ways in which communities identified themselves in Roman Britain, and their differing attitudes to the acceptance or resistance (passive or otherwise) of aspects of the Roman "package" are much debated at the moment (see Mattingly 2002; 2004 for useful summaries). The South West has much to contribute to this topic. The recent report on Trethurgy makes much play of the distinctive culture of the Roman period in Cornwall, and it is be wondered to what degree the area west of Bodmin Moor was integrated into the *Civitas Dumnoniorum* (Quinnell 2004a). By virtue of a common administration there has been a tendency in the past to view the *civitates* as uniform entities, whereas it is now clear that there are region patterns both within and across the them (see for example Hurst 2005). The actual political boundaries of the *civitates* are therefore probably irrelevant to a consideration of regional and sub-regional identity. For instance regional patterns in the distribution of villas are well known, and presumably reflect choice just as much, if not more, than the ability to generate local economic wealth. Differing burial practices, such as a continuance of local Late Iron Age traditions of inhumation into the Early Roman period, also help to identify societies.

Artefact studies also have a role to play in recognising the ways in which groups identified themselves. For instance study of the production and distribution of metalwork allows patterning to be identified, although on a broader geographical scale than the fine grain often detectable in coarse pottery. There are types of brooch which clearly show a south-western distribution. Made of leaded bronze, their main area of production may lie on Mendip (moulds have been found at Compton Dando; Butcher in Quinnell 2004a, 71). Ellen Swift (2000, 129, fig. 174) has also recognised a type of 4th-century strip bracelet which shows a clear distribution focused on the Severn estuary. The identification of a class of late 4th-century bronze belt buckles decorated with outward-facing horse-heads (Hawkes and Dunning 1961, type IB) has long been known and recently Mark Corney and Nicholas Griffiths have been working on a new study of the distribution of this material. The results of this important research are not as yet fully published, although Swift (2000, 2, 185) has summarised some of their key conclusions. Corney and Griffiths have considerably enhanced the original distribution map and show that over 70% of all finds are from the Cotswolds and Wessex, a distribution seemingly centred upon Cirencester. They suggest that production was limited

to the late province of *Britannia Prima* and that there was military or official regulation of production and distribution. Whether such accoutrements were solely the preserve of soldiers is open to debate, but nevertheless the fresh study of these seemingly familiar artefacts is providing valuable new insights on the nature of state control in the latter half of the 4th century in our area.

8.3.2 Society and Territoriality

In the aftermath of the invasion of AD 43 the Roman authorities created a framework of regional government based upon *civitates*, each with an urban centre where the administration was based; a system that had been successfully adopted elsewhere in the western Empire. The South West comprised a number of *civitates*, whose approximate bounds can be reconstructed mostly on the evidence of Ptolomy's geography (Rivet 1964; Branigan 1976). It should not be assumed that the Roman *civitates* necessarily reflect the extent of pre-Roman groupings, and indeed in the case of the Dobunni this is almost certainly not the case.

In the far west were the Dumnonii whose eastern boundary is normally assumed to lie along the lines of the rivers Parrett or Axe in Somerset, and the east Devon Axe. Their centre lay at Exeter (*Isca Dumnoniorum*). To the east lay the Durotriges. The distribution of late pre-Roman Iron Age coins normally ascribed to the Durotriges, and so-called Durotrigian pottery, covers the area of Dorset, south Somerset, south Wiltshire and south-west Hampshire. Dorchester (*Durnovaria*) must have been the *civitas* capital, although it lacks its tribal suffix in the document known as the Antonine Itinerary. An inscription found on Hadrian's Wall records work done by people from the *civitas Durotrigum Lendiniensis*. *Lindinis* (*Lendiniae*) is Ilchester, and suggests that by the 3rd century AD the Durotriges had been split into two parts, one centred on Dorchester, the other on Ilchester. The *civitas* of the Belgae was centred on Winchester, and Ptolomy records that it contained Bath. If Ptolomy is correct, it creates an odd shape for the *civitas*, so much so that it is generally regarded as a new creation of the Roman government carved out of parts of the territory of the Atrebates in the east and the Dobunni in the west. The southern boundary of the Belgae perhaps ran along the southern edge of Mendip and then eastwards towards Old Sarum before turning south along the Hampshire Avon. The Avon or Frome, and the Thames perhaps defined the boundary between the Dobunni and the Belgae.

In the later Roman period the province of Britain was divided into two, and then again into four provinces, the latter event probably in the reign of Diocletian or perhaps slightly earlier. By deduction the province of *Britannia Prima* must lie in the west, and two pieces of evidence have been advanced to champion the theory (often repeated fact) that Cirencester was the capital of *Britannia Prima*. First that it was the largest walled town within the bounds of the province (which are nowhere attested) and second that it has produced an inscription which records a *rector* (official) of *Britannia Prima*. It must be stated, however, that interpretation of this inscription is not straight-forward, and it is not conclusive proof that Cirencester was the capital. Indeed Richard Reece has suggested that Gloucester could just as easily have fulfilled this role (Darvill and Gerrard 1994, 74).

8.3.3 Economy, Trade and Interaction

Overall, despite the considerable quantity of pottery manufactured in the South West and the export of BB1 to North Britain, the balance of ceramic trade was probably a negative one. In the early Roman period, fine wares were supplied from Gaul and elsewhere, whilst in the later Roman period, the Oxfordshire and New Forest kiln centres were able virtually to monopolise fine ware and even much of the coarseware distribution into the South West. However, other products discussed above, such as shale, certain building stones, tin and lead, were all exported from the South West, both to the rest of Britain and beyond. This was a significant element in the economy of the South West during the Roman period, and may have approached agriculture in importance in those areas where production was concentrated.

8.3.4 Religion and Ritual

In the early years of Roman Britain, Roman religion acted as a unifying influence which brought and held Roman and Briton together. Later on, particularly in the 4th century AD, its effect was more divisive because of competition between cults (Christianity and Mithraism, Christianity and other pagan cults) and between different Christian heresies (Ferguson 1970; Green 1976; Henig 1984; Webster 1986). From the surviving material evidence the Olympian deities (such as Mercury, Mars, Apollo, Minerva and Hercules) dominated religious life in urban and high status rural communities, although frequently in concert with native deities: Apollo Cunomaglos at Nettleton Shrub (Wedlake 1982) or Sulis Minerva at Bath (Cunliffe and Davenport 1985). Local cults such as the Genii Cucullati (gods of healing, fertility and the other world) seem to have been popular in the Cotswold region, sometimes in association with a Mother Goddess, also from Celtic religion (Henig 1993). More research is required into the extent of these native cults and deities, their associations with Roman deities, and their manifestations as beliefs or observances within all levels of society (A Woodward 1992).

Relative to other regions there are many rural Romano-Celtic temples known in the South West, a high proportion of which have been examined using modern techniques. These include, in Somerset: Brean Down (ApSimon 1965), Pagans Hill (Rahtz and Harris 1957), Lamyatt Beacon (Leech 1986) and Henley Wood (Watts and Leach 1996), while temples are suspected at Brent Knoll, Cadbury Castle, Worlbury and Pedwell among others. To the south, in Dorset, lie Maiden Castle (Wheeler 1943) and Jordan's Hill whilst in Gloucestershire are Lydney Park (Wheeler and Wheeler 1932; Casey and Hoffman 1999), Uley (A Woodward and Leach 1993) and others suspected at Chedworth, Lower Slaughter, Sapperton and Wycomb.

In Wiltshire, Nettleton Shrub (Wedlake 1982) and Cold Kitchen Hill are known with other suspected sites at Marlborough, Westbury Ironworks, and perhaps at Silbury Hill and Winterslow (Robinson 2001). The predominantly Late Roman floruit demonstrated at so many of these sites, their potential relationship with the Late Roman prosperity of the region and its great landowners, as epitomised by the wealth of the villas (Leech 1980), require further research. In this context recent research on sites such as Frampton (suggestive of a Gnostic cult, Perring 2003), or Littlecote (Bacchus, Walters 1996, although see Ling 1997), has shown the potential for regional re-evaluation of cult structures and practices within high status sites in particular.

There are also sites where "ritual" objects have been found whose exact nature is as yet unclear; these include Cadbury, Tickenham where an altar to Mars from the hillfort is now in North Somerset Museum and Steep Holm where a carved head of "Romano-Celtic" type is known (Rendell and Rendell 1993, 21–22). Another head exhibiting high quality carving has been recovered from Frome (Bird 1985).

Romano-Celtic temples are not known from Devon or Cornwall but ritual shafts, into which offerings were placed, have been found within the hillfort of Cadbury Castle, Tiverton (Fox 1952b) and at Bosence, St Erth (Haverfield 1924, 8). In the Isles of Scilly, an unusual structure with a rich artefactual assemblage at Nornour (Butcher 2000/2001) is probably religious and an uninscribed altar is known from Hugh Town (Todd 1987, 230–1). Investigation and research into this aspect of rural life is important both for our understanding of the area and to perceptions about the extent and influence of Roman ideas and religious influence.

A review of temple sites in the region found that while there might be a siting policy for temples which placed them at boundaries in "neutral" zones, sufficient were placed away from postulated boundaries for it not be the sole consideration. Another suggestion that high places were a favoured locations was also examined and again found not to be a consistent feature. A study of intervisibility of temples might also be valuable as preliminary work showed that there was intervisibility from site to site (or very close by) from Lydney to Groundwell Ridge to Lamyatt Beacon to Cadbury Castle to Brean Down and back to Lydney (A Smith 2000).

In contrast is the almost total absence of known religious structures within urban contexts. Bath is here the significant and outstanding exception to the rule (Cunliffe and Davenport 1985; Cunliffe 2000b). The religious and cultural impact of this cosmopolitan centre upon our region deserves more study as does the relationship between pagan Roman and later Christian uses. The marked lack of evidence from the other major urban centres may be rectified by future discoveries. Portable finds or structural evidence from Cirencester, Gloucester and Dorchester hint at the presence of shrines or temples there and probably at some of the smaller nucleated settlements, such as Camerton (Wedlake 1958).

The Early Church

The survival of pagan Roman temple/shrine structures contrasts with the paucity of evidence for late Roman or early post-Roman Christian structures or portable finds, although this is by no means peculiar to the South West. The possibility of eremetic successors has been postulated at temple sites such as Brean Down, and Lamyatt Beacon in Somerset (Leech 1980), and the suggestion of Christian churches or other activity at Uley, Nettleton Shrub and possibly Bath requires reassessment in their wider context (Heighway 2003). Paganism appears to have been strongly entrenched among the landowners of the South West, but the unequivocal Christian symbolism at Hinton St Mary or at Chedworth demonstrates that this was not universal. In urban contexts Christianity makes fleeting appearances, except through burial, where a good case can be made at Dorchester, in the key Poundbury cemetery (Farwell and Molleson 1993). Christian burials can also be inferred in a number of other urban cemeteries and in at least one smaller settlement: Shepton Mallet (Leach and Evans 2001; see also 179).

Burial Traditions

There are many cemeteries and burials of the Roman period known within the region, some extensively recorded and discussed in the literature. Across the South West it is the cemeteries, and especially cremation burials, of the earlier Roman period which are least well understood (although see Foster 2001 for Wiltshire). Research has shown the potential of these data for better understanding the Iron Age/Roman transition and the impact of the Roman military upon

the funerary and social landscape (Whimster 1981). A Late Iron Age tradition of inhumation burial, often crouched, in the Cotswold/Severn region persisted well into the Roman period in some places (A Thomas *et al.* 2003; Moore 2006a).

Cemeteries of the later and early post-Roman periods have been more extensively examined, the evidence from them, including the skeletal material, representing a considerable resource for further statistical analysis following on from previous research agendas (Philpott 1991; Rahtz 1977), including important questions relating to religious identity and belief.

With the notable exception of Poundbury (Farwell and Molleson 1993), extensive examination and analysis of urban cemeteries has been relatively limited. Smaller samples are published from the Allington Avenue cemetery, Dorchester (Davies *et al.* 2002), from Ilchester (Leach 1982; 1994) and from Cirencester (McWhirr *et al.* 1982). Both Gloucester and Bath had extensive cemeteries, and with Cirencester, have important groups of tombstones and memorials, but are otherwise relatively little explored (or in the case of Gloucester, published) while even less is known of Exeter's cemeteries.

Rural cemeteries and individual burials are widespread and are probably to be found in association with almost every settlement type. Once again, modern publication of substantial groups is rare: examples include Bradley Hill (Leech 1981b), Frocester Court (Price 2000) and Hucclecote (A Thomas *et al.* 2003). Many settlement sites will have a few burials (see, for instance, the Wiltshire evidence summarised in Foster 2001 to which the newly excavated cemetery at Boscombe Down can be added). One other large and outstanding exception is Cannington, (Rahtz *et al.* 2000), where burial extended into the 7th century AD at least. Cannington also exemplifies an exceptional wealth of late and early post-Roman cemeteries in this region, notably in Somerset, such as Henley Wood (Watts and Leach 1996), Brean Down (Bell 1990), Lamyatt Beacon (Leech 1980) or Shepton Mallet (Leach and Evans 2001). These sites and others in Dorset and Gloucestershire are of outstanding importance for exploration of the Roman/post-Roman transition in the South West and the impact of Christianity (Rahtz 1977), though it should be remembered that virtually nothing is known of burial practices in Devon and Cornwall.

In the context of current research concerns there is very great potential for the scientific study of the skeletal populations now in museum storage, for biometric data, genetic data, for strontium isotope analyses and other emerging techniques. Data on contrasts between urban and rural populations, population movements, on migrations into and from Britain, for example into and from Germania, Gaul, or Britanny, could be of the greatest interest. In looking further at the Roman/post-Roman transition any opportunities to examine burial populations within early churches and churchyards should be taken where possible.

8.4 Defence and Warfare

8.4.1 The Early Military

The traditional account of the Roman invasion based on Suetonius's account appears to be borne out by the discovery of early Roman military sites and material along a line through Dorset, South Somerset and Devon (such as Lake Farm, Hamworthy, Whaddon Hill, Maiden Castle, Hod Hill, Cadbury Castle, Ham Hill and Hembury). The legionary fortress at Exeter and some other forts, appear to be slightly later foundations. We still lack a good understanding of the purpose of such forts in lowland Britain. They do not appear to follow the pattern seen in the upland areas, where forts are sited in a network to control a hostile population, and might be seen more as winter quarters (Maxfield 1987). The pattern might reflect less the need to control a population and more a need for land to supply large numbers of troops. Some forts such as those at Charterhouse-on-Mendip and Nanstallon were associated with early control of mineral resources while it is conceivable that the distribution of forts around the fringes of the Blackdown Hills and on routes leading to Exmoor reflects military control of iron extraction in these areas. Pottery types normally associated with Roman military sites in Devon have been recovered in association with iron-smelting debris at Yarcombe (Bill Horner pers. comm.). The lack of forts in the northern part of the region may be a result of complex political origins on which which we can only speculate. The forts (and their foraging troops) might not, for instance, have been imposed on tribes which allied themselves to Rome, with the exception of Cirencester which might have housed a prestige formation to support the rulers at Bagendon. Whilst more forts have been discovered in recent years, for instance, Rainsbury (Riley and Wilson-North 2001, 71) and Topsham (Sage and Allan 2004), these have all been in Somerset and Devon suggesting that the distribution pattern that we currently see is essentially correct. The majority of the forts are situated in the Dartmoor/Exmoor fringes. Two forts on the north Devon coast at Martinhoe and Old Burrow indicate a military interest in the security of the Bristol Channel in the 1st century AD.

The chronological pattern at the legionary bases appears to be fairly clear with the establishment of a small base at Kingsholm, Gloucester in the late 40s, followed by fortresses at Exeter in the early–mid-50s and Gloucester in the mid-60s, although the exact movements and identities of legions involved is still

a subject for debate. The smaller forts are less well dated although there is good evidence from Pomeroy Wood (from the 60s to the ?80s, Fitzpatrick *et al.* 1999), from Bury Barton (late 50s–80, Todd 2002) and from Bolham Farm, Tiverton (*c.*65–85/90 Maxfield 1991; Todd 2002 believes that the foundation date may be at least 5 years earlier).

The fortresses at Exeter and Gloucester were abandoned by the mid-70s as troops were redeployed to South Wales but the evidence from Cadbury Castle may indicate some continuing strife in the South West up *c.*AD 70 (Barrett *et al.* 2000). The fort at Tiverton remained in use until *c.*85/90 (Maxfield 1991). Although the Roman military remains in the South West are not as extensive as those of the upland areas, they were built during an important period of change in the Roman army whilst their early abandonment means that much of this evidence is undisturbed by later development.

8.4.2 Urban Defences

All of the principal towns of the South West were walled, most first in earthwork with later stone replacements. In common with the rest of the province the appearance of defences at this date (the earthen ones appear to be late 2nd century) is a peculiarly British phenomenon and reasons to explain it differ (see Henderson 2001, 66 for a short summary). The *colonia* at Gloucester was walled early (around the beginning of the 2nd century AD), but of the *civitates* Exeter seems to have been the earliest masonry defence (perhaps no later than the early 3rd century AD, Henderson 2001, 74). Others followed in the 3rd and 4th centuries AD. Defences were also added to the smaller towns of Bath and Mildenhall (Corney 1997). A small Late Roman defended site at Dorn on the Fosse Way has more in common with so-called "burgi" found in the Midlands and an interpretation as a small official strong point seems likely (Timby 1998). The enigmatic site at Gatcombe was also walled (Branigan 1977); interpretations of this site differ, a private or public estate or perhaps even a temple?

8.4.3 Later Military

There is currently very little evidence of a military connection with the South West after the end of the 1st century AD. A tile stamp of the Second Augustan legion, which probably dates to the 3rd century AD, has been found at Seaton. Holbrook (1987) sought to associate this with antiquarian references to a possible stone fort in the town, although evidence of the true nature of the site is still awaited. The enigmatic site at Oldaport on the south Devon coast which has been suggested in the past to be a possible Late Roman defended enclosure (for example by Todd 1987, 260–62) has recently produced a Late Saxon date for its walls (Rainbird 1998; Rainbird and Druce 2004).

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9

Early Medieval Environmental Background

Vanessa Straker

9.1 Introduction

This is not a full review of all the palaeoenvironmental studies carried out in the region, but a general summary with most emphasis placed on the environment in which Early Medieval communities lived. It does not provide a comprehensive review of crop and animal husbandry in the region. Reviews of environmental archaeology carried out or commissioned by English Heritage are in progress or complete and will give an account of knowledge in these areas. Those wishing to follow this up should consult the English Heritage website (http://www.english-heritage.org.uk and follow the links Research & Conservation → Archaeology & Buildings → Scientific Techniques → Environmental Studies → Regional Reviews). At the time of writing, the reviews on insects (Robinson 2002) and wood and charcoal (W Smith 2002) were available as PDF files. Reviews of plant macrofossils, pollen, animal bones and geoarchaeology from southern England are in preparation and will be placed on the website when available. Rob Scaife very kindly made available a draft of his pollen review for this resource assessment. The excellent review of environmental archaeology in South West England by Martin Bell (1984) is still a very useful source of information. There are also reviews of environmental evidence in the Urban Archaeological Assessments for Bath (not yet published) and Bristol (Brett 2005), which are of relevance for this period. Urban deposits have not generally been referred to, but will be included in the reviews noted above. The inclusion of "grey" literature has not been comprehensive. The introduction to the Late Bronze Age and Iron Age section (on page 103) includes a summary of sources of evidence and comments on preservation which are not repeated here but are equally relevant for this period, apart from site specific references. As for other periods, pollen evidence for past vegetation is scarce or absent from the Cotswolds, Mendip and the chalk.

There are fewer studies of off-site sequences for the historic period than for the prehistoric periods, though some upland and lowland wetland sequences do cover all or part of the last 2000 years. These have the potential to give information on the local or wider environment, depending on the likely catchment of the sampling site. Coverage of the region is very patchy, with most information coming from Devon and Cornwall.

9.2 Arable farming – the use of free-threshing wheat

At some time between the Late Roman period and the later part of the Early Medieval period, a very important change took place in the wheat species cultivated: from predominantly hulled wheat species to free-threshing ones. In the Roman period, Spelt wheat (*Triticum spelta*) was the most commonly grown cereal, with a minority of emmer (*T. dicoccum*), bread wheat (*T. aestivum* s.l.), barley (*Hordeum* sp) and, in the south-west, oats (*Avena* sp). Emmer and spelt are hulled wheats, in the sense that the chaff adheres tightly to the grain, requiring drying and deshusking to free it. Free-threshing wheats such as bread wheat and rivet wheat (*T. turgidum*) or hard wheat (*T. durum*) release the grain readily when threshed, making them much less time consuming to process after harvesting. The different types of remains are readily identified in the archaeobotanical record if chaff is preserved. Free-threshing wheat can be tetraploid (rivet or hard wheat) or hexaploid (bread wheat).

Due to the paucity of settlement-based evidence for crop processing in this period, it is still very unclear

exactly when this important change takes place in different parts of the region. As noted below, the 5th–6th century coastal sites at Bantham and Tintagel do include some possible free-threshing wheat, but not in any quantity, and as noted above, occasional finds are also typical for the Roman period.

It is now also known that cultivation of hulled wheat did not disappear from the record altogether, as shown by the radiocarbon-dated emmer of Saxon date in the upper and middle Thames valley, considered to be a local variation (Pelling 2003, 200). This regional diversity has yet to be seen in the farming record of the South West for this period.

Apart from wheat, other Early Medieval crops are oats and barley (principally hulled barley) with some rye (*Secale cereale*), though possibly not as a principal crop. It is possible that oats and barley were often grown together as a "dredge" for animal fodder, whereas wheat was mainly for human consumption.

9.3 Climate

Although there is not much evidence specifically relating to climate in the Early Medieval period in the South West, there is a possible event in the 6th century that has been widely discussed and would have had a noticeable effect on climate.

Many writers (such as Baillie 1994; 1995; 1999; Grattan and Pyatt 1999) discuss a mystery dust veil observed for several years around 536. The authors cite widespread European accounts describing a veiling of the sun with the consequent effect on warmth, crop ripeness etc. Narrow tree rings in Irish bog oaks, possibly caused by poor growing conditions, were first noted by Baillie (1994). Baillie and many other authors have discussed possible causes including the effects of a volcanic eruption or impact from a comet. Unlike most eruptions, this event does not leave a record in the Antarctic or Greenland ice cores. Grattan and Pyatt (1999) suggest that it may be caused by a minor volcanic eruption which caused gas emissions that were confined to the near surface layer of the lower atmosphere. Whatever the cause, the effect on climate in the mid-6th century was clearly of major significance.

Insect remains from Anglo-Scandinavian York have given an indication of slightly higher temperatures from around 850. The prevalence of the nettle bug (*Heterogaster urticae*) during this period is thought to relate to slightly warmer conditions as the range of the host plant has not altered (Kenward and Hall 1995, 781). There is no comparable evidence from the South West, and both the postulated 6th-century cooling and 9th-century warm conditions would benefit from investigation using palaeoenvironmental techniques, particularly insect analyses.

9.4 Area reviews

A brief summary of present knowledge follows, for each of the physiographic sub-regions – broadly similar to those used in earlier chapters.

9.4.1 Chalk downland (Wiltshire and Dorset)

There are very few studies from this area, mainly because of the lack of suitable deposits. As demonstrated for earlier periods, palaeochannels are a potential source of information, and there is a particularly good example from Market Lavington, near Devizes. A peat-filled palaeochannel of the Easterton Brook was located on a low greensand ridge at the foot of the north-west scarp of the Salisbury Plain chalk. The earliest dated sediments were Iron Age but the most important palaeoenvironmental information comes from the Early Medieval palaeochannel fills where pollen preservation was good. The suite of ten radiocarbon dates allowed the authors to claim that it is the most "comprehensively dated and analysed sequence of Saxon and earlier Medieval deposits in the British Isles" (Wiltshire and Bayliss 2006, 118–121). Wiltshire (2006) presents a very detailed analysis of pollen and fungal spores, between estimated date ranges of sometime before cal AD 420–630 to cal AD 1000–1220 (Wiltshire and Bayliss 2006, 120, Table 18). The Anglo-Saxon settlement and cemetery was set in an open agricultural landscape with cultivation of a range of crops and local grassland, meadow and fen. Larger-scale and more diverse agriculture and horticulture is evident from about AD 900 when *Vitis* (grape) pollen also became evident. While direct evidence for viticulture was not found, Wiltshire considers that vines could have been grown in the vicinity of the settlement, the most suitable location being *c.*0.5km to the south on a south facing chalk slope. The grape pollen could have entered the palaeochannel via pruning or processing waste. This is rare evidence, but documents such as the Domesday Book cite the existence of vineyards in the early 11th century and before. There are no Domesday records of vineyards at Market Lavington, though there are others in Wiltshire (Wiltshire 2006). Both charred and waterlogged plant macrofossils were recovered from the top fill of the palaeochannel and demonstrated the value of multidisciplinary studies where preservation conditions permit. For example, rye pollen was present, indicating cultivation in the catchment, but rye cereal grains were not present either in the palaeochannel or in settlement contexts (Straker 2006a).

9.4.2 Jurassic uplands (Cotswolds and Mendip) and Coastal lowlands (Somerset, Severn and Avon Levels)

Environmental data for these two large areas is severely lacking. There are some reports on charred plant remains and animal bones, but the landscape context is still poorly understood.

9.4.3 Triassic and Devonian hills and valleys (south Somerset, Devon and east Cornwall

The studies that cover this period are from very different types of deposits but all suggest mainly open vegetation. The pollen sequence from a small peat accumulation at Aller Farm, in east Devon starts in the Roman period. The basal of three dates was 120–390 cal AD (GU-2710). The vegetation throughout was mainly pasture, but towards the end of the period (possibly Norman) there was more evidence of arable (Hatton and Caseldine 1991).

In the Blackdown Hills the end of the sequence at Bywood Farm dates to cal AD 990–1025. Pollen analysis shows that pasture with some woodland is accompanied by localised cereal production (A G Brown pers. comm.; Hawkins 2005).

On the Culm Measures of central Devon, Fyfe *et al.* (2004) studied four small sites giving information on local land use on Knowstone Moor and Rackenford Moor. Three cover the Early Medieval period, Middle North Combe (dating from *c.*1000 BC to AD 1400), Hares Down (*c.*300 BC to AD 900) and Lobbs Bog (Late Iron Age to Medieval). The vegetation record for the fourth (Windmill Rough), covers the later Medieval period. From the Iron Age until the 7th century AD, the land use was predominantly pasture, with no decline in human activity in the area, compared to that seen in some upland pollen sequences. From the 7th century, the introduction of a mixed farming system is suggested by expansion in arable and mixed heath at North Middle Combe and Lobbs Bog.

The recent discovery of two 7th-century wells on a spring line in the sands and gravels of the Budleigh Salterton Pebble Beds at Burlescombe, east Devon (Figure 9.1 on the next page), has provided the only dendrochronological dates for the period. The felling date from the earlier of the two wells is spring AD 629 (Tyers 2006; Marshall *et al.* forthcoming). The waterlogged conditions preserved wood, plant macrofossil, pollen and insect remains. The most likely explanation, drawing together the different lines of evidence is that the wells provided a watering hole for passing and local animals, but it is possible that some textile processing was also taking place. The evidence for arable, pasture, meadow, heathland and some managed woodland in the area shows a well-used and varied landscape (AG Brown *et al.* 2006; Gale 2006; J Jones 2006; forthcoming).

On the North Cornwall coast at Tintagel, ten seasons of excavation on the terraced slopes of the peninsula (usually referred to as the Island) revealed the remains of 5th–7th century settlement (Harry and Morris 1997). As both bone and pollen were very poorly preserved, evidence for land use and vegetation relied on the charred plant macrofossils from settlement contexts (Straker in Harry and Morris 1997, 82–108). Fruits and seeds of rough grassland and herbaceous plants were dominant and probably originated from open areas surrounding the settlement. The almost complete absence of heathland species such as heather and gorse suggests that the open island vegetation was mainly grassland. This is also reflected by the charcoal, where only a small amount of gorse (*Ulex* sp.) or broom (*Cytisus* sp.) was found. In contrast, excavations on the "mainland" in St Materiana's churchyard revealed macrofossils of gorse (*Ulex* sp.) and bell heather (*Erica cinerea*) from contexts thought to be associated with burial and feasting (Nowakowski and Thomas 1992; Straker 1992). The scarcity of gathered wild fruits and seeds (rare hazel-nut shell fragments and bramble pips) on the Island, was unusual. Hazel was the most frequently found wood species in both structural contexts and general layers (Gale and Straker in Harry and Morris 1997, 101–6). One possible explanation for the lack of nuts is that hazel was not growing on the island and wood was brought in for building when needed, possibly, to judge from the charcoal, from managed coppice.

Coastal occupation in the 5th–6th centuries AD was also found on the south coast at Bantham, in the South Hams and at Mothecombe, further to the west. At Bantham, two buried soils were separated and overlain by blown sand. Hearths on the ground surfaces included charred plant remains and the artefact assemblage included imported pottery (see page 179). Hulled barley, oats and occasional wheat with rounded grains typical of free-threshing forms were found at Tintagel and Bantham, but virtually no chaff was present to confirm species identifications. At Tintagel, oats were argued to be the principal crop, possibly because of their tolerance to poor acid soils and the exposed conditions of the area. At Mothecombe, abundant oat chaff confirmed the presence of domesticated oats as a crop (Carruthers 2002).

At Bantham, in contrast to Tintagel there was abundant evidence for the consumption of hazelnuts and the weed flora, which included corn spurrey, suggested some local cultivation, with meadow or grassy field verges nearby. The Bantham assemblages also preserved celtic bean and flax from one of the

Figure 9.1: *The plank-lined springhead at Town Farm Quarry, Burlescombe, Devon, during excavation. Dendrochoronolgy has provided a felling date of AD 629 for one of the timbers. Photo: Exeter Archaeology*

hearths. The flax could have been pressed for oil or used in breadmaking (J Jones 2002; Bidwell and Reed in preparation). The buried soils at Bantham were rich in sand and preserved shell and bone. The open environment is also shown by the mollusc fauna from the upper soil, which was probably relatively short sward or patchy dune vegetation (Davies pers. comm.; Bidwell and Reed in preparation). Eighty per cent of the animal bone is from the lower occupation horizon. It is well-preserved and dominated by

domestic species. Of the diagnostic fraction, cattle bones comprise 54%, pig 10% and sheep/goat 8%. Body part distribution indicates that livestock were brought to the site on the hoof and slaughtered locally. Cattle and sheep were slaughtered at the optimum age for prime beef and mutton, whilst pigs were slaughtered at a fairly young age. It appears that the principal meat preferences characteristic of the Roman period (i.e. beef and pork, followed by mutton) continue into the Early Middle Ages. Less frequent species include dog, red deer, roe deer, hare, domestic fowl, crow (*Corvus corone*), gull (*Larus* sp.), mouse (*Apodemus* sp.), amphibian (*Rana*) and fish (Higbee pers. comm.; Bidwell and Reed in preparation). The information gained from a small excavation at Bantham emphasises how much of the record is lacking because of poor preservation of bone and shell in the acid soils at Tintagel.

9.4.4 Moorland (Scilly and west Cornwall, Bodmin, Carnmenellis, St Austell area, Dartmoor and Exmoor)

At Gaverigan, in the china-clay area between St Austell and Indian Queens, pollen spectra were obtained from well-developed podsols buried beneath hedge banks. The hedges are thought to be Medieval (Tinsley 1999a, quoting R Cole pers. comm.) but are not independently dated. The pre-enclosure landscape was open, acid, grass-heathland with occasional stands of hazel and alder, the latter on wetter valley soils. Stands of oak woodland with elm, hornbeam and beech were present at some distance. The existence of well-developed woodland assemblages beneath heathland pollen in the lower parts of some of the Gaverigan profiles is of interest. It suggests a phase of woodland regeneration or possibly persistence in some areas considered to have been open heathland in the Bronze Age. However, the chronology for the vegetation is not clear (Tinsley 1999a). Similarly on Bodmin Moor, Maltby and Caseldine (1984) noted similar post-heathland woodland regeneration at Colliford, and at Stuffle, Walker (in Austin *et al.* 1989) suggested that patches of hazel woodland were growing on free-draining sites as recently as AD 600–700.

Gearey *et al.* (1997; 2000b) discuss the possibility of pre-1200 AD settlement on Bodmin Moor and Dartmoor. They note that sample sites at Rough Tor and Tresellern Marsh on Bodmin Moor and Tor Royal and Merrivale on Dartmoor all show anthropogenic activity in the area before later Medieval settlement. At Tor Royal, a rise in ribwort plantain (*Plantago lanceloata*) together with decreases in tree and shrub pollen continue from the 1st millennium BC. A possible hiatus occurs around the 5th to 7th centuries AD but, after this, expansion of grasses continues and the heather pollen curve is maintained. The authors interpret this as increased presence of grass-dominated heathland. A similar picture is seen at Merrivale, with a marked intensification of activity in the 9th century AD. At Rough Tor, species-rich grassland similar to old meadow communities such as *Cynosurus cristatus–Centaura nigra* grassland (see Rodwell 1991) is evident between the 1st to 4th centuries AD, lasting for about a thousand years. The grassland could have been managed by light grazing and possibly the removal of a hay crop. Gearey *et al.* (1997; 2000b) suggest that a seasonal system of low input land-use, such as transhumance that would have prevented woodland regeneration, would be appropriate for both moorland areas studied. The persistence of the limited evidence for woodland from the 1st millennium BC to the 12th to 14 centuries AD, with no observable increase or decrease, suggests careful husbanding of these resources. The very slight presence of cereal pollen in pre-12th century levels may be short-lived experimentation in cultivation or long-range transport from the lowlands.

On Exmoor, as on Bodmin Moor and Dartmoor, peat on the high moorland continued to accumulate in some locations until the present day. Profiles on Codsend Moor and Hoar Moor (Francis and Slater 1990; 1992) show an expansion of heathland between about AD 610–810, but as with other upland profiles, the dating resolution is not good, particularly for the historic period.

Fyfe *et al.* (2003b) report on studies from three spring mires on Exmoor's southern fringe: Long Breach valley/spring mire (*c.*3500 BC to AD 1300), Gourt Mires (*c.*2400 BC to AD 1000) and Anstey's Combe (*c.*100 BC to AD 1500). These sites allow detailed reconstruction of the local vegetation and show the scale of variation in vegetation type around the southern moorland edge. At Gourt Mires and Anstey's Combe on Molland Common, there is little change in the pollen record and no discernible Roman or post-Roman impact on the largely open, pasture-dominated agricultural system. This suggests cultural stability from the late Iron Age to the Early Medieval period (Fyfe *et al.* 2003a). At around AD 1000, there is a change from pasture to arable and pasture which the authors suggest is some form of convertible husbandry. Fyfe *et al.* (2003a) note that as at Hoar Moor and Codsend Moor on the Exmoor high moorland, (Francis and Slater 1990; 1992) fire appeared to have been used in land management. Woodland persists on slopes in Anstey's Combe, until the later Medieval period and may have been managed for fuel, timber or use in industrial processes.

At Brightworthy, the valley was not cleared of woodland at all until the Medieval period though the land probably still formed part of the upland farming system providing wood pasture, for example (Fyfe

2000; Fyfe *et al.* 2004). Reduction of oak and hazel woodland between AD 800 and 1200 was probably for pasture. Alder growing on the valley floor was also partially cleared, to be replaced by wet grassland supporting meadowsweet, bedstraws, and marsh valerian. Although typical of unmanaged floodplain grassland, these species are also characteristic of some hay meadows. Fyfe (2000) and Fyfe *et al.* (2004) suggest that these changes relate to the establishment of Brightworthy, with clearing and enclosure of both the moorland and valley bottom adjacent to the farm.

Petra Dark includes several sites in the South West in her investigation of landscape continuity and change between AD 400 and 800 (SP Dark 1996). These are the high moorland sites at Hoar Moor (Francis and Slater 1990) and the Chains on Exmoor (Merryfield and Moore 1974; Moore *et al.* 1984), Aller Farm in Devon (Hatton and Caseldine 1991) and Rimsmoor in Dorset (Waton 1982). The Exmoor sites show reduced activity, whereas the others appear to show continuity of exploitation. At the Chains, for example, an increase in heather (*Calluna*), birch and hazel and decrease in cereal pollen is seen. In contrast, the mosaic of woodland, grassland and possible arable showed no change at Aller Farm, whereas changes in tree pollen and increases in herbs continued from the earlier period at Rimsmoor. It should be noted however, that the dating for the Exmoor sites used in the study is not high resolution and, as noted above, moorland edge sites show a rather different picture. The dating at Rimsmoor may also bear reinvestigation.

There are many other potential studies that could have been included, but not all have been studied at sufficient resolution or possess adequate dating evidence. This is mainly because many pollen studies have focused research on prehistoric levels.

9.5 Discussion

Many studies relevant to this period, especially those from the last ten years (Bodmin Moor, Exmoor, central Devon and the Blackdown Hills in particular) have concentrated on building up a picture of relatively local environmental change by studying small catchments. This approach has shown its potential to further understand the setting of early settlements and diversity of local land use, provided that it is supported by high resolution dating.

A key question is whether woodland regeneration took place in the centuries following the Roman period. Once again, good dating is essential to answering this in any but the most general of terms. Some progress has been made, however, with the study by Petra Dark (1996, discussed above) but better dating is needed to fully interpret her findings. Woodland regeneration has been identified after heathland development on Bodmin Moor and in central Cornwall. This contrasts with continuity of pasture and land use between the Late Iron Age and Medieval periods on the Culm Measures, and sands and gravels of central and east Devon. The scarcity of settlement evidence in this area is tantalising, given the continuity of land use implied by the vegetation history. The new evidence from Burlescombe is especially welcome, even though the focus of settlement is yet to be discovered.

It is clear from these studies that in the west of the region, patterns of vegetation change on both upland and lowland were very variable. In the east and north of the region, in the Severn, Cotswolds, Wiltshire and Dorset, data is extremely limited.

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9.6 Radiocarbon dates

See Table 10.1 on page 187.

10

Early Medieval

Edited by Chris Webster from contributions by Mick Aston, Bruce Eagles, David Evans, Keith Gardner, Moira and Brian Gittos, Teresa Hall, Bill Horner, Susan Pearce, Sam Turner, Howard Williams and Barbara Yorke

10.1 Introduction

10.1.1 Early Medieval Studies

The South West of England, and in particular the three western counties of Cornwall, Devon and Somerset, has a long history of study of the Early Medieval period. This has concentrated on the perceived "gap" between the end of the Roman period and the influence of Anglo-Saxon culture; a gap of several hundred years in the west of the region. There has been less emphasis on the eastern parts of the region, perhaps as they are seen as peripheral to Anglo-Saxon studies focused on the east of England. The region identified as the kingdom of Dumnonia has received detailed treatment in most recent work on the subject, for example Pearce (1978; 2004), KR Dark (1994) and Somerset has been covered by Costen (1992) with recent work reviewed by Webster (2000b). The area that became Wessex has been discussed from a historical viewpoint by Yorke (1995) and its later archaeology by Hinton (1977; 1994a). Wiltshire has been reviewed by Eagles (2001), Gloucestershire is covered by Hooke (1985), Heighway (1987) and has also been the subject of two recent conferences (Ecclestone *et al.* 2004). There is a short review of the Dorset evidence by Hinton (1998) aimed at the non-specialist. The collection of papers edited by Aston and Lewis (1994) covers much of the region.

The Early Medieval archaeology of the region is internally diverse in terms of chronology, with the 5th and 6th centuries (Sub-Roman, Dark Ages, Early Anglo-Saxon) looking very different from the 7th to early 9th centuries (Middle Anglo-Saxon) and the late 9th to mid-11th centuries (Late Anglo-Saxon or Viking period). Moreover, the region has always been perceived, both in terms of landscape history, and in terms of Early Medieval political and ethnic geography, as two entities: one "British" (covering most of the region in the 5th century, and only Cornwall by the end of the period), and one "Anglo-Saxon" (focusing on the Old Sarum/Salisbury area from the later 5th century and covering much of the region by the 7th and 8th centuries). This is important, not only because it has influenced past research questions, but also because this ethnic division does describe (if not explain) a genuine distinction in the archaeological evidence in the earlier part of the period. Consequently, research questions have to deal less with a period, than with a highly complex sequence of different types of Early Medieval archaeology, shifting both chronologically and geographically in which issues of continuity and change from the Roman period, and the evolution of medieval society and landscape, frame an internally dynamic period.

Our understanding of the Early Medieval archaeology of the South West has been dependent upon a series of key excavations and, fortunately, many of the extensive campaigns of excavation, particularly from the 1960s and 70s, have recently been published, key sites such as: Tintagel island (C Thomas 1993; Harry and Morris 1997; Barrowman *et al.* 2007), Tintagel churchyard (Nowakowski and Thomas 1990; 1992), Trethurgy (Quinnell 2004a), Lundy (C Thomas 1991; C Thomas 1994, 163–182), Cannington cemetery (Rahtz *et al.* 2000), Cadbury Castle (Alcock 1995), Wells Cathedral (Rodwell 2001), Shepton Mallet (Leach and Evans 2001), Poundbury (Green 1987; Sparey-Green 1996; 2004), Cadbury Congresbury (Rahtz *et al.* 1992), Henley Wood, Congresbury (Watts and Leach 1996), Bath (Cunliffe and Davenport 1985), Frocester (Price 2000), Gloucester, St Oswald (Heighway and Bryant 1999), Uley (A Woodward and Leach 1993), Deerhurst (Rahtz and Watts 1997) and Trowbridge (Graham and Davies 1993).

Many of these reports contain discussions of themes within the period as well as accounts of the excavations. We are consequently in a much stronger position to assess and appraise future research questions than would have been possible only a decade ago.

The publication of the Shapwick report (Gerrard and Aston forthcoming) will also provide a wealth of evidence for rural settlement in Somerset but for the Early Medieval period, its main conclusion is that, despite 10 years of fieldwalking, geophysics and targeted excavation, the evidence for Early Medieval rural settlement is remarkably elusive.

10.1.2 Background

Probably the largest challenge facing the archaeological study of this period is the lack of chronologically diagnostic artefacts (discussed for the later part of this period by Hinton 1994a, 35–37). There is very little pottery production (although evidence for this is increasing) until the very end of the period and imported wares appear during very limited phases and are geographically restricted. Without scientific dating it is extremely hard to identify sites to this period for excavation and many that have been excavated have been identified either by the presence of imported pottery or were located serendipitously. The increasing use of scientific dating is showing, however, that sites that might once have been thought to belong to another period, for example Trethurgy (Quinnell 2004a), Shepton Mallet (Leach and Evans 2001 and more recent unpublished work), or Hayes Farm (Simpson *et al.* 1989), have Early Medieval phases. In the eastern parts of the region there is material from burials but a similar lack of domestic material that would allow settlement sites to be located, although chaff-tempered ware has been identified during fieldwalking in the Avon valley (Light *et al.* 1995).

This paucity of evidence makes identification of settlement difficult and thus questions such as population, land-use or social hierarchy very difficult to approach.

Historical Sources

Doubtless these issues also occur in earlier periods (possibly unrecognised) but the problems are complicated by the presence of historical sources of very varying degrees of reliability and hence the *expectation* that archaeology should answer very specific chronological and socio-political questions that involve precise dating. The uncritical use of these sources in the past led to a very simplistic view of the region based largely on the framework provided by the Anglo-Saxon Chronicle. However, it must be remembered that the Chronicle was being compiled in the 9th century for propaganda purposes, although it did make use of earlier written material, some of which has not survived in any other form. The early annals appear as a seamless whole, but conceal within them a point at which contemporary record-keeping began, probably around the middle of the 7th century (Stenton 1926). The annal entries for the late 7th and early 8th centuries cluster around the north-west border of Wiltshire and it is possible that they were compiled at Malmesbury. Therefore entries from the late 7th century onwards carry much more authority than those for earlier periods. The earlier entries should not be dismissed altogether, but the dates for anything before 600 have been shown to be completely unreliable (Dumville 1985). The 577 entry for Dyrham is not without interest, however, and the reference to three cities and three leaders recalls the forms of Welsh triads (Sims-Williams 1983). It may preserve some authentic information, but the least reliable facet of it is the date attached and this should not be cited as a point around which Anglo-Saxon penetration of the region can be dated.

The historical evidence for the 5th and 6th centuries provided by Gildas (Winterbottom 1978), is traditionally associated with Glastonbury but this is not accepted by recent authorities who would see the association as a product of Glastonbury's medieval pilgrimage "industry". However, Higham (1991), KR Dark (1994, appendix 1) and Sharpe (2002, 108) have all argued that Gildas may well have written in the lowland zone of the region, with Higham and Dark favouring Dorset or Wiltshire while Sharpe prefers Somerset or Gloucestershire. KR Dark (1993) further argues for St Patrick originating in the South West and arguments along these lines have existed for some time (for instance, O'Rahilly 1942) and continue (Jelley 1999) but there is less acceptance of these claims among the academic community today, where the case for the North West of England is considered to be stronger.

There is also the potential of other Anglo-Saxon written sources to illuminate the nature of society in the Early Middle Ages. Bede has an important account (*Ecclesiastical History* ii, 2) of the meeting between Augustine and British bishops at Augustine's Oak, and its aftermath. The law code of Ine has a series of clauses dealing with the Britons under his authority that may help us understand the nature of the Anglo-Saxon annexation of much of the region (Attenborough 1922). Another important source is the writings of Aldhelm of Malmesbury who seems to have been charged with bringing the British church under West Saxon control and enforcing conformity with "Roman" customs in the late 7th century (Lapidge and Herren 1979; Lapidge and Rosier 1985).

Other sources, for example the medieval saints' "lives" have been studied (for instance by Pearce 1978, appendix 3) but there are also the products

of Arthurian studies, Celtic mythologies and other "New Age" beliefs to contend with. These last clearly have an important effect on the public's perceptions of this period and need to be appreciated, engaged with and perhaps countered, if we are to move forward. As well as public perceptions of mythologies and the romance of the Early Medieval period, it is equally important to recognise that the Early Medieval period has a fundamental position in the popular imagination in terms of nation-building. Therefore, while archaeologically authoritative accounts must negotiate with many misconceptions over Early Medieval "races" and "ethnicities", they must not forget that this debate is central to modern claims of identity. Nested and conflicting modern identities of British, English and Cornish have often seemed to be predicated upon Early Medieval racial distinctions between Celts and Saxons, and these continue to pervade our attempts to explain and communicate the Early Middle Ages.

Chronological Phases

In broad outline, discussion of the period can be divided into three chronological episodes, although the first two are often complicated by synchronicity across the region and questions of ethnicity.

There is continuing debate about the transitions that occurred around the end of Roman control of the provinces of Britannia with sharply contrasting views ranging from total systems collapse to the survival of a recognisably Roman administration, lacking only access to new forms of material culture. The date of this transition is also argued, with some seeing the start of Roman "decline" occurring during the 4th century whilst others see continuity for several centuries after the traditional date of 410.

Most of the debates over the timing and nature of the transformation of the Roman province (see for example KR Dark 1994 and Henig 2004 for views which stress continuity and Faulkner 2000; 2004 for a systems collapse model) have focused upon south-eastern Britain. There are real challenges in applying models constructed in these regions to the west of Britain where the nature of Romano-British society may well have been substantially different, as the archaeological record seems to suggest. At the end of Roman administration it is likely that the South West occupied a large proportion of the province of *Britannia Prima* but the ways that the withdrawal of imperial control affected the region are poorly understood.

The second phase would traditionally be described as the Anglo-Saxon conquest and sees the gradual absorption of the southern parts of the region into the kingdom of Wessex, with control of the Hwicce of Gloucestershire taken by Mercia. The Hwicce were also probably originally a British kingdom; they and the people to the north, the Magonsaete appear to be Christian from at least *c.*660 (Sims-Williams 2000, 55–9, 75–9, 84; Bassett 2000). Central to this traditional view is the *Chronicle* date of 577 for the battle assumed to be located at Dyrham to the north of Bath when three "kings" were defeated and three cities captured. A more secure date is provided by charter evidence from Glastonbury and Malmesbury in the reign of Centwine (676–85) and the life of St Boniface which refers to an English abbot at Exeter in 680 (Yorke 1995, 60). Obviously, the eastern parts of the region had an Anglo-Saxon identity from an earlier date and Cornwall was never fully incorporated into the West Saxon kingdom.

The final phase, from the mid-9th century sees the effects of growing international contacts and trade, reflected in both the Viking raids and the growth of urbanism at towns such as Exeter and Gloucester. In the countryside, it is from the ninth century that we may have clear and unequivocal evidence for village nucleation in some parts of the South West as evidenced by the Shapwick Project (Gerrard and Aston forthcoming). There is also the development of a more central authority and more fully Medieval forms of ecclesiastical and secular settlement.

10.2 The Material World

10.2.1 Rural settlement

Examination of rural settlement is hampered by the problems outlined above in the identification of sites belonging to this period. Our knowledge of forms of settlement at the beginning of the period is also hampered by limited understanding of rural settlement in the later Roman period but there is a growing body of evidence for continuing occupation on Roman settlement sites. Small enclosed settlements, perhaps containing a few round (or in Cornwall, oval) houses are a feature of the western part of the area from the Bronze Age onwards and recent excavations have indicated settlement into the Early Medieval period at some. In Cornwall, Trethurgy (Quinnell 2004a), which began in the late pre-Roman Iron Age continues into the 6th century with the best published sequence covering the 1st millennium AD in the region.

Another significant settlement was excavated at Gwithian during the early 1950s, directed by Charles Thomas, which formed part of a series of related programmes of fieldwork which documented the long history of settlement and land-use in this unique coastal setting on the north Cornish coast. Stratified occupation horizons with stone and wooden structures, stone-lined hearths and settlement middens were found together with evidence for small-scale (industrial) iron working. The remains of a contemporary field system were also discovered. The site was rich with finds and is of particular significance

as it produced a long stratified sequence of key local, post-Roman and Early Medieval ceramics as well as a unique metalwork assemblage. These are key ceramic assemblages for the post-Roman period and a recent programme of accelerator dating residues on selected Gwithian sherds show a continuous sequence of settlement which dates from the 5th to at least the 8th centuries cal AD. A further dating programme will continue during current work on the archive (Nowakowski 2004; pers. comm.).

Sites in Devon, such as Hayes Farm (Simpson *et al.* 1989) show activity on similar enclosed settlements and it appears likely that the Somerset site of Yarford, where a late prehistoric enclosure was succeeded by a small villa, will have a post-Roman phase (Wilkinson *et al.* 2004). Work at the old church site in Shapwick, Somerset, has shown that the church (later resited to the planned village) was associated with a manorial complex which overlay a Roman settlement. Whilst no diagnostic artefacts were recovered, radiocarbon dates indicate that one building was constructed around 710–720 cal AD (OxA-11461, 11474, 11475, 11873, 11874, 11930, 11931) and went out of use before 910–1060 cal AD (OxA-11932, 11933, GU-5898, 5899, Chris Gerrard pers. comm.; Gerrard and Aston forthcoming) suggesting that occupation of the site may have continued from the Roman through to the Medieval period. Interestingly the underlying Roman settlement was not one of the two villas identified in the parish, perhaps showing that it was not the Roman period elite who founded the Medieval manorial centre. There is other evidence for late reuse of Roman buildings in Shapwick; the small Roman building at Sladwick was partly demolished following a period of abandonment and used to shelter a hearth around 430–640 cal AD (SUERC-2938; Chris Gerrard pers. comm.; Gerrard and Aston forthcoming). A similar picture may be seen at Worth Matravers where a single-roomed building, probably a barn, which contained a corn-drier was floored over late in its life and subsequently used for a single burial. Unfortunately there were no dates for these events but they are likely to be very late or post-Roman (Graham *et al.* 2002).

Recent fieldwork in northern Somerset has identified 8 enclosed settlements in the woodlands around Congresbury within 1km of the hillfort settlement of Cadbury Congresbury (Keith Gardner pers. comm.). Although these are as yet undated, further examination may provide a context for the occupation at the hillfort.

Excavations at the Roman villa at Frocester have shown significant post-Roman occupation of the site. The main villa building appears to have been partly destroyed by fire but the front corridor was then reoccupied. Post-holes suggested divisions of the room into an eastern end with a hearth, associated with chaff-tempered pottery, and a western end where further post-holes and wear to the floor suggested, to the excavator, a byre, and thus a layout similar to that of a Medieval longhouse (Price 2000, 115–6). Reynolds (2006) has pointed to the lack of a drain in the byre area which would argue against this. Three timber buildings appear to have been constructed within and around the courtyard of the villa, one with a radiocarbon date of 430–660 cal AD (CAR-1475 – the calibration curve suggests that a date after 530 is more likely). Unfortunately, the dating of the villa fire and the subsequent occupation is not precise enough to distinguish between continuity of occupation or reoccupation.

Further east, enclosed settlement appears to be absent and, without this visible (even when ploughed-out) attribute, few settlements are known. In Wiltshire a settlement at Collingbourne Ducis (Pine 2001) was excavated in advance of development. Eight sunken-featured buildings were recorded together with a possible post-built structure. Calibrated radiocarbon dates suggest occupation in the 8th and 9th centuries (BM-3162–4) but one date centres on the later 6th century (BM-3165). A cemetery containing some 5th-century artefacts had previously been excavated 150m away (Gingell 1975/6). At Market Lavington another apparently contemporary settlement and cemetery of similar date have been excavated (Williams and Newman 2006).

In Gloucestershire finds are concentrated in the upper Thames valley, for example, Sherborne House, Lechlade, (Bateman *et al.* 2003), almost certainly due to the level of development there. In these areas, cemeteries are likely to be much easier to identify due to their diagnostic grave goods, whereas settlements of the same period are difficult to locate. However, by analogy with Anglo-Saxon settlements elsewhere in the upper Thames valley, we may be looking at a densely occupied landscape from the later 5th century with sizable dispersed (and perhaps shifting) settlements situated on the gravel terraces above the Thames and its tributaries. The Sherborne House site comprised sunken featured buildings and "halls" associated with boundary ditches dating from the 6th century onwards. There was evidence of shifts within the village and Reynolds (2006) notes both the early date of property boundaries within the settlement and also parallels with the buildings at Poundbury (Green 1987), suggesting a western tradition of construction.

There are also places where there is little archaeological knowledge but where there are suggestions that work might pay dividends. One such is the Exmoor village of Porlock, where early sculpture is known and whose raiding by the Vikings suggests a settlement of some importance. The church tower also appears to have a defensive aspect to it.

Rural settlement is also hard to identify in the later periods, until the 10th century when pottery begins to make a reappearance. The coastal settlement at Mawgan Porth falls into this period (Bruce-Mitford 1997) and finds of 10th-century pottery from rural sites are increasing in areas such as Somerset. The evidence from Shapwick (Gerrard and Aston forthcoming) suggests that by this date a previously very dispersed settlement pattern, which we are unable to identify because of the lack of diagnostic artefacts and its scattered and small-scale nature, was becoming more concentrated and is now hidden under many modern farms and villages. The situation further east is similarly difficult because of the lack of chronologically diagnostic artefacts with few patterns emerging (Hinton 1994a).

High-status rural sites are dealt with below (Section 10.2.3 on the next page) but also need to be considered in the context of possible ecclesiastical origins and urban developments.

The contribution of placename studies to the understanding of rural settlement is particularly relevant to Cornwall where pre-English names survive in large numbers (Rose and Preston-Jones 1995). This has allowed more detailed work on settlement patterns than elsewhere in the region (see Turner 2006a for a summary). Placenames have also been put to good use on a smaller scale at Shapwick where the identification of field-names with habitative components has been used to reconstruct the pre-open field settlement pattern (Gerrard and Aston forthcoming).

10.2.2 Urban Settlement

The decline of urban settlement in the major Roman towns, such as Cirencester, Gloucester, Dorchester, Ilchester and Exeter is a well-known feature of the late 4th and 5th centuries but in most cases the evidence for the fate of the towns is poor. The enigmatic "dark earth" has been recorded at a number of these urban sites, for example Bath, Gloucester and Exeter, but the nature of this deposit continues to be debated. More work on the longevity of the Dorset Black Burnished Ware industry may help to provide dating evidence (Gerrard 2004b). The best evidence for continuing populations is perhaps the large organised cemeteries of oriented burials at such places as Poundbury (Farwell and Molleson 1993) or Ilchester (Leach 1994). Unfortunately as these sites are "Roman" they are rarely dated by radiocarbon, so it is usually not possible to say when they went out of use. Interestingly, the cemetery at Queenford Mill near Dorchester-on-Thames (Oxfordshire) has produced dates suggesting use into the 7th century AD (HAR-5324, 5325, 5350, 5351, Chambers 1987) which suggests that the dating of simliar sites in the South West might be fruitful. The evidence from Poundbury, however, is that that part of the cemetery was out of use and built-over sometime in the 5th century (Sparey-Green 1996). The cemetery at Kingsholm outside Gloucester does, however, see one possibly early 5th-century burial within what is believed to have been a Roman mausoleum (Hurst 1975). The body of a male aged 25–35 was accompanied by a silver belt-buckle, an iron knife and other silver buckles. Parallels for these items suggest a south-eastern European origin, in which case, a Late Roman date may be preferred (Hills and Hurst 1989). It is less clear what was going on within the town walls, although the Greyhound Yard site at Dorchester seems to show continuing use of buildings in the north of the excavated area, with chalk floors laid over mosaics, whilst the southern part was given over to cultivation (PJ Woodward *et al.* 1993). Other parts of the town appear to show a similar picture of less urban use, although with some (undated) activities continuing (Hinton 1998, 11). There is late occupation of the amphitheatre at Cirencester, perhaps suggestive of its use as a defended enclosure (Wacher 1976; Holbrook 1998), although the nature of the blocking of the entrance does not look particularly defensive.

At Exeter, the discovery of a post-Roman cemetery dating from perhaps 450 indicates continuing population but not necessarily urban life (Allan 1991, 29–35) as may the church of St Pancras which predates the medieval street pattern (Bidwell 1979). In Gloucester the excavation at St Mary de Lode suggests a (?continuing) ecclesiastical presence at least (Bryant and Heighway 2003), although Blair (2005, 31n) stresses that the first phase is, in fact, undated and could be late.

Recently good evidence has been found for the continuing occupation of the Roman roadside settlement at Shepton Mallet where some of the plots had been used as burial grounds for groups of burials (Leach and Evans 2001). More recent work on the site has produced archaeomagnetic dates of 285±80, 400±90, 515±45 and 515±65 from stone-built hearths within demolished buildings (Peter Leach, pers. comm.).

Historical sources attest that town life seems to have become re-established by the late 9th century at Exeter and other places, although there is very little archaeological evidence for this. The work at Trowbridge (Graham and Davies 1993) showed a sequence of structures below the later castle, church and cemetery. These included sunken-featured and post-built buildings. In the absence of closely dateable pottery or other artefacts it was not possible to say whether occupation was continuous with the succeeding manorial enclosure and then castle. The status of the site is thus unclear. Other places such as Taunton and Ilchester are assumed to have some urban characteristics by the late 9th century because of the presence within

them of mints but there has been no archaeological evidence from this early date with the exception of a radiocarbon date of 770–1150 cal AD from the cemetery beneath Taunton Castle (HAR-2674, Clements 1984, 28). There may be evidence of planned settlement from the 9th century at places such as Glastonbury and Iron Acton (see also Section 12.2.2 on page 198).

John Blair (2005) has recently argued that many of these urban places (including many of those mentioned in the Burghal Hideage) were associated with the presence of earlier minsters. The interaction between religious communities, royal estates, markets, defended sites and later urban status needs further work.

10.2.3 Elite Settlement

In a period with poor survival of material culture it is the settlements of the elite that are most visible with their imported "luxury" items and metalwork. In the early period these appear to take the form of refurbished hilltop sites such as Cadbury Congresbury (Rahtz *et al.* 1992) and Cadbury Castle (Alcock 1995), a phenomenon known from across western Britain. The possibility of a "hall" of Early Medieval date, tentatively reconstructed from the patterns of postholes at Cadbury Castle, may be further evidence of elite occupation and emphasises the challenge of identifying structures at sites of this nature. Post-Roman phases have been reported from Crickley Hill (Dixon 1988a, 78) in two areas, one suggested as a defended elite centre, but in the absence of full publication these cannot be confirmed (Charles Parry pers. comm.). In Dorset, a similar refortification to that at Cadbury Castle has been suggested at Poundbury (Hinton 1998, 15) where excavations in 1939 (Richardson 1940) located a limestone wall constructed on the top of the Iron-Age ramparts and not associated with any refurbishment of the ditch. The excavator dated this to the latest Iron Age on the basis of a sherd of pottery from the ditch but in the absence of any indication of occupation of this date from the interior (RCHME 1970) a post-Roman date must be considered.

Tintagel continues to hold a special place in the interpretation of these sites. The interpretation of Tintagel island as a "celtic monastery" is almost universally out of fashion, but its role as a high-status residence or central place continues to hold sway, although debates continue about its size, status and duration of use (see for instance KR Dark 2000; C Thomas 1993). The recent work by the University of Glasgow (Harry and Morris 1997; Barrowman *et al.* 2007) has examined (and re-examined) the evidence from Radford's excavations. New excavations on the lower terrace of site "C" identified three structural phases dated by radiocarbon. The earliest (395–460 cal AD) is associated with hearths, floors and stakeholes and the only pottery is Romano-British. In the second phase (415–535 cal AD) Romano-British pottery is associated with the arrival of Mediterranean imports and in the last phase (560–670 cal AD), the stone structures excavated by Radford are associated with large quantities of imported pottery. Re-excavation on the upper and middle terraces located an ephemeral building predating the stone structures located by Radford and similar to those found on the lower terrace. The deposits in these structures suggested that they may have been seasonally occupied. The stone building was confirmed to belong to this period and close to it was found a remarkably inscribed slate with two phases of lettering (Late Roman and post-Roman) and a collection of glass, possibly Spanish. Work also showed that the "Great Ditch", by the lower ward of the castle on the mainland, had been in use (and its natural defensive qualities enhanced) in the immediate post-Roman centuries. These findings, together with 5th–6th century material from below the medieval lower ward of the castle itself have reinforced the sheer scale and significance of Tintagel island (Rachel Barrowman, pers. comm.).

Later high-status sites do not appear to be characterised by the presence of similar diagnostic artefacts and those that are known have been identified by chance or aerial photography. Perhaps the best known is Cheddar, excavated by Philip Rahtz (1979) and interpreted by him as a palace of the kings of Wessex. The site is adjacent to the sites of several Roman buildings, one at least with the character of a villa, and comprises a series of timber halls and associated structures. John Blair has questioned the royal origins of the site (Blair 1996; Blair 2005, 326–7) suggesting that the king's hall was founded in the late-9th or early-10th century adjacent to a minster (with probable British origins) and grew at the church's expense.

There is also the enigmatic site at Foxley to the west of Malmesbury where aerial photography, geophysical survey and limited excavation have shown what appears to be a hall (of several phases) with subsidiary buildings as well as a church in its own enclosure (see also below on page 178). Only one radiocarbon date, 420–770 cal AD (HAR-6216), has been published (Hinchliffe 1986), from charcoal in the wall trench of one of the ancillary buildings; an unpublished date from the one of the hall post-holes calibrates to AD 660–970 (HAR-8082). The earlier date range, as Eagles (2001) points out, spans both British and Anglo-Saxon control of the area. Blair, however, sees this site as a monastic cell of Malmesbury with a significant agricultural function (Blair 2005, 214–5).

In Gloucestershire (Reynolds 2006) a similar site was excavated at Kingsholm to the north of Gloucester where timber halls have been identified with a

palace mentioned in the Anglo-Saxon Chronicle in the mid-10th century (Hurst *et al.* 1985) and another site was excavated at Holm Hill, Tewkesbury; a site which later became the residence of the Earls of Gloucester (Hannan 1997).

10.2.4 Technology and Production

There is increasing evidence for the continuity of pottery manufacture, particularly from Cornwall. "Gwithian Style" pottery in gabbroic fabric was identified as long ago as 1958 as continuing Late Roman forms (C Thomas 1958) and the current work on the Gwithian archive will provide further information on this (see Section 10.2.1 on page 171). There is also material from Trethurgy in a similar fabric which appears to continue a limited range of Late Roman forms into the 6th century (Quinnell 2004a, 111). There is one sherd of the later grass-marked pottery from Trethurgy which is petrologically identical to the earlier material, suggesting continuity of manufacture (David Williams in Quinnell 2004a, 126–7). Grass-marked pottery is elsewhere more firmly dated to the 8th century but the evidence for continuity of manufacture may require revision of this date (and/or that for the cessation of Late Roman forms). There is also the possibility of local breaks in pottery availability and use (Quinnell 2004a, 127). This detailed evidence is currently limited to Cornwall but there is some evidence for local wares elsewhere, such as at Mothecombe (Turner and Gerrard 2004) and Bantham (Silvester 1981; Griffith 1986; May and Weddell 2002; Bidwell and Reed in preparation) both associated with Mediterranean imports. To the north there are sherds of grass-marked pottery from Cannington (Rahtz *et al.* 2000) and at Cadbury Congresbury there also appeared to be continuing use of pottery made in an Iron Age tradition into the early 5th century (Rahtz *et al.* 1992). Shell-tempered ware is found in the north of the region, for example at Lower Woods, Hawkesbury, where it was found in layers which overlay a late 4th-century mosaic. The later period is equally poorly served, with little pottery before small quantities appear in the 10th century. Collections of this material have been published from Cheddar (Rahtz 1979) and, more recently, material from 1950s'excavations at Glastonbury Abbey has been re-examined (Kent 1997; 1998). The exception, to this aceramic picture is the presence of chaff-tempered wares in Gloucestershire and Wiltshire but these change little during their long date-range and are rarely found in non-excavation contexts such as fieldwalking.

The Glastonbury pottery was associated with glass furnaces which were dated to "before the middle of the 10th century" (Radford 1956, 69–72; Radford 1981); current thinking might push the date earlier into the 9th (Harden 1971) or even late 8th century (Justine Bailey quoted by Kent 1997). A full report on the excavation and finds is awaited.

An iron-working site at Blacklake Wood on Exmoor has recently produced a radiocarbon date of cal AD 415–650 and five sherds of pottery that appear, on the basis of granitic inclusions, to be products of the South West (Martin Gillard pers. comm.). The site appears to have been using surface ores and the waste products indicate a different technology from that used at Sherracombe Ford (also on Exmoor) in the Roman period. There was no evidence of smithing, implying that artefacts were being fabricated elsewhere. Other later dates are known from iron working sites such as Bywood Farm, Dunkeswell and North Hill Glider Field (6th–9th century) on the Blackdown Hills (Reed 1997; Horner 1998; Bill Horner pers. comm.) and at Burlescombe (7th–11th century, Reed *et al.* 2006). Iron working is known from further east, at Ramsbury (Haslam 1980), Gillingham (Heaton 1992) and Worgret (Hinton 1992a). The last site produced dendrochronological dates of between 664 and 709 for a structure, perhaps a watermill, filled with slag and furnace residues. If the structure at Worgret was a mill it would be only one of many mentioned in Domesday Book and it is, perhaps, surprising that more evidence for milling has not been located.

There is some limited evidence for quarrying: a charter from Bishop's Lydeard (AD 899x909, Sawyer 1968, No. 380) refers to *stangedelfe*, the stone digging (although the boundary clauses may be later, Robert Dunning pers. comm.) and there is a similar reference from Pucklechurch (*c.*950).

There appears to be very little evidence for other activities, although wooden fish traps in Bridgwater Bay have recently produced 10th-century dendrochronological dates (Groves *et al.* 2004) and radiocarbon dates beginning in the 9th century (GU-6002–6011, 6038, 6039, Richard Brunning pers. comm.). The context of these structures is, at present, not understood but it is possible that they are a feature of royal estates along the Somerset coast. There is also the enigmatic site at Duckpool in North Cornwall where industrial hearths have been found close to the beach which date from the Late Roman period and the 8–12th centuries. There was no evidence from the area excavated that occupation was continued between these two periods and the industrial processes involved are unknown (Ratcliffe 1995).

10.3 Social Life

10.3.1 Ethnicity and identity

As mentioned above, assumptions about racial identity (more recently reformulated in terms of "ethnicity") have had a central place in historical and archaeological research into the Early Medieval period. Arch-

aeological evidence has long been used and abused in this debate, from Victorian studies of "celtic" crosses and "teutonic" graves. Questions of ethnicity evoke much current debate (see for example Lucy 2000; Hills 2003). The key debate has tended to focus on the nature of "Anglo-Saxon" ethnicity, often linked to the scale and character of Anglo-Saxon immigration.

Drawing upon the last 25 years of revision in Early Medieval history, ethnicity in the Early Middle Ages has been reformulated as a "situational construct" defined by political allegiance rather than biological or even familial ties. The implications of this argument for the assumption of "British" and "Anglo-Saxon" identities from the material evidence have been noted as cautionary, but have yet to be fully explored. At one extreme, conflating the issues of ethnicity and migration, some archaeologists have taken these arguments to mean that we can reject the supposed population movement: Bede's "Adventus Saxonum". However, this "immobilist" approach that emphasises "British" continuity over "Saxon" immigration also has its roots in Medieval biases and British nationalism (Härke 1998) and needs to be challenged as rigorously as traditional stereotypes of Germanic immigration and population replacement. Certainly we have evidence of novel forms of burial, settlement and material culture that can be associated with Germanic groups, but whether these are immigrants (Eagles 1994), or indigenous groups under the influence or direct control of invading elites (Higham 1992) remains open to debate. The South West may provide the best place to study such changes due to the apparent progression of Anglo-Saxon culture, both from east to west and through time.

Archaeological evidence from Wiltshire certainly seems to suggest significant "British" elements within the "Anglo-Saxon" population. Cemeteries such as Collingbourne Ducis and Market Lavington have produced burials which appear to have been wearing Roman-style dress, and female burials at Harnham appeared to favour bracelets and finger-rings, again a Roman fashion (Eagles 2001, 218). The rite of clothed inhumation itself, however, is a novel development that has parallels not only in other parts of England but also with Francia. One distinctive feature of Wiltshire is the low proportion of cremation burials, marking the burial rites of the region out from other parts of Wessex, and Anglo-Saxon England as a whole (Williams 2002). This might be evidence of greater "acculturation" between natives and immigrants, or alternately, it could reflect a distinctive local identity. More research is needed to ascertain whether this absence of cremation is a result of poor preservation or indeed is a reality of past mortuary practice.

Evidence from Gildas, Bede and Aldhelm suggests that, in the period from *c*.550 to the early 8th century, there was pretty uncompromising hostility that solidified the identity of both sides as "British" and "Anglo-Saxon" respectively, irrespective of the question of whether in reality many of the Anglo-Saxons of eastern Wessex were of British descent (Hines 2000). Later, the laws of Ine (688–725) show an "apartheid" between Anglo-Saxons and British; the latter were presumably people of the South West who had been recently incorporated into Wessex. They are described as *wealas* from which comes "Welsh", but at the time of the laws the word probably had the connotation of "foreigners". The British had rights and were assigned wergilds and oath values according to class, but these were worth less than those of their Anglo-Saxon counterparts.

The history of the church in western Wessex could support this. Evidence from Aldhelm's writings suggests British clergy had to conform over matters such as the celebration of Easter and the form of the tonsure in order to continue in their positions. One could suggest that what lies behind these arrangements are the conditions on which the British submitted to the English – the British agreed to accept Saxon authority and in return had their legal (but second class) status assured. No doubt landowners also had to surrender much of their land to incomers like the family of the missionary Boniface who seem to have moved from Hampshire to Devon probably in 670s. It is possible that some of the villages in Devon, otherwise an area of dispersed settlement, were founded at this time. The battles as recorded in the Anglo-Saxon Chronicle may indicate that the Saxons advanced district by district (or by groups of districts). Dumnonia, for instance, does not seem to have fallen in one fell swoop, but to have suffered a gradual loss of its easternmost territories with boundaries inexorably moving further and further west. By the time Alfred (871–99) drew up his law code, everyone he ruled had become West Saxons – there is no separate provision for people of British descent. The prevalence of the Old English language as seen in placenames suggests that the former British had had to become "Anglo-Saxon" rather than that there was any compromise.

Archaeologically the "Anglo-Saxons" also appear distinct with a range and use of material culture that differed from that of areas to the west. For much of the region, however, the incorporation of the area into English kingdoms took place six or seven generations after the first appearance of Anglo-Saxon material culture in the east of England, and at a time when the use of distinctive items deposited in burials was ending. It is possibly that DNA studies may help but possibly more fruitful is the increasing use of stable isotope analysis to identify the diet, environment and place of origin from the human skeleton. Provisional strontium and oxygen isotope analyses of a range of Early Medieval cemeteries across England (Budd *et al.*

2004) suggest that first-generation immigrants from over the North Sea are likely to be recognised but also a range of local and regional migrations could be identified. Inevitably such studies are hindered by the poor bone preservation from much of the South West.

In Wiltshire the distribution of Anglo-Saxon material appears to show an expansion of Anglo-Saxon burial sites from the Avon valley (particularly around Salisbury) in the 5th century, across Wiltshire in the 6th, and into Dorset in the 7th. Eagles suggests that a clear area of Anglo-Saxon penetration into eastern Dorset beyond Bokerley Dyke sometime in the 6th century is visible in the distributions, possible halting at a refurbished Combs Ditch (Eagles 2004).

To the north there are large 6th-century cemeteries with Anglo-Saxon material which appear to follow the present county boundary of Gloucestershire (for instance that recently excavated at Butlers Field, Lechlade, Boyle *et al.* 1998) but to the west such burials are less common, although there are small numbers of secondary interments in barrows (Heighway 1984; 1987; Reynolds 2006). The small group from Bishop's Cleeve stands out from this as it would appear to represent the burials of a small community (perhaps 13 people burying over 50 years) in an area where other communities were disposing of the dead without Germanic material culture (Holbrook 2000).

There is even less information on the other migrations reported in historical sources and suggested by placenames; movements of Irish, either direct or via South Wales, and the, presumed larger, movement to Brittany (Giot *et al.* 2003).

One group makes a large impact on the history of the 9th and 10th centuries: the Vikings. Raids are reported along many coasts following the killing of the king's reeve at Portland (see Pearce 2004, fig. 111) but the archaeological evidence for raiding or settlement is extremely sparse. There are two (with a fragment of a third) hogback tombs from Cornwall (Langdon 1896) and the dedication of a church in Exeter to St Olaf may show the presence of Norse communities (Pearce 2004, 277). There are also hints of peaceful activities at Gloucester in 877 when the Vikings are reported to have "built booths in the streets" (Heighway 1984, 236). The re-interpretation (Gardner and Ternstrom 1997) of a 19th-century discovery of burials on Lundy as a Viking cemetery will need further work before it can be considered convincing. As in many other areas the chief legacy visible to us is the renaming of nautical features, but the mechanism by which this name replacement took place is extremely obscure (C Thomas 1997).

10.3.2 Society and Politics

Much of what is known of this period comes from the scanty historical sources with a limited contribution from archaeology. Gildas only refers to the presence of kings in the western part of the region and it is possible that when he writes in ch. 27 that *Reges habet Britannia, sed tyrannos; iudices habet, sed impios* (Britain has kings, but they are tyrants; she has judges but they are wicked) he was contrasting two separate political systems with which he was familiar (Woolf 2003). All the kings that he mentions are associated with the least Romanised areas of western Britain and it could be argued that these areas had been left more under native control in the Roman period and so circumstances were more favourable for the emergence of kingdoms when Roman authority was removed altogether. In the more Romanised eastern areas there might have been a more gradual adaptation of local government to changing circumstances, and this may be reflected in the *iudices* ("magistrates"?) of Gildas and the three leaders (not necessarily "kings") based in towns in the Chronicle annal for 577.

It could be argued that, in the west of Britain at least, the evidence of Gildas and St Patrick provides more support for gradual adaptation to changing circumstances following the withdrawal of imperial control. The case for a basic continuity of the British church and its structures from the 4th to 5th centuries and beyond has been cogently made (Sharpe 2002). That, however, need not mean that Christianity had made a substantial impact on all areas of the region before 400.

The presence of "elite" sites has been taken to indicate the presence of a strongly hierarchical society (together with Gildas's "kings") but the archaeological evidence for status is based solely on the presence of imported artefacts and, in some cases, the amount of labour needed to refurbish the defences. However, in the absence of other contemporary sites, it is not possible to show that the presence of imported pottery is a characteristic of status and the size of the defended area might suggest communal defence rather than an exclusive elite residence. The theoretical model employed to understand these sites has been based on a now-questioned and out-moded model employed for the pre-Roman Iron Age. Since the interpretation of hillforts has undergone a major shift from military defence and elite residence to communal and seasonal gathering places and ritual centres, we must equally open the debate with regard to post-Roman sites.

10.3.3 Territoriality

As noted above there is historical evidence for the people of Dumnonia and the Hwicce but this is not well-reflected in the archaeological record. One

pattern which may be evident is the distribution of enclosed settlements which does appear to concentrate within the area believed to be Dumnonia with its eastern border along the Quantock Hills. This may, however, be more of a reflection of the pastoral nature of the west of the region and a prevalence of cattle raiding. There do seem to have been distinctive settlement types in Cornwall during the Roman period (the courtyard house and the oval house); the latter tradition, at least, appears to continue after 400.

To the east the importance of Selwood as a boundary may be perpetuated in the two dioceses of Wessex: Winchester and Sherborne. The latter was established in *c.*705 for what seem to have been the predominantly "British" areas of Wessex where Aldhelm, the first bishop, had been labouring for some years to bring the church into conformity with Canterbury. The earlier presence and importance of Selwood is suggested by its British name of *Coit Maur*, Great Wood, but this needs to be treated with caution as it may only be its 9th-century name known to Asser. Eagles (2001, 214) has suggested that it formed the boundary of the Roman *civitas* of the Belgae.

Another boundary appears to have followed the Bristol Avon which divided the Hwicce from the people of Somerset and later divided Wessex from Mercia. This would appear to be the boundary that the West Wansdyke was built to defend (see page 186). The boundary between Gloucestershire and Somerset uses the river itself and Reynolds and Langlands (in press) suggest that this move took place in the 10th century.

Eagles (2001; 2004) has argued that a part of the boundary between Hampshire and Dorset follows that of the Durotrigan territory and was defended by the Bokerley Dyke. He also suggests that further to the north the boundary lay to the east of the county boundary, perhaps through Teffont to the River Wylye, based on finds distributions and placenames (Eagles 2004).

The origins of the boundary between Somerset and Dorset may be based on the possible Late Roman division of the Durotriges into two cantons based on Dorchester and Ilchester. Costen (1992, 85–6) notes that the placenames Rimpton in Somerset and Ryme in Dorset come from the Old English for "edge" and are likely to have been named by the earliest English speakers in the area. He suggests that the boundary must have been laid out at around this time but there is no reason that it could not be earlier. It is unknown whether the Somerset/Devon border bears any relationship to that of the former Dumnonia which is often believed to have lain further north-east, closer to the River Parrett.

The development of smaller territorial units, such as estates, parishes, hundreds and the like, has been studied in several areas but much has depended on the availability of historical evidence, principally charters, to define the earliest recorded units. A good review has been provided by Hooke (1994) which draws attention to the potential of defining British territorial units in the far west as well as the better recorded estates in the Wessex heartlands. The use of Iron Age hillforts, some reoccupied in the Early Medieval period, to define Early Medieval territories has a long history, and continues to hold potential (Burrow 1981; Rahtz *et al.* 1992). The extent to which this is possible might be testable through the work of the Cadbury Castle environs project (Davey 2004). Costen (1994) has examined some estates in detail in Somerset and adjoining counties and there have been detailed studies of particular estates in the same area by Corcos (2002). There remains considerable potential for integrating landscape, placename, charter evidence and archaeological research to understand the development and evolution of territories and estates in the Early Medieval South West (see Reynolds 1999). For instance, the place-name research of Aliki Pantos on assembly places across England (Pantos 2004) combined with an ongoing project to examine Early Medieval assembly sites archaeologically by Sarah Semple (2004), contain the potential to heighten our understanding of some of the most important, yet archaeologically understudied, categories of "central place" in the landscape as does the research of Andrew Reynolds concerning execution places and burials in Wiltshire.

The identification and analysis of the structure of royal estates also has great potential for the understanding of many aspects of the period. Most minster churches appear to have been founded on these estates and they also appear to have a bearing on the location of mints and of other settlements, for example burhs, which often appear to lie on their edges, as at Axbridge on the edge of the Cheddar estate. It is possible that while the minster lay on the royal estate, it and the royal "villa" were not always on the same site. The site at Foxley (Hinchliffe 1986), described above on page 174, may represent such a royal site with a small chapel, the minster lying at Malmesbury, although Blair (2005, 213–4) would see it as a subsidiary monastic cell. Most of such sites will, however, have developed into modern settlements and thus be hard to discover. In particular, minsters seem to develop into towns, often with planned royal additions. These sites may also be identified by later royal attempts to regularise (and thus profit from) the "customary" market.

10.3.4 Economy, Trade and Interaction

Two episodes of external trade are visible in the archaeological record for the early part of the period (see

Pearce 2004, table 3 for a useful overview). The earlier, which seems to centre on the period 475–550, is characterised by pottery from the eastern Mediterranean with a smaller component of North African origin (which appears to be slightly later, Campbell 1996). The vast majority of this material (originally defined as Tintagel A and B wares) in Britain comes from Cornwall, Devon, Somerset and South Wales with the largest amount from Tintagel (C Thomas 1993). There are many sites in Cornwall that have produced a few sherds (C Thomas 1981b) and more recent finds such as at St Michael's Mount (Herring 2000). In the last few years, sites along the south coast of Devon have begun to produce larger amounts of this material, for instance, Bantham (Silvester 1981; Griffith 1986; May and Weddell 2002; Bidwell and Reed in preparation) and Mothecombe, where there appear to be houses to one side of the beach with an area of hearths on the other (Sam Turner, pers. comm.). Similar occupation was discovered at Wembury along the coast, but without the imported pottery; it has been dated by radiocarbon to cal AD 420–600 (Wk-13086–8, Reed 2005). It is possible that Tintagel and sites on the south coast such as St Michael's Mount (Herring 2000) or Bantham (Silvester 1981; Griffith 1986; May and Weddell 2002; Bidwell and Reed in preparation) were fulfilling the same function as the so-called "productive" sites (Pestell and Ulmschneider 2003) known from eastern England and may have been recognised trading centres like the later *wics*.

The other sites producing quantities of this material are Cadbury Congresbury (Rahtz *et al.* 1992) and Cadbury Castle (Alcock 1995), neither of which lies on the coast and both are assumed to have been high-status sites which consumed the contents of the amphorae and used the tablewares. Tintagel island appears to have combined both roles. Small quantities of this material turn up on other sites in the region, such as Trethurgy (Quinnell 2004a), Lundy (McBride in Allan and Blaylock 2005, 88) and Carhampton (McCrone 1995) which do not appear to be particularly high-status, although the last two may be monastic. It is likely that more remains unrecognised in excavation archives but the distribution does appear to exclude Dorset and Gloucestershire, a fact which cannot be explained by the presence of Anglo-Saxons at such an early date. Corfe Castle has been suspected of having a pre-Norman phase (Hinton 1994b; 1998) and the collections from here might be worth re-examining.

The later episode comprises material dated to the 6th and 7th centuries. Most of this is E-Ware which dates towards the later part of the range; the earlier D-Ware is extremely rare. This material is believed to derive from western France and is much more widespread than A and B wares in the British Isles but it does not tend to be found on hillforts such as Cadbury Congresbury and Cadbury Castle which has led to the suggestion that these were abandoned before this date. It is, however, mostly absent from Somerset in any case which again emphasises the problems when only "high-status" sites are known.

Glass also appears to form part of this later continental trade as it has a similar distribution and is stratified with D-Ware and E-ware at Whithorn in southern Scotland (Campbell 1996; 2000; Hill 1997). The only site with significant amounts in the South West is Cadbury Congresbury. There is some indication of the movement of items from English areas, although debate continues as to whether this was in the form of raw glass for local manufacture (Whitehouse 2003) or as complete vessels (Campbell 1996, 93). Certainly some complete vessels are found such as the jar from Pagans Hill (Evison in Rahtz and Watts 1989, 341–5) and metal objects of English origin were found at Cadbury Castle (Alcock 1995).

Consideration of trade patterns in the later periods is similarly hampered by the almost complete absence of material culture until the 10th century (Hinton 1994a).

10.3.5 Religion and Ritual

The spread of Christianity is one of the areas where much research has focused in the past, stemming from a long tradition of interest in this topic by the Medieval church and later historians. Burial is also one of the few areas where there is a comparatively large amount of data. The religious affiliations of the population at the beginning of the period are obviously deeply connected to those of the Late Roman period and there has been much argument on the extent to which Christianity had spread in urban and rural populations by AD 400 (C Thomas 1981a; Petts 2003). The numerous saints' "lives" which survive (mostly from much later than the period) paint a picture of missionary activity from South Wales but Gildas appears to be writing in a Christian society, more concerned with heresy than paganism.

The Early Church

Unfortunately the most direct evidence for Late or post-Roman Christianity, the Shepton Mallet amulet (Johns in Leach and Evans 2001, 257–260), appears to be a modern forgery; its authenticity has been in doubt for some years, on both art-historical (Martin Henig, pers. comm.) and scientific (Johns in Leach and Evans 2001, 260) grounds. More recent scientific tests have confirmed that the silver alloy contains too few contaminants to be pre-Industrial Revolution (Stephen Minnitt pers. comm.). The presence at Shepton Mallet of separate groups of oriented and north-south aligned graves, however, still suggests the presence

of a Christian (and a pagan) community. This leaves the best evidence at Poundbury (Farwell and Molleson 1993), where Late Roman mausolea contained Christian imagery, and the well-known Christian mosaics at villa sites in Dorset. In addition to these there is now a suggestion that the recently discovered villa at Bradford-on-Avon had a baptistery and possibly a later cemetery. There are also pagan temple sites that appear to have been re-used as Christian churches, for example at Uley (A Woodward and Leach 1993) where a wooden basilica was built over the site of the pagan temple. This was replaced around 600 by a smaller stone building which then had an apse added to the north-east end. These are both interpreted as chapels but the careful burial of the unweathered head of Mercury from the Roman temple near the junction with the apse suggests a complex picture. Similar associations of Roman temples with later, oriented, structures are known at Brean Down (ApSimon 1965) and Lamyatt Beacon (Leech 1986) where they were also associated with east-west burials (see page 183).

There is no sign of any surviving Roman church in eastern Wessex at the time of the appointment of Birinus as bishop in 635 (Hase 1994) but in the west there is both historical and archaeological evidence. Gildas believed that the church of his day had evolved from its Roman antecedents without a break and the presence of seven bishops and other churchmen at the meeting with Augustine in *c*.601 shows a well-organised structure. Eagles (2003) has suggested that Augustine may have travelled along the Thames and that the meeting place, known to Bede as Augustine's Oak lay close to the source of the river, which burial evidence suggests is close to the limit of Anglo-Saxon settlement at the time. If this location, or other locations in the South Gloucestershire area, is correct and taken with the origin (from Bangor-is-y-Coed near Chester) of some of the British representatives it is possible that that the province of *Britannia Prima* still operated for ecclesiastical purposes at that time. Gildas, indeed, may have been writing specifically for this province. The locations of the other bishoprics depend in part on the fate of the *civitas* capitals (presumably the centres of Roman sees).

Monasticism was already coming into western Britain when Gildas wrote *De Excidio* (a date much debated but probably in the first half of the 6th century) and by the time of his later writings was more fully established. These later writings suggest that we should not expect all monasteries in the west to follow the same degree of asceticism – Gildas did not approve of the extreme asceticism associated with St David. Studies throughout the insular world suggest that *monasterium* and associated words could be applied to any religious community and did not necessarily have connotations of celibacy and the following of a rule.

The meeting with Augustine and the writings of Aldhelm suggest that by the 7th century the British church was seen as very conservative and adhering to customs of Easter calculation and tonsuring that were prevalent when Christianity had been introduced into western Britain in the later Roman period. The British views on Easter were seen as bordering on the heretical and it is maintained in some quarters that the heresy of Pelagianism (which concerned the doctrine of free will) was rife in the British church (Herren and Brown 2002) but, if this were the case, one might have expected reference to it in Anglo-Saxon sources.

Many sites have been identified by archaeologists and historians as those of early churches or monastic settlements. In Cornwall, although Tintagel island is now suggested to be a secular elite site, there is continued interest in the origins of place names incorporating the element **lann* (enclosure) and showing circular form (Olson 1989; Preston-Jones 1992; Pearce 2004, 136–48). David Petts has argued convincingly, however, that the circular churchyards are probably later as he can find no evidence for enclosed cemeteries in Britain before the 8th century (Petts 2002). Several Cornish churchyards have produced cist graves (Preston-Jones 1984) as has, possibly, Street in Somerset (Bridgers 2003; Calder 2004). Street ("Lantokai") may well be the original focus for the religious sites of Glastonbury with the others, most famously the Tor (Rahtz 1970; Rahtz and Watts 2003), originating as outlying hermitages. These hermitages do not appear to have been approved of by the Roman church and were regularised in some way to become the chapels which survived into the Medieval period (Aston 2004), for example St Michael's on the Tor or St Bridget's at Beckery (Rahtz and Hirst 1974). Recent work on the causeway linking Street to Glastonbury has produced radiocarbon determinations suggesting an 8th-century date (Richard Brunning pers. comm.), probably associated with the growth of the Anglo-Saxon monastery at Glastonbury itself.

There are also other locations in Somerset that have been suggested as early monastic sites, such as Carhampton (McCrone 1995), Banwell, Congresbury (Oakes and Costen 2003), Kewstoke (Calder 2004) and St Decumans at Watchet (Calder 2004). In Dorset the excavated settlement at Poundbury has been proposed as monastic, based primarily on the continued use of the Roman stone-built mausolea as churches (Sparey-Green 1996; 2004).

Despite the difficulties it is clearly important to try to identify early church sites, and the type of church involved, as they appear to have had a significant influence on the landscape and societies in their areas (Turner 2003; 2005; 2006a).

Figure 10.1: *The figure of Christ on one of the sculptural fragments recently found at Congresbury (Oakes and Costen 2003). Photograph: Tom Mayberry.*

The Anglo-Saxon Church

Many of the known ecclesiastical sites in the west continued as important places in the Anglo-Saxon church suggesting that the organisation in-place there was one familiar to Anglo-Saxon rulers and churchmen. Both structures appear to have comprised royally-held central places, accompanied by the more important churches, surrounded by a dispersed settlement. The main difference appears to be a greater closeness between secular and religious in the Saxon kingdom which may explain occurrences such as the movement of church sites over small but significant distances, as may have occurred at Sherborne (Hase 1994, note 30). The old site then seems to have become a chapel dependant on the new minster. There may also have been political and doctrinal reasons for this as as discussed below.

Various ecclesiastical sources indicate a rapid colonisation by Anglo-Saxon churchmen and women in the wake of the Anglo-Saxon take-over of the South West. It is apparent that many of Boniface's correspondents lived in the western part of Wessex, but unfortunately we do not know the location of all of their communities (Yorke 1998). Some places only known to us as parish churches may have been significant male/female religious communities with high standards of Latin culture even though little is known of their material culture.

The extent to which John Blair's minster theory can be universally applied to the South West requires further exploration (Blair 1994). Key archaeological questions relate to the identification of the plans and extent of Early Medieval monasteries, most of which are poorly understood. The combination of focused archaeological research, combined with topographical and place-name analysis, used by Hall and Whyman (1996) at Ripon, must provide a template for future studies of Early Medieval ecclesiastical sites in the South West. As well as the monasteries, we also need to understand the development of the daughter and manor churches. There seems to be a very large number of churches which, from their siting, are likely to have started life as manorial chapels or churches and this, too, needs to be understood.

Hase (1994) discussed the location of the early "mother" churches and suggested evidence for their location on sites close to water but above the floodplain in contrast to other parts of the country where Roman sites and other earlier fortifications seem to have been preferred. More recent work (for example, Blair 2005; Gittos 2002) has suggested that the situation is more complex; the South West had fewer towns and stone-walled forts (which appear elsewhere to have been favoured over villas for church sites) than other regions. Other factors, such as the Christianisation of pagan sites, for example, at Uley (Hase 1994, 48), Knowlton (the church has 12th-century features but is otherwise hard to date, RCHME 1975, 111) and Bath (Cunliffe 1986; Davenport 2002), which may also have contributed to the apparent preference for sites close to water, will also have been important. The location of Malmesbury within an Iron-Age hillfort may be due to its Irish origins (Blair 2005, 190). The decision, in many cases, is likely to have lain with the donor of the land. This is an area of continuing debate where the South West may provide much of the evidence.

The differences may be explained by the existence of a pre-existing Christian population in western Wessex so that sites were located close to existing British centres as, for instance, with the siting of the seat of the new diocese of Selwood close to *Lanprobi* (believed to be Sherborne) rather than at Ilchester or Dorchester (Hall 2005). Sherborne is one of a number of places where earlier British monastic centres appear to have been replaced by new minsters, built in large rectangular enclosures that still survive in the modern street-patterns of towns and villages today. This may be the result of a deliberate suppression of British ideas following the Synod of Whitby

and the arrival of the reforming archbishop Theodore in 668. There was a hardening of attitudes towards the British church which was increasingly seen as heretical in its views on the date of Easter and also in its monasticism which, with its emphasis on individual asceticism, was seen to be contrary to the views on grace propounded by St Augustine of Hippo. These views may have led to the replacement of "remote" British sites by minsters providing pastoral care, on new accessible sites and based on rectangular plans to emphasise their "Roman-ness" and therefore orthodoxy. In Dorset and the adjacent areas of Somerset, a system of these minsters seems to have been created under Ine (688–725), possibly by Aldhelm whose writings show a strong concern for orthodoxy. Similar beliefs may have prompted the start of stone church building, seen by Bede as "in the Roman manner" (Hall 2000; 2004; forthcoming) and, perhaps, a preference for new locations, uncontaminated by the past, which appears to have been the case at places such as Yeovil (Gittos and Gittos 2004b).

The small size and large number of these early sites prevented them from becoming too powerful and wealthy and, again, may have been a deliberate policy of royal control. This system began to break down towards the end of the period under the pressures of the increasing wealth of some churches based on endowments, the pastoral needs of a dispersed population and the establishment of churches by powerful laymen at their own residences. These developments, together with the monastic reforms initiated by Dunstan at Glastonbury from about 940, led to the creation of the medieval parish system.

Glastonbury itself has been studied extensively by both historians (see Carley 1988; Abrams and Carley 1991) and archaeologists (Rahtz and Watts 2003 and references therein) but there has been less archaeological work at the other reformed monasteries of the 10th century listed by Hill (1984): Abbotsbury, Athelney (unpublished Time Team excavations), Bath (Davenport 2002, 57–60), Buckfast, Cerne, Cranborne, Deerhurst (Rahtz and Watts 1997), Exeter, Gloucester St Peter's, Horton, Malmesbury (Haslam 1984, 111–7), Muchelney, Tavistock, Westbury-on-Trym (unpublished excavations in 1968 revealed 10th-century timber-buildings, burials and a jetty, Bob Jones pers. comm. – see Ponsford 1968; 1981) and Winchcombe (Mullin 2006). The nunneries are similarly poorly known archaeologically.

The Shapwick project has shown that a stone-built church had seen several phases of alteration (and acquired burial rights) before a burial dated to 890–1150 cal AD (SUERC-2937; Chris Gerrard pers. comm.; Gerrard and Aston forthcoming).

The evidence surviving in standing church fabrics is poorly understood over most of the South West. The Taylors' survey (Taylor and Taylor 1965) is now over 40 years old and more recent work, both published and unpublished, suggests that there is a far greater survival rate than they supposed. Important investigations have been conducted on some notable buildings, for example, Deerhurst (Rahtz and Watts 1997) and Bradford-on-Avon (Hinton 2001), raising many questions about their complex history and design while evidence of others has been gathered through excavation: Gloucester St Oswald's (Heighway and Bryant 1999), Cirencester Abbey (PDC Brown and Evans 1998), Bath Abbey (summarised in Davenport 2002) – both of these were constructed within areas of standing Roman masonry, Wells (Rodwell 2001, but see Blair 2004 for the origins), Cheddar (Rahtz 1979; Blair 1996), Glastonbury and Tor (Rahtz and Watts 2003), Muchelney Abbey(Taylor and Taylor 1965, 451–3), Potterne (Davey 1964) and Exeter (Allan 1991).

Of parish churches, in addition to the published work on East Coker (Gittos and Gittos 1991) and Exeter St Martin (Blaylock and Westcott 1989), many retain features highly suggestive of an Anglo-Saxon origin or building tradition. There is documentary and substantive evidence of many other churches in existence in Anglo-Saxon times which include Shaftesbury (Keynes 1999), Crediton (Orme 1980), Ramsbury (Taylor and Taylor 1965, with its collection of 9th–10th century carved stones, Cramp 2006, 228–34) Malmesbury (Pugh and Crittall 1956, 210–31), Wareham (Hinton and Webster 1987), Milborne Port (considered a late 11th-century rebuilding by Blair 2005 and Gem 1988 but it could have been an updating of the existing church which, in any case, must have existed), Bitton (Ellacombe 1878; Taylor and Taylor 1965) and Britford (Chambers 1958–60; RCHME 1987, 113–5). The areas around Bath, Cirencester and Sherborne show particular concentrations of Anglo-Saxon physical evidence which are unlikely to be the result of differential survival.

Although there have been some previous local studies (for example Foster 1987), the South West's carved stone has recently been thoroughly catalogued and reviewed (Cramp 2006). The material is more substantial than might be thought at first and includes highlights such as the standing crosses of the far west, the font at Melbury Bubb (Cramp 2006, 104–6), the recently discovered sculpture from Congresbury (Figure 10.1 on the preceding page; Oakes and Costen 2003), the fine and important collection at Ramsbury (Cramp 2006, 228–34) and elements incorporated into standing buildings, such as at Keynsham (Cottle and Lowe in Lowe 1987, 103–6).

Burial Traditions

Burial rites have been used by archaeologists as a source of cultural, religious, social and ideological evidence for contemporary society. The burial tradi-

tion of the sub-Roman South West from the 5th century comprises both large and small cemeteries with oriented burials at what appear to us, as we know so little of the settlement pattern, to be remote locations (Petts 2004). These presumably have some relationship to the large Late Roman cemeteries such as Poundbury (Farwell and Molleson 1993). There are also indications of other continuing Late Roman mortuary practices, such as the burial with hobnails at Shepton Mallet dated to cal AD 430–680 (GU-5293, Leach and Evans 2001, 45). The burials within most of these post-Roman cemeteries, however, are usually simple interments with little evidence for coffins but there is also a tradition of stone "lining" to graves. The most developed of these is the cist grave as recorded, for example, from 5th and 6th century contexts at Tintagel churchyard (Nowakowski and Thomas 1990; 1992) where the cist graves were lined and roofed with large slates forming a complete stone burial chamber. A similar picture is seen at Ulwell in Dorset, which dated to the 7th century and contained 13 cist graves (some with lids), 13 stone-lined graves (some with only head and foot stones) and 27 simple graves (Cox 1988b). Similar structures form a small component of the large cemetery at Cannington (Rahtz *et al.* 2000) but with no indication here of roofing slabs.

Other burials at Cannington contained smaller amounts of stone, appearing on excavation as a line of stones along the sides of the grave and these are also known at cemeteries with no true cist graves such as the cemetery on the site of the Late Roman temple at Henley Wood, which had 30 burials with stone lining together with 26 simple graves (Watts and Leach 1996). The small cemetery at the foot of Brean Down (Bell 1990, 73–83), which may be associated with an oriented building replacing a Roman temple (ApSimon 1965) on the Down above, contained graves lined with irregular boulders and produced 3 radiocarbon dates spanning 340–900 cal AD (HAR-8548, 8549, Birm-246). A similar cemetery partly investigated at Wembdon Hill (Langdon 1986; Croft and Woods 1987; Croft 1988) again revealed graves with partial stone linings and radiocarbon dates from the 7th to the 10th centuries (GU-5149–5151). Yet again, some cemeteries appear to consist entirely of simple graves such as Lamyatt Beacon, where in a very similar way to Brean Down, a Roman temple was replaced by an oriented building and accompanied by 16 burials (Leech 1986). Such cemeteries continue to be located, usually as a result of work on other sites, or as a result of development such as the cemetery of oriented inhumations at Tolpuddle (Hearne and Birbeck 1999, 55–62, 150–161, 226–230, 246–148), with radiocarbon dates centring on the 7th century (OxA-8297–8300, 8320).

There are also graves that are marked out as, in some way, special such as the proposed "cella memoria" on Lundy, believed to be the burial place of a "saint" – Charles Thomas (1991; 1994, 171) suggests St Nectan before his translation to Hartland – and graves enclosed by square ditches at Kenn (Weddell 2000) and Stoneage Barton (Webster and Brunning 2004). Very similar enclosures are also known at Poundbury (Farwell and Molleson 1993), where they lie beyond the main burial area, and at several other places in Britain, in Roman and post-Roman contexts. It has been suggested that the square-ditched enclosures are secular elite burials consciously copying Roman mausoleum forms (Webster and Brunning 2004).

There may also be more unusual forms of burial; a prone burial of a young woman in water-logged conditions by the Wiltshire Avon near Lake produced a radiocarbon date of 400–610 cal AD (GU-4921). It was suggested that the unusual location of the burial by the river may have been conditioned by the use of the river as a boundary at the time (McKinley 2003). Single burials, with or without unusual rites, may be common but without scientific dating are unlikely to be assigned to this period.

Another unusual burial was excavated at Filton in 2005 (Cullen *et al.* forthcoming). A woman had been buried after the removal of both lower legs, the feet being placed below the knees. The bones of the missing right leg were crossed over the upper leg bones but those of the left leg were missing. The grave was of full size and was surrounded, at a slght distance, by clusters of others, some intercutting to suggest that closeness was important. Other graves in the cemetery were arranged in spaced rows. The mutilation of the body has echoes of some late Roman burials but a radiocarbon date of cal AD 555–655 (Wk-17495) suggests that this was one of the later graves in the cemetery which appears to date from cal AD 400–650 (Wk-17495–17498).

A further feature of the western parts of the area is the presence of inscribed stones, known in greater numbers in Wales and Ireland. These are usually believed to be grave markers although few (Lundy with 4 and St Just) have been found in a cemetery (Okasha 1993; C Thomas 1994). The majority may have marked isolated graves and/or functioned as territorial markers but given the poor survival of bone in the area it is unlikely that burials will be located. The identification of stones in association with burials and other archaeological features is clearly of considerable importance to situate and contextualise this important source of evidence; their inscriptions could then be understood in context (Handley 1998; Howlett 1998).

An exception to the westerly distribution of these stones is the group from Wareham where five stones have been found in and around Lady St Mary Church (RCHME 1970, 308, 310–12, pl 105, 106; Hinton 1992b; Higgett 2006) The presence of these stones,

Figure 10.2: *Excavating one of the graves at the 5th- to 7th-century cemetery at Filton, South Gloucestershire. Photo: Cotswold Archaeology*

so far east of the main distribution, contrasts interestingly with the lack of imported pottery from Dorset, as does the re-use of Roman masonry for the carvings with the undressed stones of the west.

The earliest Anglo-Saxon burials appear to lie in, and to the east of, the valley of the Wiltshire Avon. The exception to this is the site at Market Lavington some 10km to the west which may represent the first phase of expansion (Eagles 2001). These cemeteries appear to provide for the burial of small groups occupying dispersed settlements, similar to cemeteries at Roman rural sites but in contrast to the larger cemeteries found adjacent to Late Roman towns and elsewhere further west. A further characteristic of these, and later, cemeteries is their association with earlier burial sites, often barrows, and there is also a tradition of the insertion of secondary burials into existing monuments (Meaney 1964; Williams 1997).

An intriguing site was excavated at Monkton Deverill where a water pipeline revealed a cemetery of unaccompanied oriented burials, one within a ring ditch. Some of the graves had stone lining (dressed stones, presumably from a Roman building) and similar stones were found in the top of the ring ditch. A secondary burial had been placed within the ring ditch; a crouched inhumation with an iron knife of 7th-century date which provided the only dating for the cemetery (Rawlings 1995). Although interpreted

as Anglo-Saxon, most of the graves would appear to demonstrate "British" traits (see above) with only the intrusive burial showing any Germanic features. Another site showing features from both cultures is at Portesham (Valentin 2003). Here Durotrigian crouched burials, possibly associated with a circular, non-domestic building were succeeded by oriented burials with two radio-carbon dates spanning cal AD 640–870 (Beta-167358, 167359). At least four burials were in a large pit and one single burial had an iron saw by the foot (although this could be residual). Another burial, however, was accompanied by bird bones – a known "Anglo-Saxon" trait (Lucy 2000, 90–4, 112–13). There was organic-tempered pottery and the Roman pottery included some very late Black Burnished Ware forms. The site was later crossed by a large ditch containing Saxo-Norman pottery in its fills that might have formed the enclosure of the minster that Hall (2000, 19–20, 72–3) has suggested was sited here.

In the 7th century, "Anglo-Saxon" burials are found more widely as the influence of Wessex spread westwards. There is an increase in the wealth of material deposited in the graves which form part of a pattern seen more widely in England than the more locally distinctive burials of the 5th and 6th centuries. There is a continued emphasis on association with, and reuse, of old burial sites, together with the construction of new barrows in some places (Williams 1999). The burials also occupy prominent locations in relation to routes, later hundred boundaries, and situations with all-round views.

This "final-phase" of furnished burials may incorporate the last of pagan burial rites but also, following the conversion, furnished burials continuing in a Christian context. The latter include some exceptionally rich barrow-burials (notably of females) at Roundway Down (Meaney 1964) and Swallowcliffe Down (*c.*700, Speake 1989). The radiocarbon dating of such burials to ascertain their precise location in relation to the conversion process, and their investigation to understand to what extent they related to the contemporary and evolving Early Medieval landscape, both need to be considered. Some of the outlying furnished burial sites are among the most intriguing and should be investigated further to ascertain the nature of the burial rites employed and whether they are the same as burial sites further east. Some of the Dorset and Somerset sites, for instance, are poorly understood and require further investigation under modern archaeological conditions to address these questions.

There is then a significant gap in our knowledge until churchyard burial becomes the norm, perhaps at minsters by the 8th century and proprietary churches by the the 10th. As discussed by numerous authors, there remains a debate over how burial rites developed in the 8th, 9th and 10th centuries, hindered by the lack of dating evidence earlier provided by the furnished burials. John Blair (1994), Dawn Hadley (2002) and Andrew Reynolds (2002) are among those to suggest that burials continued to be located in the landscape away from churches and sometimes away from contemporary settlements. Prehistoric burial mounds may well have continued to feature as favoured locations (Williams 1997) although increasingly selected mounds took on demonic and dangerous associations (Semple 1998; 2002). The further investigation of placenames for prehistoric monuments attributed mythical or supernatural associations, charter references to execution sites connected to mounds and other earthworks, and evidence for later Anglo-Saxon execution cemeteries (Reynolds 2002), combine to give us a better impression of the sacred and political geography of later Anglo-Saxon England.

Evidence of high-status churchyard burials has been identified at ecclesiastical centres such as Gloucester (Heighway and Bryant 1999) where chests and charcoal burials are elements of a Christian elite repertoire of burial rites. However, our understanding of the development of parish churches in the South West has not developed to compliment the work undertaken at Raunds (Boddington 1996) from the East Midlands. The work undertaken at Shapwick Old Church (Gerrard and Aston forthcoming) may help to redress this balance although few burials were excavated. There are also smaller scale works on churches in use which add small but cumulative pieces of evidence, for example the burials laid on charred planks at Pulham (Claire Pinder pers. comm.). Few, however, of these churchyard sites have been available for large-scale excavation due to their disturbance by later burials and continuing use.

10.4 Defence and Warfare

The historical sources give a strong emphasis to the presence of warfare during the period and the nature of defensive structures is such that they often survive. Battlefields, at this early period, are extremely hard to locate but that has not stopped a great deal of effort being spent, often in circular arguments, relating the location of battles to the supposed "frontier" between Britons and Saxons at any particular date. The historical sources become more informative later but that does not always allow more accurate location.

The excavations at Cadbury Castle (Alcock 1995) and Cadbury Congresbury (Rahtz *et al.* 1992), together with Ian Burrow's (1981) work have shown that several Somerset hillforts were reoccupied in the 5th and 6th centuries and there are hints that this is also the case in other areas (for example around Bristol, Bob Jones pers. comm.). Poundbury hillfort outside Dorchester may also have been reforti-

fied (see page 174). Radiocarbon dates have recently also been obtained from a ploughed-out hillfort at Raddon suggesting occupation, and possible refurbishment in the 5th–7th centuries (Gent and Quinnell 1999) and there is imported pottery from High Peak near Sidmouth (Pollard 1966). The work at Cadbury Castle involved the construction of about 1100m of timber-laced stone rampart on top of the earlier ramparts, a significant expenditure in terms of stone, timber and man-power. No other site exhibits this degree of refurbishment, although there was new rampart construction at Cadbury Congresbury which divided the original enclosure into two halves, and recent work at Brent Knoll (Papworth 2004) has supported the suggestion made by Ian Burrow that the ramparts were heightened there in the Roman period or later.

The other large construction that may belong to this period is the Wansdyke, whose western section runs south of the River Avon between Bristol and Bath and whose eastern section runs for 15km along the ridge to the south of the River Kennet. It is not clear, however, what the relationship between these two lengths of rampart is, although they appear to be joined by the course of a Roman road. The East Wansdyke has recently been discussed by Fowler (2001) following new fieldwork in Overton and Fyfield parishes. Examination of the earthworks appears to show that it was abandoned whilst under construction, suggesting the lifting of the threat from the north that it was intended to counter. Fowler draws attention to the similarities with the Roman walls in northern Britain, particularly in the provision of numerous gateways (although these are not all proved to be original), and also with the Late Roman (or early post-Roman) Bokerley Dyke in Dorset. He favours a late 5th-century date for construction in the context of Anglo-Saxon expansion from the Thames valley and discounts Reynolds's suggestion (Reynolds 1999, 85; Reynolds and Langlands in press) that the dyke was a later boundary between Wessex and Mercia, believing that the name implies that its origins had been forgotten before it received an English name. Several recent excavations have shown that the West Wansdyke was carefully constructed to a uniform plan but have failed to produce conclusive dating evidence (Keith Gardner pers. comm.). The extent of the monument to the west continues to arouse discussion with Gardner (1998) reasserting a continuation to Stokeleigh Camp on the basis of fieldwork and medieval documentary evidence.

The southern part of Offa's Dyke was identified in Gloucestershire by Sir Cyril Fox (1955) but more recent work (Hill and Worthington 2004) has suggested that the earthworks he identified as the Dyke are discontinuous and of unknown date. There are problems with this reinterpretation, such as a 14th-century reference to "Offediche" (Herbert 1996, 249), but the Gloucestershire sections certainly seem to be separated from the dyke further north by a gap of 60km.

Later, during the time of the Viking attacks, the system of burhs was established to provide protected locations. Some of these, such as Wareham, retain impressive earthwork remains but at several the identification of the documented site is uncertain and at others, like Axbridge or Wilton, there is no evidence of the boundary today. Such sites are often classified as urban but work at Wareham appears to show that much of the large interior was not occupied until later in the medieval period. Unfortunately the important excavations at Lydford, by Peter Addyman in the 1960s, remain unpublished despite recent attempts to achieve this. There has been recent work by the Time Team at the Alfredian fort at Athelney (not yet published) which has given some idea of the range of activities there and the finding of a sherd of an imported Mediterranean amphora (Hollinrake in Bagwell and Webster 2005, 171) has supported previous work (the discovery of a 6th-century bank, Reed 2002) suggesting that the site was important before Alfred. Andrew Reynolds has recently reassessed the evidence from Avebury and, controversially, suggested that a planned town or burh was established there, to the west of the henge (Reynolds 2001a;b) associated with other defensive sites on Silbury Hill and at Yatesbury (Reynolds 2000). There are also other sites, such as Totnes which does not appear in the Burghal Hidage but which is known from archaeology and numismatics (Dyer and Allan 2004a; SW Brown 1999), and Oldaport (Rainbird 1998) which appears to be completely undocumented but which has produced a radiocarbon date of 810–1030 cal AD (NZA-17401) from the mortared stone wall which survives at the site (Rainbird and Druce 2004).

Acknowledgements

We are grateful to those who provided comments on earlier drafts and to Martin Watts of Cotswold Archaeology for information about the Filton site in advance of publication.

10.5 Radiocarbon dates

Table 10.1: *Details of radiocarbon dates used in the text. Calibrated ranges are at 2σ (95.4%) and were calculated with OxCAL 3.10 (Bronk Ramsey 2005) using the probability method and the IntCal04 calibration curve (Reimer et al. 2004).*

Lab. Ref.	^{14}C age BP	Cal AD	Site	Context	Reference
Beta-167358	1320±40	640 – 780	Portesham	Human burial	Valentin (2003)
Beta-167359	1260±40	660 – 870	Portesham	Human burial	Valentin (2003)
Birm-246	1300±80	600 – 900	Brean Down sandcliff	Human burial	Rahtz (1977)
BM-3162	1160±50	710 – 990	Collingbourne Ducis	Sunken floored building 104	Pine (2001); Ambers and Bowman (2003)
BM-3163	1245±50	660 – 890	Collingbourne Ducis	Sunken floored building 103	Pine (2001); Ambers and Bowman (2003)
BM-3164	1210±50	670 – 950	Collingbourne Ducis	Sunken floored building 102	Pine (2001); Ambers and Bowman (2003)
BM-3165	1460±50	430 – 670	Collingbourne Ducis	Sunken floored building 101	Pine (2001); Ambers and Bowman (2003)
CAR-1475	1475±60	430 – 660	Frocester	Ox skull on floor of building E	Price (2000)
GU-2710	1790±50	120–390	Aller Farm, Devon	Peat	Hatton and Caseldine (1991)
GU-4921	1560±50	400 – 610	Lake	Plank from "grave"	McKinley (2003)
GU-5149	1300±90	580 – 970	Wembdon Hill	Human burial	Bob Croft pers. comm.
GU-5150	1240±70	650 – 970	Wembdon Hill	Human burial	Bob Croft pers. comm.
GU-5151	1060±90	770 – 1180	Wembdon Hill	Human burial	Bob Croft pers. comm.
GU-5293	1450±70	430 – 680	Shepton Mallet	Human burial	Leach and Evans (2001)
GU-5898	940±50	1010 – 1220	Shapwick Church Field	Animal bone	Gerrard and Aston (forthcoming)
GU-5899	1050±50	880 – 1160	Shapwick Church Field	Animal bone	Gerrard and Aston (forthcoming)
GU-6002	1090±50	810 – 1030	Bridgwater Bay	Fish weir 307	Richard Brunning pers. comm.
GU-6003	1150±50	720 – 1000	Bridgwater Bay	Fish weir 307	Richard Brunning pers. comm.
GU-6004	1150±60	710 – 1020	Bridgwater Bay	Fish weir 309	Richard Brunning pers. comm.
GU-6005	1170±50	710 – 990	Bridgwater Bay	Fish weir 309	Richard Brunning pers. comm.
GU-6006	430±50	1400 – 1640	Bridgwater Bay	Fish weir 202	Richard Brunning pers. comm.
GU-6007	340±50	1450 – 1650	Bridgwater Bay	Fish weir 202	Richard Brunning pers. comm.
GU-6008	960±50	980 – 1190	Bridgwater Bay	Fish weir 306	Richard Brunning pers. comm.
GU-6009	1050±50	880 – 1160	Bridgwater Bay	Fish weir 306	Richard Brunning pers. comm.
GU-6010	1060±50	870 – 1150	Bridgwater Bay	Fish weir 204	Richard Brunning pers. comm.
GU-6011	1160±70	690 – 1020	Bridgwater Bay	Fish weir 204	Richard Brunning pers. comm.
GU-6038	1050±50	880 – 1160	Bridgwater Bay	Fish weir 205	Richard Brunning pers. comm.
GU-6039	940±50	1010 – 1220	Bridgwater Bay	Fish weir 205	Richard Brunning pers. comm.
HAR-2674	1090±70	770 – 1150	Taunton Castle	Human burial	Clements (1984)
HAR-5324	1430±70	430 – 770	Queenford Mill (Oxon)	Human burial	Chambers (1987)
HAR-5325	1480±70	420 – 660	Queenford Mill (Oxon)	Human burial	Chambers (1987)
HAR-5350	1550±70	380 – 650	Queenford Mill (Oxon)	Human burial	Chambers (1987)
HAR-5351	1550±80	340 – 650	Queenford Mill (Oxon)	Human burial	Chambers (1987)
HAR-6216	1430±80	420 – 770	Foxley	Charcoal from wall trench	Hinchliffe (1986)
HAR-8082	1220±70	660 – 970	Foxley	Charcoal from hall post-hole	*Radiocarbon*, 32 (1990), 189–90
HAR-8548	1550±80	340 – 650	Brean Down sandcliff	Human burial	Bell (1990)
HAR-8549	1430±70	430 – 770	Brean Down sandcliff	Human burial	Bell (1990)
NZA-17401	1098±45	810 – 1030	Oldaport	Hazel charcoal from wall mortar	Rainbird and Druce (2004)
OxA-8297	1380±35	590 – 690	Tolpuddle Ball	Human burial	Hearne and Birbeck (1999)
OxA-8298	1440±35	560 – 660	Tolpuddle Ball	Human burial	Hearne and Birbeck (1999)
OxA-8299	1660±35	250 – 540	Tolpuddle Ball	Human burial	Hearne and Birbeck (1999)
OxA-8300	1450±30	560 – 655	Tolpuddle Ball	Human burial	Hearne and Birbeck (1999)
OxA-8320	1470±35	530 – 650	Tolpuddle Ball	Human burial	Hearne and Birbeck (1999)
OxA-11461	1156±32	770 – 980	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)
OxA-11474	1251±32	670 – 870	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)
OxA-11475	1277±31	660 – 810	Shapwick Church Field	Duplicate of OxA-11474	Gerrard and Aston (forthcoming)
OxA-11873	1189±30	720 – 950	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)

continued on next page

Lab. Ref.	^{14}C age BP	Cal AD	Site	Context	Reference
OxA-11874	1196±30	710 – 940	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)
OxA-11930	1277±27	660 – 780	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)
OxA-11931	1301±26	660 – 780	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)
OxA-11932	880±24	1040 – 1220	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)
OxA-11933	942±25	1020 – 1160	Shapwick Church Field	Charcoal from building posthole	Gerrard and Aston (forthcoming)
SUERC-2937	1025±35	890 – 1150	Shapwick Old Church	Human burial	Gerrard and Aston (forthcoming)
SUERC-2938	1510±35	430 – 640	Sladwick, Shapwick	Bone	Gerrard and Aston (forthcoming)
Wk-13086	1552±45	410 – 610	Wembury Bay	Burnt pit fill	Reed (2005)
Wk-13087	1635±53	250 – 550	Wembury Bay	Burnt gully fill	Reed (2005)
Wk-13088	1510±44	430 – 640	Wembury Bay	Burnt gully fill	Reed (2005)
Wk-17495	1451±32	555 – 655	Filton	Human burial	Cullen *et al.* (forthcoming)
Wk-17496	1491±30	460 – 650	Filton	Human burial	Cullen *et al.* (forthcoming)
Wk-17497	1515±32	430 – 620	Filton	Human burial	Cullen *et al.* (forthcoming)
Wk-17498	1571±31	410 – 560	Filton	Human burial	Cullen *et al.* (forthcoming)

11

Post-Conquest Medieval Environmental Background

Vanessa Straker

11.1 Introduction

This is not a full review of all the palaeoenvironmental studies carried out in the region, but a general summary with most emphasis placed on the environment in which later Medieval communities lived. It does not provide a comprehensive review of crop and animal husbandry in the region. Reviews of environmental archaeology carried out or commissioned by English Heritage are in progress or complete and will give an account of knowledge in these areas. Those wishing to follow this up should consult the English Heritage website (http://www.english-heritage.org.uk and follow the links Research & Conservation → Archaeology & Buildings → Scientific Techniques → Environmental Studies → Regional Reviews). At the time of writing, the reviews on insects (Robinson 2002) and wood and charcoal (W Smith 2002) were available as PDF files. Reviews of plant macrofossils, pollen, animal bones and geoarchaeology from southern England are in preparation and will be placed on the website when available. Rob Scaife very kindly made available a draft of his pollen review for this resource assessment. The excellent review of environmental archaeology in South West England by Martin Bell (1984) is still a very useful source of information. There are also reviews of environmental evidence in the Urban Archaeological Assessments for Bath (not yet published) and Bristol (Brett 2005), which are of particular relevance for this period. Urban deposits have not generally been referred to, but will be included in the reviews noted above. The inclusion of "grey" literature has not been comprehensive. The introduction to the Late Bronze Age and Iron Age chapter (on page 103) includes a summary of sources of evidence and conditions for preservation which are not repeated here, but are relevant for this period, apart from site specific references. There are few studies of "off-site" sequences. Some upland and lowland wetland sequences do cover the Medieval period and have the potential for understanding the contemporary local or wider environment, depending upon the nature and catchment of the sampling site.

11.2 Climate

A "warm period" which is thought to have occurred between the 11th and 14th centuries, is frequently referred to in the literature. For example, Rippon (2002) refers to favourable climatic conditions in the 11th to 13th centuries and climatic deterioration in the 14th and 15th centuries. In the context of understanding present and predicting future climate change, the IPCC (Folland *et al.* 2001, 2.3.3) has reviewed much research and states that "The long-term hemispheric trend is best described as a modest and irregular cooling from AD 1000 to around 1850 to 1900, followed by an abrupt 20th century warming". The report notes that regional evidence is, however, very variable and Medieval warmth appears to have been largely restricted to areas within and bordering the north Atlantic, considered by some as mainly reflecting changes in the North Atlantic Oscillation (Folland *et al.* 2001, 2.3.3). Kenward (2004) reviews the evidence from insects in northern England and concludes that, while the effects of climate change and human activity are hard to separate (Buckland and Wagnew 2001), evidence from some bug species may provide an unambiguous signal. He argues that many of the insect remains from occupation sites have potential for climatic reconstruction and that systematic analysis of the existing records from British sites is needed (Kenward 2004, 48, 49). There is clearly much that could be done using palaeoenvironmental proxies to better understand climate in the Medieval

period in South West England. As for other periods, a range of studies using biological indicators such as chironomid larvae, other insects and testate amoebae combined with some more applied scientific methods are a priority for the future.

11.3 Area reviews

A brief summary of present knowledge is given for each of the physiographic sub-regions in the South West but there are very few studies, principally because of the scarcity of suitable deposits preserving a wide range of palaeoenvironmental data.

Wild plants from Medieval smoke-blackened thatch and daub or cob are sources of direct information on the character of arable fields and meadows. They also give insight into farming practice, in terms of degree of weeding and infestation. Reporting on smoke-blackened thatch of 14th- to 15th-century date from cottages in Dorset and Wiltshire, de Moulins (2007) noted the possibility that shortage of labour after the Black Death could be responsible for an apparent low level of weeding.

11.3.1 Jurassic and Carboniferous uplands (Cotswolds and Mendip)

Although there is little bioarchaeological evidence for the detailed nature of Medieval environments in the Cotswolds, some comments by Bowden (2006) using air photographic evidence are useful. He noted the views of Dyer (1995, 160; 2002, 16), that arable farming was important on the Cotswolds from an early date and comments that air photographic evidence supports this. He does question the assumption that all ridge and furrow is necessarily of Medieval date, though acknowledges that it most probably is. He also reminds us that some ridge and furrow could result from improvements to pasture as well as arable. However, both Bowden and Dyer acknowledge the importance of arable and the role of sheep in keeping the land fertile. It seems that in parts of the Cotswolds there was little pasture in the Medieval period and sheep were fed on stubble, fallow land and imported hay (Dyer 1995, 158). As in other periods, a former river channel has proved to be an important source of information. Detailed pollen analysis of the fill of what is thought to have been the former channel of the river Churn, near Stratton gave useful insight into the local environment in the Late Medieval period (Scaife 1999d). A range of species characterised slow-flowing water and a marshy local environment. The wider landscape was very open with few trees. Mixed agriculture included rare evidence for cultivation of hemp and vine (Scaife 1999d). Radiocarbon dates at 68cm, from near the base of the sequence and at between 40 and 60cm calibrate to cal AD 1310–1640 (NZA-9082) and cal AD 1390–1640 (NZA-9083) respectively. For the basal date (NZA-9082) at 79.7% confidence the age range is cal AD 1380–1530 and for NZA-9083, at 74.6% confidence it is 1390–1530. If the dates are combined at 92% confidence, the age range is cal AD 1400–1520. It is thus highly likely that the fills are of Late Medieval date. The other possible evidence for viticulture in the South West comes from Market Lavington (Wiltshire 2006), and is noted in the section on Early Medieval environments (page 164). Charred and waterlogged plant macrofossils from Gloucester give an indication of the range of crops available to the townspeople, but there has been less research on this than in other Medieval towns in the region. The identification of spelt wheat in a 10th- or 11th-century context was an unexpected find (Green in Heighway *et al.* 1979) which has not been repeated in other similar contexts, though it is now known from Saxon deposits in the Thames valley (Pelling 2003). Animal fodder or stable litter containing plants of wet grassland was reported both from Medieval pits on Westgate Street (Green in Heighway *et al.* 1979) and accumulation on a street surface outside St Nicholas Church (Straker and Heighway 1985).

11.3.2 Upper Thames valley

No studies of the wider environment of this date from this sub-region are known.

11.3.3 Coastal lowlands (Somerset, Severn and Avon Levels)

As noted below (on page 193), most progress on the reclamation that created large areas of agricultural land, by draining and enclosing the coastal saltmarshes and freshwater wetlands along the Severn and in central Somerset, took place in the 11th to 13th centuries. Small-scale saltmarsh reclamation of started in the 10th or 11th century in a few places, including Puxton, in North Somerset. More substantial embankments along the higher coastal alluvial marshes and some tidal rivers are thought to have taken place by the mid-11th century, while the backfens remained unreclaimed. These were a valued source of grazing (Rippon 2006). The reclaimed farmland at Church Field, Puxton supported meadows and damp herb-rich pasture as well as arable (J Jones 2006 – giving an overview of the analyses of pollen (Tinsley), plant macrofossils (Jones), molluscs (Davies), diatoms (Cameron) and foraminifera (Kreiser)). Wheat, barley, rye and oats were grown as well as garden pea (*Pisum sativum*), field bean (*Vicia faba*) and flax (*Linum usitatissimum*). This was part of a mixed farming system with cattle, sheep, pigs and poultry. There is no evidence that estuarine water entered the ditches between the late 11th and 13th centuries. At Seabank on the

Severn levels north of Avonmouth, the fills of five drainage ditches dating from the 11th–18th centuries had been used for disposing of domestic rubbish as well as drainage. The microfossils included freshwater, brackish and estuarine species (J Jones in Insole 1997). Until recently it was not thought that peat growth in the Somerset peat moors continued into the Medieval period but, although it has been largely removed by peat cutting or peat wastage, it has now been established that some sequences do still survive, both north and south of the Polden Hills (AG Brown *et al.* 2003a; Housley *et al.* in press). This important wetland survival holds a record of vegetation and climate change for the surrounding area in the historic period. Documents can also assist in understanding some aspects of past land use and vegetation; this is particularly valuable where sources of palaeoenvironmental evidence are scarce or absent.

The parish of Shapwick in Somerset, was the focus of over 10 years of detailed research using many different sources of data. The Shapwick Project benefited from the survival of documentary records relating to the management of the Glastonbury Abbey lands including Shapwick's Medieval manor. The record is not comprehensive, as it does not reflect the practices and priorities of the tenants, but it gave a rare opportunity for comparison with the archaeobotanical evidence (Straker *et al.* in Gerrard and Aston forthcoming). The two records are complementary in that for example, the archaeological record identifies the types of wheat being grown and the crops grown on land farmed by tenants for their own use, which are not specified in the documents. In contrast, the documents show the importance of oats on the demesne land, which is not apparent to the same extent in the archaeological record. The documents show the extent of woodland survival better than the archaeobotanical record does as, apart from the moat at Shapwick House, there are no deposits with accumulated sediments preserving plant and animal remains. Among other things, pollen analysis of the moat sediments suggested disturbed ground and hedgerows in the vicinity of the Manor (Tinsley in Gerrard and Aston forthcoming).

11.3.4 Triassic and Devonian hills and valleys (south Somerset, Devon and east Cornwall)

No published data from south Somerset is known. New data from Devon was provided by the Community Landscapes Project (AG Brown *et al.* 2004; Hawkins 2005). On the Hartland peninsula, Medieval (*c.*AD 1000) peat formation in a valley/spring mire at Clifford may have been the result of removal of tree cover in an exposed location, but this is not certain. The vegetation record showed no evidence of woodland regeneration and, both here and at Kennerland, Medieval arable cultivation continued into the 18th century (AG Brown *et al.* 2004; Hawkins 2005). In the Clyst valley, a floodplain mire at Helling's Park covers the Late Glacial–Medieval periods and a palaeochannel at Mosshayne also covers the Medieval period. There is no-evidence of Post-Medieval woodland regeneration and a pattern of land use continuity is apparent. At Mosshayne, cultivation of wheat/oats and rye ceased in the 18th century but barley cultivation may have continued (AG Brown *et al.* 2004; Hawkins 2005). Other studies from the Rackenford area of central Devon are included in the section on Exmoor (below).

Daub from a partition from a Medieval house at Leigh Barton in Devon contained desiccated fruits and seeds of hay meadow species (J Jones in S Brown 1998, 84–88). Palaeoenvironmental studies of building materials are very rare but can produce useful results from sites which may have no other sources of contemporary data. There is little information from the Late Medieval period for the south Devon coast, but at Slapton Ley, open fields and arable cultivation were in existence by Domesday and continued after 15th century enclosure (Crabtree and Round 1967; Nichols in O'Sullivan 1996).

Turner (2006a, 85) demonstrates how Historic Landscape Characterisation (HLC) may be able to provide general information on local environments for the Medieval period and gives an example from the Tintagel area in north Cornwall. Of a 60km^2 case study area, centred round the early Medieval church at Tintagel, 37.5km^2 was thought to be Medieval farmland (the main arable and year-round grazing zone), 21km^2 rough ground (turf, furze and summer grazing) and 1.5km^2 woodland. Turner notes that this would broadly agree with the view of Herring (1999, 20) and Rackham (1986, 335) for the 11th century landscape in the area. Although the dating and nature of the landscape provided by this method are not very precise, HLC is a very useful starting point on which to base future detailed research, particularly for areas such as north Cornwall where sources of palaeoenvironmental information are scarce. In turn, palaeoenvironmental studies should be able to refine or check HLC.

11.3.5 Moorland (West Cornwall, Bodmin, Carnmenellis, St Austell area, Dartmoor and Exmoor)

There are no major later Medieval palaeoenvironmental studies from west Cornwall. The upper parts of some of the coastal wetland sequences such as at Porthleven (Lawson-Jones 1999) and Church Cove, Gunwalloe (French 1996; 1999) do extend to the

period but have not been studied in detail. There is evidence from both Bodmin Moor and Dartmoor that a later Medieval rise in cereal pollen accompanies expansion of settlement and more intensive grazing of the moorland (Gearey *et al.* 1997; 2000b). On Bodmin Moor, studies at Rough Tor North and Tresellern Marsh show similar vegetation throughout the 1st millennium AD (Gearey *et al.* 2000b). The present moorland vegetation, regarded by some as impoverished in terms of species diversity, is not seen until the Medieval period. Gearey *et al.* (2000b, 506) note a "consistent change to a less diverse ground flora and minimum forest cover from the Medieval period onwards". The grass (Poaceae) pollen maximum at Rough Tor North C post-dates a radiocarbon date of cal AD 1160–1300 (GU-5610). The Early Medieval chapter makes mention (on page 167) of the species-rich grassland, similar to old meadow plant communities that may have been managed for the removal of a hay crop. The diagrams for Tor Royal and Tresellern Marsh identify a rise in cereal pollen and spread of local settlement (Gearey *et al.* 1997). This takes place at Tor Royal after cal AD 1010–1300 (SRR-5715) in an area previously characterised by acid grassland with Rumex species, *Potentilla*-type *Plantago lanceolata* and Asteraceae (Gearey *et al.* 1997). At Rough Tor the rise in cereal pollen starts between cal AD 1160–1300 (GU-5610). The dating is less precise for the Withey Brook valley, Dartmoor (around AD 890–1225) though at Merrivale cereals may not have been cultivated until the 17th century (Gearey *et al.* 1997). Other examples of later Medieval pollen suggestive of arable on Dartmoor and its northern fringe come from Holne Moor, Hound Tor and Okehampton (Maguire *et al.* 1983; Austin and Walker 1985; Austin *et al.* 1980). The increase in arable and pastoral indicators at Stuffle, St Neot (Bodmin Moor) may also date to the late 12th to the early 13th century, but the events are not dated directly (Walker in Austin *et al.* 1989). The setting of a small 12th–14th century Medieval hamlet at Sourton Down at an altitude of 290m, on Dartmoor's northern fringe provided some contrasts with the vegetation of the higher moorland (Straker 1997). Pollen from buried soils and a small valley mire showed varied local vegetation with species-poor grassland, heather moorland and some woodland. Although charred cereals were found in settlement contexts, the pollen record for cereals was very slight with no rye pollen present despite the presence of charred rye caryopses (which need not have been the result of a local crop). Some regeneration of alder, oak, hazel and birch in the Late Medieval period, most probably in the 15th century, is of interest (Straker 1997). There are other studies from Dartmoor, some of which extend to the Medieval period, but this was not a principle focus for the research and detailed dating for the historic period is lacking; Bell (1984) is a useful source for these references.

Studies of sediments in valleys of rivers draining Dartmoor have been used to investigate the timing of tin mining (streaming) on Dartmoor (AG Brown *et al.* 2003b; Thorndycraft *et al.* 1999; 2003; 2004). The sites were palaeochannels at Ermington, Aveton-Gifford and North Tawton, a valley mire at Taw Marsh and a terrace in the middle Teign valley. Most sites show an increase in the fine size fraction of cassiterite as a result of mining in the 11th and 12th centuries, which is in agreement with the documentary evidence.

The Medieval landscape on the western and southern side of Exmoor and the Rackenford area in central Devon to the south have been the focus of recent research (Fyfe *et al.* 2003b; Rippon *et al.* 2006). Valley/spring mires at Long Breach and Anstey's Combe on the southern side of Exmoor were still accumulating in the later Medieval period. Reconstruction of the local vegetation using pollen analysis shows the scale of variation in vegetation type. Fyfe *et al.* (2003b) found that by around AD 1100 there was a change from pastoral to mixed arable/ pastoral farming. This may have been some form of convertible husbandry with long periods of ley, which persisted well into the Post-Medieval period. Cereals cultivated were rye, with barley and oats or wheat, the pollen types of the last two not usually being distinguished. The date for the end of arable cultivation was not very clear, but Fyfe *et al.* (2003b) consider the decline in rye pollen to be broadly synchronous with the rise in pine at around AD 1750–1800, when plantations were established around the upland fringes.

Rippon *et al.* (2006) discuss the contribution of evidence from pollen analysis to the understanding of the origins and development of the Medieval landscape. They refer to Long Breach and Anstey's Combe (above) in conjunction with further sites from the fringes of Exmoor on Molland Common and Parracombe, the high moorland and the Rackenford area of central Devon. The pollen sequences are interpreted together with documentary evidence and remaining physical features of the landscape. The largely early Medieval expansion of cereal cultivation is not always seen to be consistent with pressure to expand arable from favoured land to more marginal land within reach of the pollen catchments, as there is no accompanying decline in pasture or woodland. Indeed, there is even some expansion of local heather heathland at Hare's Down, Lobb's Bog and Windmill Rough. A convertible husbandry system is proposed with most fields growing alternate grain and grass crops for possibly 2–3 years followed by a long grass ley, with a total rotation of about 10 years. Rippon *et al.* (2006) describe the system which is evident from 14th-century documentary evidence for the region. They note that the crops grown were principally oats and rye for reasons

such as high yields and local preference, not necessarily because of their tolerance of acid soils and high rainfall. Although known from later Medieval documents, the pollen record suggests that this distinctive form of husbandry came into use much earlier, possibly as early as the 7th and 8th centuries in the Rackenford area (Rippon *et al.* 2006).

11.4 Landscape

The basic physical fabric of the landscape was in place long before the Medieval period, though in a few places there were minor adjustments. Along the softer coastlines there has been some erosion, with several hundred metres probably having been lost from the shores of the Severn Estuary (by analogy with the Welsh side of the Estuary, Rippon 1996; Allen and Rippon 1997; Allen 2002). Along the Somerset coast this was also associated with the inland migration of sand dunes, which now surround the isolated Medieval church at Berrow (Rippon 2001, fig. 3). On the granite uplands in Devon and Cornwall, and on many valleys running off the higher ground, large-scale physical transformations were wrought through streamworking for tin. These operations have left cuttings up to 15m deep and 50m wide accompanied by tell-tale patterns of dumped material (Gerrard 2000; Herring *et al.* forthcoming). There is documentary evidence of the widespread silting of rivers and estuaries, including the Fowey, Fal, Conner (Red River) and Hayle rivers, reflecting the wider impact of tinning operations on the landscape but also on some earlier ports such as Lostwithiel and Tregony. This may have been exacerbated by run-off from more intensive agricultural exploitation and it is likely that the lower reaches of many other river valleys were more markedly tidal than is now the case. The north coast, from St Ives to Crantock, was also "sore plagued" by sand blows in the Medieval period according to Leland (Gray 2000). For the Isles of Scilly, sea level change is of particular importance, specifically the chronology of the separation of the earlier land mass into a number of separate islands. Charles Thomas presented a model by which this finally occurred during the Medieval period (C Thomas 1985) but assessment of inter-tidal peats from various locations (Ratcliffe and Straker 1997) has modified this model to some extent although further work is required to confirm or modify the Thomas model. Some further modelling work on sea level change has been done in the course of a Rapid Coastal Zone Assessment for the Isles of Scilly (Johns *et al.* 2003).

Reclamation, which in many areas began in the pre-Conquest period, also transformed the mosaic of intertidal and freshwater wetlands that fringe the Severn Estuary and dominate central Somerset, creating vast tracts of new agricultural land (Williams 1970; Rippon 1997b). Most progress was made during the period of rising population and flourishing markets of the 11th to 13th centuries, which also corresponded to a period of favourable climatic conditions, though following the demographic, economic and climatic deterioration of the 14th and 15th centuries these fertile wetland areas do not appear to have seen a significant contraction of settlement (Rippon 2002), in contrast to the adjacent upland areas where a number of deserted farmsteads and hamlets were probably deserted at this time: examples include Carscliffe, Christon and Deerleap/Ramspitts on the Mendip Hills (Rippon 1997b; Pattison 1991), and Houndtor, Hutholes and Dinna Clerks on Dartmoor (Beresford 1979; Allan 1994b). In Devon there are several unsynthesised published and grey literature reports (such as Allan and Langman 2002; PDE Smith *et al.* 1983 and the work of the Exeter University/Devon County Council Community Landscapes Project looking at pollen cores across the county) that provide some environmental background.

11.5 Discussion

Several themes emerge consistently from the studies summarised above.

- More attention needs to be given to ensuring that radiocarbon or other scientific dating strategies will be able to provide the precision needed to usefully interpret the results of analyses.
- Bodmin, Dartmoor, Exmoor and central Devon have all benefited from recent research, but long sequences covering the historic period are still needed for many other parts of the region.
- Climatic variation during the Medieval period is still poorly understood. Expansion of techniques where appropriate, to include testate amoebae, chironomids and other insects must be considered, along with other methods.
- The added information from integrated palaeoenvironmental and documentary studies shows the importance of making use of these complementary approaches whenever possible.
- The hinterland of Medieval towns is not well understood. More attention should be paid to understanding the local context for urban centres from both documents and palaeoenvironmental analyses.

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11.6 Radiocarbon dates

Table 11.1: *Details of radiocarbon dates used in the text. Calibrated ranges are at 2σ (95.4%) and were calculated with OxCAL 3.10 (Bronk Ramsey 2005) using the probability method and the IntCal04 calibration curve (Reimer* et al. *2004).*

Lab. Ref.	^{14}C age BP	Cal AD	Site	Context	Reference
GU-5610	770±50	1160 – 1300	Rough Tor North monolith C	Peat 27.5–32.5cm	Gearey *et al.* (2000b)
NZA-9082	462±57	1310 – 1640	Stratton	Peat	Scaife (1999a)
NZA-9083	441±57	1390 – 1640	Stratton	Peat	Scaife (1999a)
SRR-5715	840±95	1010 – 1300	Tor Royal	Peat	Gearey *et al.* (1997)

12

Post-Conquest Medieval

Edited by Stephen Rippon and Bob Croft from contributions by Oliver Creighton, Bob Croft and Stephen Rippon

12.1 Introduction

Note *The preparation of this assessment has been hampered by a lack of information and input from some parts of the region. This will be apparent from the differing levels of detail afforded to some areas and topics, and the almost complete absence of Dorset and Wiltshire from the discussion.*

The period covered by this review runs from the Norman Conquest in 1066 through to the Dissolution of the monasteries in the 16th century, and unlike the pre-Conquest period is rich in both archaeology (including a continuous ceramic sequence across the region) and documentary sources. Like every region of England, the South West is rich in Medieval archaeology preserved within the fabric of today's historic landscape, as extensive relict landscapes in areas of the countryside that are no longer used as intensively as they were in the past, and buried beneath our towns, villages, farmsteads and the plough soil. In places this Medieval archaeology has seen intensive research, but unfortunately it is sorely lacking in synthesis. In common with the rest of the country, the study of the Medieval period in the South West has also suffered from a fragmentation of scholarship, with detailed studies of documentary archives, placenames, archaeology and standing buildings all to often being carried out in isolation. A number of important overviews have been published in recent decades both on a county basis, for example, Cornwall (Preston-Jones and Rose 1986), Somerset (Aston and Burrow 1982; Aston 1988), the former Avon area (Aston and Iles 1986) and Gloucestershire (Finberg 1975), and at a more regional scale (Aston and Lewis 1994; Kain and Ravenhill 1999), though these mostly have a broad landscape focus.

Unlike the preceding millennium, which had seen the upheavals of the Roman conquest and then growing Anglo-Saxon influence, and the related socio-economic transformations reflected, for example, in the emergence, virtual desertion and then revival of an urban hierarchy, the post-Conquest Medieval period was one of relative social, political and economic continuity. Most of the key character defining features of the region – the foundations of its urban hierarchy, its settlement patterns and field systems, its industries and its communication systems – actually have their origins in the pre-Conquest period, and the 11th to 13th centuries simply saw a continuation of these developments rather than anything radically new: new towns were created and monasteries founded, settlement and field systems spread out into the more marginal environments, industrial production expanded and communication systems were improved, but all of these developments were built on pre-Conquest foundations (with the exception of urbanisation in the far south-west). It is true that the 14th century saw a major demographic decline, and resulting adjustments in the economy, but in contrast to the end of the Roman period the majority of the Medieval rural landscape and its towns continued in use.

12.2 The Material world

12.2.1 Rural settlement and field systems

Probably by the 11th century there had emerged, across the South West, rural landscapes of very different character. The north and east of the region formed part of what has been called England's "central province", with large, nucleated, villages surrounded by extensive open fields, while in the far south-west (beyond the Blackdown and Quantock Hills) the landscape was characterised by far more dispersed settlement patterns associated with a mixture of closes (enclosed fields) and small-scale open fields.

Some progress has been made in examining the development of these landscapes through a number of major projects. These include broad, county-wide historic landscape characterisations; a technique pioneered and subsequently developed in Cornwall (Herring 1998), which has now been extended to cover much of the region (see Section 1.2.4 on page 15).

There have also been local landscape studies carried out as part of development-led projects (for example at Roadford Reservoir) and university-based programmes of research, such as those at Shapwick (Aston and Gerrard 1999; Gerrard and Aston forthcoming), Puxton (Rippon 2000) and on Dartmoor (Austin 1978; Fleming 1994). The uplands have seen survey projects conducted by the former RCHME and continued by English Heritage, such as Bodmin Moor (Johnson and Rose 1994), Dartmoor (unpublished), Exmoor (Riley and Wilson-North 2001) and the Quantock Hills (Riley 2006); survey is currently underway on Mendip. The individual site reports from all these are available from the National Monuments Record and local HERs.

There have been more detailed assessments of Medieval settlement and landscapes around Brown Willy on Bodmin Moor (Herring 1986; 2006a), Holne Moor (Fleming and Ralph 1982) and Okehampton Park (Austin *et al.* 1980), on Dartmoor together with English Heritage survey work around Challacombe which included extensive strip lynchets.

A number of earlier surveys, based on the transcription of air photographic evidence and some limited fieldwork, were also carried out and integrated into HERs: Exmoor National Park, Quantock Hills AONB, Mendip Hills AONB (Ellis 1992), Blackdown Hills AONB and the Somerset Claylands. These have been augmented by more recent work as part of English Heritage's National Mapping Programme, principally in Cornwall, but also in those areas where English Heritage field surveys have been undertaken.

Until recently the study of the Medieval landscape was based primarily around the survey and excavation of deserted Medieval settlements (see Aston 1988; Allan 1994b; Henderson and Weddell 1994), and early pioneering work on the morphology of extant settlements (Ellison 1983; Roberts 1987b, Fig. 9.6) has now been followed up as part of a national survey (Roberts and Wrathmell 2000). While Gloucestershire and most of Somerset lay within England's "central province", there was considerable diversity in the character of its Medieval landscape. To the north-east of the Blackdown and Quantock Hills the Medieval rural landscape followed the broadly Midland pattern, with a compact nucleated village adjacent to the church, surrounded by communally managed open field system, with small areas of woodland usually restricted to the steeper slopes, and meadow in the valley bottoms. The most intensively studied landscape has been Glastonbury Abbey's manor at Shapwick on the Polden Hills in central Somerset, where the parish has seen a ten-year programme of interdisciplinary research, supported by the Universities of Bristol and Winchester, English Heritage and Somerset County Council (Aston and Gerrard 1999; Gerrard and Aston forthcoming). It appears that this planned village was created by (and probably in) the 10th century, replacing what had been a more dispersed settlement pattern, some elements of which were recorded by the names of furlongs in the open fields surrounding the village. Shapwick is one of a series of planned villages on the estates of Glastonbury, such as those on the Polden Hills together with the nearby island at Meare (Rippon 2004a), suggesting that the abbots were closely involved in restructuring and managing their estates (Corcos 2002). Similar landscapes of villages and open fields are found elsewhere in northern, central and eastern Somerset (Ellison 1983; Aston 1988; Rippon 1997a), though some areas, notably in the north of the county, had more dispersed settlements patterns with little evidence in the available documentary sources or the field boundary patterns to suggest that there were ever extensive open fields. This can be seen, for example, around Backwell, Nailsea and Wraxall in North Somerset, (Rippon 1997a, 198–200; Ponsford 2003). Some areas of the lowlands appear never to have experienced the complete transformation from a dispersed settlement pattern to one of nucleated villages and open fields, and this trend towards marked local difference in Medieval landscape character, here at the margins of England's "central province", is also seen on Somerset's extensive wetlands, which were reclaimed at this time. The area around Puxton in North Somerset has seen the most intensive research. Here landscapes characterised by both nucleated and dispersed settlement patterns were created in a physically uniform environment that fell within estates held by the same lord of the manor (the bishops of Bath and Wells). This suggests that, in contrast to the highly interventionist abbots of Glastonbury, the bishops were less directly involved in physically structuring their estates with local communities playing a far more significant part in shaping the countryside (Rippon 2006).

The date when open fields were enclosed also varies significantly. In many areas of Gloucestershire and Somerset the open fields were enclosed by agreement, a process starting in the late Medieval period, though some open fields survived to be enclosed by Act of Parliament in Somerset. Aston (1989) has reviewed the current state of knowledge with regard to the study of deserted settlements in Gloucestershire, Somerset, and Wiltshire. Few deserted Medieval farmsteads have been examined in the region

but unpublished work at Carscliffe in Cheddar by Bristol University has shown that the site was occupied from the 12th to the 17th century (Mark Horton pers. com.).

In the south-west of the region the Medieval rural landscape was distinctly different. Historic Landscape Characterisation in both Cornwall and Devon (Cornwall County Council 1996; Turner 2006b) has greatly improved our understanding of the wider Medieval landscape particularly in terms of the extent and broad morphology of its field systems and of its upland and rough grazing. Strip fields, or the cropping units they were within, were enclosed from the 13th century onwards and are recognised in all parts of Cornwall (Herring 2006b). They are particularly visible on Bodmin Moor, but there are well-preserved relict outfield strips in parts of West Penwith, as at Treen Common and Chun Downs. Forrabury Stitches, Boscastle, is a surviving open field that maintains the strip form of individual holdings and also includes some strip lynchets. There is some limited survival of unenclosed strips in the coastal zone nearby, as at Bossiney. This surviving physical evidence been complemented by assessment and interpretation of place-name evidence (Padel 1985; 1988a). Overall, this was a region of predominantly dispersed settlements, though some at least of what are now isolated farmsteads may have been small hamlets until the late Medieval period (Beresford 1964; Aston 1983; Fox 1989). Surveys across the South West have also identified evidence for the colonisation of marginal upland during the 12th and 13th centuries, most notably on the higher uplands (Herring 1986; Johnson and Rose 1994; Henderson and Weddell 1994). These remains are particularly well preserved on Bodmin Moor and Dartmoor, where a full range of domestic dwellings, corn-drying barns, ridge and furrow (spade-dug lazy-beds as well as plough ridges), lynchets, hollow-ways, pasture boundaries and shepherds' huts all survive in excellent condition and the dynamic ways in which they were inter-related are easy to record and understand. There are indications of new woodland settlements being established in south-east Cornwall at about the same time, some of which have English rather than Cornish names (Peter Herring, pers. comm.). There is another cluster of apparently English names, including several in *–ley*, in the immediate vicinity of Bodmin. These may indicate Medieval colonisation but could also relate to the establishment of a new urban settlement at Bodmin in the Late Saxon period (Kirkham 2005a). The Isles of Scilly were also colonised with new settlements, following the acquisition of a large part by Tavistock Abbey, probably in the late 11th century. These included a monastic settlement on what is now Tresco and minor new planted hamlets such as Bantom and Sturtom on Bryher (C Thomas 1985). There was also a nucleated settlement at Old Town, St Mary's, enhanced from the 13th century by the construction of a castle (C Thomas 1985). The Late Medieval period saw the abandonment of some settlements in the highest upland areas, while hamlets in some places contracted to single farmsteads (Beresford 1964; Herring 1986; Fox 1989; Johnson and Rose 1994; Henderson and Weddell 1994). There are extensive Medieval settlement remains on Bodmin Moor, although it is uncertain when these were abandoned (Herring 1986; Johnson and Rose 1994). The plague must have had some impact, but it is likely that the situation was complicated by significant local economic factors, notably tinning, which probably acted as something of a brake on abandonment. Examples of abandoned settlements also occur elsewhere in upland contexts in Cornwall, as at Treworld, Lesnewth (Dudley and Minter 1966; Dudley 1955–6). Some environmental analysis covering the Medieval period has been undertaken for Bodmin Moor (Austin *et al.* 1989). This shows changes in grazing intensity over the period, reflected in variations in levels of grassland, heath and scrub. In lowland Cornwall there was continuing reduction in ancient woodland, although some new woodland areas were created in deer parks (Herring 2003).

Although proportionally less than on the uplands, there were also abandonments in lowland Cornwall (Herring and Thomas 1993). Many hamlets in Cornwall, Devon and western Somerset did not shrink to single farms but rather split into two or sometimes three separate settlements, often single farms, distinguished by place-name elements such as Higher and Lower, East and West, Great and Little, Vean and Wollas etc (Herring 2006b). On the coast, however, specialised fishing villages started to emerge (Fox 2001). Aston (1989) has reviewed the state of knowledge of deserted settlement in Somerset, Wiltshire and Gloucestershire.

Across the region there have been a number of studies of vernacular architecture, though there is little in the way of synthesis: see Hall (1983) for southern Gloucestershire, Penoyre (2005) for Somerset, Preston-Jones and Rose (1986) for Cornwall, and Beacham (1990) and Cherry and Pevsner (1989) for Devon. Rural housing appears to have been dominated by two- or three-roomed cross-passage houses, with longhouses a common feature in the Medieval landscape of Cornwall and Devon (though there are relatively few standing examples). A number of these have been recorded by excavation and survey but these examples may not be typical: for the most part they lie in marginal upland settings, subsequently abandoned, mostly in the east of Cornwall. Long houses away from the uplands have been identified at Tresmorn and Treworld, and as extant buildings at Cullacott, Stonaford and Halbathick; it seems

likely that they were also the dominant house type in lowland settings (Herring and Berry 1997). Cornwall and Devon also had smaller forms of longhouse which Cathy Parkes has termed "mixed-houses" (Parkes 1987).

There is a particular need for new investigations in lowland areas that integrate standing building survey, and the publication/synthesis of existing surveys. Importantly, in the vernacular building tradition, Devon has 85% of the national total of Medieval smoke-blackened thatch (Cox and Thorp 2001; Letts 1999). In Devon work has concentrated on several areas notably Dartmoor (Henderson and Weddell 1994; Thorp and Cox 1994) and the Dartmoor fringe. There has been little synthesis of the numerous small-scale archaeological and building recording episodes across Devon (such as Allan and Langman 2002; Keystone 1993; Silvester 1980; Thorp 1982; Goddard and Todd 2005; Waterhouse 2000). There is some evidence for enclosed Medieval farmsteads such as Dunkeswell (Silvester 1980) but other evidence from the Roadford Project and Cleave Hill, Membury is as yet unpublished. English Heritage has funded a programme of dendro-dating of house timbers across Devon and Somerset but no synthesis of this data is readily available.

12.2.2 Urban settlement

There have been several studies of the urban settlements within some counties: for instance, Cornwall (Sheppard 1980), Somerset (Aston and Leech 1977; Aston 1986), Dorset (Penn 1980), former Avon (Leech 1975) and more recently the reports of the English Heritage Extensive Urban Survey Project (see Section 1.2.4 on page 11).

With the exception of Cornwall, the South West had a large number of urban centres by the 11th century, with Somerset particularly well-endowed. The following centuries saw the continued growth of these existing centres, most notably the major regional centre of Bristol, and the emergence of a series of new towns that showed differing degrees of success.

Cornwall

In Cornwall there are some indications of urban or proto-urban centres in the pre-Conquest period, including St Stephen-by-Launceston, Liskeard, Bodmin and St Germans, the focus of which was almost certainly their pre-Norman religious houses. The Medieval period saw the development of a series of small to moderate sized urban market centres, many of which originated as planted settlements laid out by major local landowning families during the 12th to 14th centuries such as Tregony (Pomeroy), Boscastle (Bottreaux), Lostwithiel (Cardinan), St Columb (Arundell, in the 15th or even 16th century) and St Ives (Willoughby). Several of the new towns were on the coast (Penryn, St Mawes, Fowey, Looe, Padstow, St Ives and Penzance) and were more or less closely based on maritime trade and/or fishing; at Penzance urban development around a market site was separate from activity in the harbour area. Other towns such as Tregony, Grampound, St Germans and Wadebridge were located on tidal rivers and another group appears to have been associated with highways (St Columb, Mitchell, Camelford, Callington and Kilkhampton).

Launceston and probably Fowey became walled and gated during the period. Many lengths of the wall at Launceston survive as standing remains, together with the south gate, but additional evidence for the former line of the wall and accompanying ditch has come from several minor archaeological investigations. A number of the new urban creations have a similar "planned" layout: a main axis laid out along the spine of a ridge with burgage plots running back from the roadway down the flanks; several of those following this pattern have a castle on the same axis (Helston, Truro, Tregony and Boscastle) and also incorporate early market places. Lostwithiel may have been reorganised by the Cardinan family on a grid plan in the 13th century. Little is known of the form of urban buildings of this period in Cornwall; several archaeological investigations have been carried out in Medieval areas of Truro, Launceston and Bodmin, for example, but evidence of the form of early structures has been elusive. The earliest standing urban building is probably the Duchy palace at Lostwithiel with origins in the late 13th century. Tintagel Old Post Office is a later 14th- or 15th-century domestic building of yeoman or merchant status constructed within the 13th-century planted town associated with Tintagel Castle (Berry *et al.* 2003a;b). The major ports included Fowey, Lostwithiel, Saltash, Padstow, Mousehole and St Michael's Mount; little is known of their early forms although the harbour at St Michael's Mount survives more or less intact and the west quay at Mousehole may be Medieval (Peter Herring, pers. comm.). The numerous "porth" place-names around the coast mark landing places of greater and lesser importance, some of which, such as Bossiney, accommodated small-scale fishing activity. Leland (c.1540) noted "fisher towns" and "succour for fishing boats" at a variety of places around the coast, including Port Quin, Port Isaac, Pentewan, Golant, Polruan, Millbrook and the much-decayed St Germans (Gray 2000); he also found piers at Penzance, Newlyn, Mousehole and St Mawes.

Devon

Devon has four pre-Conquest burhs, Exeter, Pilton, Totnes and Lydford, and the latter's subsequent failure

to develop as a town has left surviving earthworks and open areas with high archaeological potential (important excavations by Addyman in the 1960s remain unpublished). In the post-Conquest period there was a somewhat denser pattern of relatively small towns spread across the whole county, though with two urban centres – Exeter and Plymouth – on an altogether different scale (having populations of *c*.3,000, Fox 1999, map 51.2). Devon had the greatest density of boroughs in England (while Cornwall had the third highest), which is probably due to the fragmented patterns of lordship/lack of large compact estates, its diverse economy, and difficulties in travelling across such difficult terrain (Fox 1999, 402). Although a small number of towns failed in Cornwall, far more places in Devon shrunk during the Late Medieval period to become little more than villages (for instance, South Zeal). Several pieces of work have been published on excavation projects in Devon's smaller Medieval towns such as Barnstaple, Exmouth, Kingsteignton and Newton Abbot (Markuson 1980; Weddell 1980; 1985; 1986; 1987). Much more remains as grey literature particularly for Barnstaple where there is a significant backlog of excavation reports linked to ceramic assemblages that need to be analysed and reported on. There have been building recording programmes in some Devon towns such as Totnes (unpublished Keystone reports in the Devon HER).

Exeter By the Norman Conquest, Exeter was one of the ten largest towns in England with 399 houses recorded in Domesday Book and a population of *c*.2000. The Conquest had a profound impact on the city with a large earthwork castle being constructed on Rougemont Hill, an expanded cathedral close and the foundation of St Nicholas' Priory (parts of which still survive). Although the Greyfriars (Franciscans) vacated their intra-mural precinct in favour of the suburbs, the Dominicans (Blackfrairs) came to dominate the north-east quarter of the city. By the late 12th century a narrow timber bridge had been built alongside the ancient ford across the Exe, which was replaced by a stone structure and earthen causeway that led to the West Gate in *c*.1200. While some examples of Norman architecture survive, most notably the two towers of the cathedral, there appears to have been a major programme of rebuilding in Exeter in the 13th century that included the cathedral's nave/chancel, the city gates and numerous town houses. The source of Exeter's wealth was largely based on its role as the major secular/ecclesiastical centre within the region, and on trade, notably cloth. In addition to the castle, cathedral, St Nicholas' Priory and the Medieval stone bridge over the Exe, long stretches of the city walls still survive along with a number of houses. Perhaps the most remarkable survival, however, is the system of underground passages, which contained the city's piped water supply (Henderson 1999; Orme and Henderson 1999). More recently, Dyer and Allan (2004b) and the excavations at Princesshay have provided additional information on the Medieval water supply to the city.

Plymouth The Medieval town of Plymouth appears to have developed in the 13th century around a fishing village called Sutton on the west side of Sutton Pool (Brayshay *et al.* 1999). Its growing prominence as a port in the Medieval period owed much to the decline of Plympton, which had previously offered a safe inland harbour before the silting of the Plym rendered the river impassable for sea-going ships (Gill 1993). Thus, Plymouth became the largest settlement between the head of the two major estuaries (those of the Plym and the Tamar) that coalesce as Plymouth Sound. The town achieved Borough status in 1439 and was important both commercially and militarily in the Medieval period offering a defended port once the castle (built by or in the 14th century) was in place; the defences were strengthened in the 16th century by a number of blockhouses at points on the coastal approaches. Excavations close to the harbour at Sutton Pool and within the Barbican area have revealed the Medieval shoreline and a series of reclamations and quays that were constructed as the port flourished in the Late Medieval period (Barber 1986; Ray 1995b; Stead 2003). Waterfront archaeology has been rich in artefact recovery. Little is known, however, about the rest of the town which suffered extensive redevelopment following the bombing of the Second World War and recent excavation in 2005 at the Drake's Circus development in the north of the Old Town area has been disappointing with virtually no archaeological survival encountered (Stead pers. comm.). Carmelite and Franciscan friaries were founded in the late 13th century and late 14th century respectively. Evidence for the Carmelite friary came to light in 1992 (Henderson 1995) whilst the Franciscan friary has escaped detection but it is confidently believed to lie at the west end of New Street (Barber 1973). Despite the place-name "Blackfriars" on the Barbican, there is no evidence for the Dominican order at Plymouth and recent studies at the Blackfriars Distillery have shown that it was unlikely to have had an ecclesiastical origin, although it was clearly a building of some importance (Heaton 2003). Little is known about the city walls and it is uncertain whether there was any continuous defensive circuit until the Civil War (Pye 1995). A handful of Late Medieval town houses survive (such as Prysten House and the Merchants' House) although evidence is emerging for further examples "hidden" within later remodelling. The ancient town church of St Andrew dates from the mid- to late

Figure 12.1: *View east up the new Princesshay, Exeter, during the excavation of a large tank. The remnants of the north aisle of the medieval Blackfriars' church can be seen, including the north wall (top centre) and a pier base (centre) of the nave arcade. More than 50 separate graves, often intercutting, were discovered, the bases of several of which can be seen in the underlying clay subsoil. Photo: Gary Young, ©Exeter Archaeology*

15th century with earlier origins and is the largest parish church in Devon. It was gutted during the Second World War and subsequently rebuilt. Prior to the dominance of Plymouth as a major port, nearby Plympton had already developed as a river port with two foci. Plympton Priory was founded in *c.*900 and closed down by King Henry I in 1121 because "the monks would not give up the concubines"; it was re-founded in the same year (Gill 1993). Limited excavations have revealed part of the south-western range of buildings and some above ground remains survive (Gibbons 1998). The second focus was an earth and timber castle which had been constructed perhaps by the end of the 11th century and this was subsequently rebuilt in stone in 1140 in the characteristic Norman motte and bailey manner, the ruins of which still stand. The town, which grew up to the south of the castle, clearly displays in plan the distinctive burgage plots characteristic of Medieval town settlement. By 1242 Plympton Erle as it was known had achieved the status of a borough but as the sea-going estuary of the River Plym began to silt up, as a result

of the tin working further up stream, Plympton lost its trade to Plymouth. Another Medieval settlement later overshadowed by Plymouth and incorporated within it was Stonehouse on the east bank of Stonehouse Creek at the mouth of the Tamar estuary. The settlement developed as a Medieval port with a range of trading and sea-faring connections that echo those of Plymouth (Ray 1998). Its importance in the Medieval period is confirmed by its acquisition of a town wall perhaps by the early 15th century; a section of the wall survives to full height within the grounds of Stonehall Flats. There is potential for archaeological remains at the site of the Medieval fortified manor of Stonehouse north of the High Street and on the former Medieval shoreline and quay now lying behind reclaimed land (JP Gardiner 2000).

Somerset

Somerset had a relatively high density of pre-Conquest burhs (Watchet, Lyng, Langport, Axbridge, Cadbury Castle and Bath), other defended urban centres (Ilchester and possibly Taunton), and other settlements of possibly urban status judging from the presence of mints, and Domesday markets and burgesses (Milverton, Ilminster, Crewkerne, South Petherton, Yeovil, Milborne Port, Bruton, and Frome). Apart from Axbridge and Bath the north of Somerset appears to have been devoid of 11th-century towns which may reflect the emergence of Bristol as a major centre. In the post-Conquest period a number of new towns emerged, for example around pre-existing ecclesiastical centres (such as Glastonbury and Wells), and on "greenfield" sites (the major port at Bridgwater and the, ultimately failed, foundations at Downend, Rackley and Lower Weare). The most extensive excavations have been in Bridgwater, Glastonbury, Ilchester (Leach 1982; 1994), Taunton (Leach 1984) and Wells.

Bristol

The major Medieval city in the South West was Bristol, whose topography was dominated by its castle constructed in the early Norman period in the eastern part of the town. Recently discovered documentary evidence suggests that there was a defended bridgehead on the Somerset bank of the Avon which may have originated in the pre-Conquest period. By 1200 the town, castle, abbey and other institutions (such as St Bartholomew's Hospital, Price and Ponsford 1998) were well-established with suburbs developing in Broadmead and Old Market. There was also a planned development, separate from Bristol, at Redcliffe on the south bank of the River Avon. In the 12th century the inner circuit of the town wall enclosed the town and this area has seen limited archaeological examination (Rahtz 1960). The walled area was extended in the following century to enclose the immediately adjacent areas outside the original course of the town wall including Redcliffe on the Somerset side of the river. The area of the early port is not known but there is some evidence (a "hythe" name) to suggest that it may have lain to the south of the historic core area some distance from the present river course. It has been suggested that the area south of the Castle may have been a focus for the early port, on the basis of street name evidence; this has not yet been tested but the steepness of the cliff may make it unlikely. Wherever it was, the 12th-century port was clearly substantial as it was used as the base from which to mount the invasion of Ireland. In the 1240s the River Frome was diverted to join the Avon further downstream which allowed the area of the quays to double in size.

Medieval Bristol was extremely cosmopolitan and had a small but influential Jewish community. The remains of a structure previously identified as a *mikveh*, and now suggested (Hillaby and Sermon 2004), due to its location, to be a *bet tohorah* (for ritual washing of the dead), have recently been scheduled. There is considerable artefactual evidence from excavations, including organic finds from waterfront sites, of the wide contacts that Bristol enjoyed in this period, both with its immediate hinterland and from Europe. By the 15th century it is clear that Bristol was incredibly wealthy and probably ranked second to London. Antiquarian illustrations of the Medieval buildings (many of which were destroyed in the 18th and 19th centuries) show the amount of architectural investment. There are large gaps in our knowledge of Medieval Bristol, including the smaller settlements around it, the port, urban housing and the churches. Evidence from previous excavations has led to broad generalisations that have not been fully tested. There has also been a concentration on certain areas, such as the castle, primarily due to development pressures and funding opportunities. There is also a large backlog of unpublished excavations, often carried out by government employment schemes in the 1970s and 80s but unfortunately also true of some recent work.

Gloucestershire

Not much work has been carried out in the known Medieval settlements of Gloucestershire. In Thornbury the work of the Extensive Urban Survey (see Section 1.2.4 on page 11) has identified several urban forms of tenement plots, some of which appear to have been laid out as late as the 16th century. Thornbury Castle was in decline *c.*1500 and evidence suggests that the earlier manor may have been moated. Gloucester was the largest town in Medieval Gloucestershire but its archaeology is not well known, mostly because earlier excavators concentrated on

the Roman period and because much remains unpublished. St Oswald's Priory is an exception (Heighway and Bryant 1999). There has been hardly any excavation at Medieval Cirencester. There were important abbeys in both these towns and at Cirencester it is suggested that the abbey held back the development of the town (Chris Dyer pers. comm.). The lord of Tewkesbury was not the abbey but the earls of Gloucester, and their successors, and it is possible that they had an important role in the urbanisation of the town. There are about 30 other towns covered by the Extensive Urban Survey, of which Newent was the largest. There has been very little archaeological work in any of them and almost none on street frontage sites. Cheltenham is known to have originated in the Medieval period but little evidence has been found in excavations in the town. There appears to be evidence that the small towns in the Cotswolds had strong links to monastic houses (some outside the county such as Evesham and Pershore). Gloucester has recently been treated to a most intensive topographical survey which has incorporated archaeological information into the analysis. New work is currently under way by John Rhodes and these studies will help with the understanding of the development of Medieval Gloucester. (Chris Dyer pers. com.). There is a large number of small towns comparable with the density in Somerset, some of which are described as "wool" towns, though they appeared to serve the same functions as in other counties, providing market centres for the general needs of a rural hinterland. Their wider connections are suggested by their positions on major roads (some were "thoroughfare" towns and on the frontier between Cotswold and valley landscapes, for example, Wootton under Edge or Chipping Camden). Several of these towns have a large number of surviving secular buildings, as well as impressive churches, but the buildings are badly in need of study; the rewards are indicated by the architectural surveys of Northleach carried out by the Victoria County History. Very little excavation has been done in these towns, though Tewkesbury is an exception (Hannan 1993) and not enough is known about this important group of urban communities. There is a current PhD by Antonia Douthwaite, University of Birmingham, on Gloucestershire towns.

12.3 Communications

The Medieval period saw significant improvements to the communications in the South West. Bridges were constructed on main highways – such as those at St Erth and Wadebridge in Cornwall – and were evidently wide enough for wheeled vehicles. Many Medieval bridges survive in excellent condition and some have been studied (by, for example, SW Brown 1981; 1982). Less is known about roads, both in terms of the network of routes at this period and their construction and maintenance. A number of wayside crosses survive in the west of the region and within surviving Medieval landscapes local lanes and by-ways, often deeply hollowed, are embedded in the field patterns.

Although canals are usually thought of as a Post-Medieval innovation, in the Somerset Levels a series of canals was dug by Glastonbury in the Brue and Axe valleys, and possibly by the bishops of Bath and Wells in the North Somerset Levels (the Banwell River), in order to link their inland estates centres with the mother church and the coast (Rippon 2004a; 2006; forthcoming).

12.4 Technology and production

Industrial production was found across the South West during the Medieval period although it has seen surprisingly little archaeological investigation. In Devon and Cornwall a wide range of metal ores were extracted, most famously tin (Gerrard 2000). The excavation of stream deposits was extensive around the granite uplands such as Bodmin Moor (Herring *et al.* forthcoming) and the surviving remains are of national importance; shaft working has been identified as early as the 13th century at Godolphin Hill in Cornwall (Herring 1997b). Associated activities such as ore processing and smelting must also have taken place widely, but there are few published investigations of surviving remains (Austin *et al.* 1989; Gerrard 1985). Lead was worked around Charterhouse-on-Mendip in Somerset, Combe Martin in North Devon and underground mining took place in silver-lead mines on the Bere Alston peninsula from the late 13th century (Mayer 1990). There is evidence on Dartmoor for tin-streaming and openworking, with numerous associated features including trial pits, leats and the mills where the ores were stamped and or smelted (Newman 1998). One tin mill has been excavated but not fully published. Iron was mined in a number of locations, most famously in the Forest of Dean but also at Iron Acton in southern Gloucestershire and on Exmoor and the Blackdown Hills (Griffith and Weddell 1996; Riley and Wilson-North 2001; Passmore 2000). Production on the Blackdown Hills is known from Medieval documents but the archaeological evidence is mainly of Saxon date (see Section 10.2.4 on page 175).

Far less is known about the mining of other metals, such as copper at South Molton and silver at Bere Ferrers (both in Devon) though the latter is an extremely well documented industry that has left some impressive earthwork remains (Claughton 2003). A major research project on the Medieval

silver mines at Bere Alston is being undertaken at the University of Exeter and there are some references to Medieval silver/lead working at Combe Martin (Bill Horner pers. comm.).

The Medieval period saw a number of major pottery industries emerge, most notably at Ham Green and Wanstrow in northern Somerset and Donyatt in southern Somerset (Coleman-Smith and Pearson 1988; Coleman-Smith 2002). There was important ceramic production in Barnstaple which developed into a major industry in the 17th and 18th centuries. Other pottery production sites include Bridgetown, Totnes and recent research into east Devon fabrics such as Membury Ware has shown the need for further research (Allan and Langman 2002).

In Cornwall, local production of grass-marked and Sandy Lane-type pottery continued into the early part of the period and gabbroic clays from the Lizard remained in use until the 13th century (Carl Thorpe pers. comm.). Later, however, pottery production is known only from Lostwithiel and St Germans; much pottery was imported from north Devon, some from elsewhere in Britain and also the continent.

Wool production and cloth making were both important in the 14th and 15th centuries; some evidence for this is available in the form of "tucking mill" place-names. The woollen industry was also very important on Dartmoor; there is a 14th-century reference to fulling mill in Moretonhampstead. Evidence for tanning has been identified at Glastonbury, Taunton and Hardington Mandeville in Somerset but further work is needed to understand the importance of this industry in the South West.

Fishing and victualling of ships was important for many coastal settlements, and shipbuilding was also carried on. In south Devon, Fox (2001) has shown that until the Late Medieval period, coastal resources were exploited from inland manors/settlements whose primary focus was agriculture, making some of the many coastal fishing villages that are so characteristic of Devon and Cornwall a relatively recent addition to our landscape.

Stone was quarried locally across the region, and its use in houses, agricultural buildings and field boundaries adds much to the local colour and diversity of the South West. Some particular stone sources were of more than local importance. In Cornwall, quarrying at Polyphant, Pentewan and Cataclews supplied the construction or rebuilding of many churches and there is evidence for slate quarrying in the Delabole area. Slate quarrying was also common in parts of Somerset with Morte slate quarried in the west of the county and lias in the east. Granite quarrying at De Lank may also originate in the Medieval period but the dominant source for granite at this time was moorstone; working of surface stone included production of millstones and cider mills. In Somerset the quarries at Ham Hill, Dundry and Doulting were established by the 12th century and were particularly important in church building (particularly at Wells and Glastonbury). Beer stone was used extensively in the 11th-century Exeter Cathedral. Other east Devon coastal quarries such as Dunscombe were exploited in the Medieval period.

Salt production is recorded in Domesday at Seaton and Beer. Medieval bell founding is known at some sites notably in Exeter associated with the recent excavations at the Princesshay site (Bill Horner pers. comm.). Coal was mined to the north of Mendip, notably at Norton and Radstock and bell pits of late Medieval date are known in the Holcombe area of Somerset. Evidence for charcoal burning is widespread in the form of platforms in surviving ancient woodland; dating is uncertain as the activity continued until fairly recently.

12.5 Social life

Although the Norman Conquest brought about a profound dislocation in landownership at the higher levels of society, at the local scale there was probably little disruption beyond the major towns and the basic fabric of society remained unchanged. Across the South West, however, there appear to have been significant differences in the way that, particularly rural, society was structured. For most of the region the manor was the primary unit around which daily life was conducted and in a number of areas the church was the dominant landowner (see Rippon 2004b, fig 27.14 for mapping of the major ecclesiastical estates in Somerset). The manorial system in Cornwall, as evidenced by the estate of the Earldom and later the Duchy of Cornwall, was much looser than that to the east. There were fewer labour services, more money rents and greater freedom of decision-making for tenants. The most obvious material consequences of this situation were the relatively early enclosure of some open fields, although the co-operative character of working the land within the hamlets of the lowland countryside is likely to have persisted strongly. The hundred continued as the basis of the intra-regional administrative system of Cornwall and elsewhere; a number of hundred pounds are known but it is not clear whether there may have been other physical remains such as hundred meeting places or boundary marks. The parish system is likely to have its origins in the Early Medieval period but was subject to some later manipulation, particularly where new urban developments took place; examples of late parishes in Cornwall, typically considerably smaller than others, include Truro, Tregony St James and probably Forrabury, created to serve Boscastle. The tin industry was regulated by a number of stannaries, each operating over a defined area. The taxation and assay

element of the system operated via coinage halls in a number of towns but, as with hundreds, it is not clear whether there were other physical elements of their jurisdiction. Tithings, associated with law and order, represent another layer of local administration (Pool 1981; Harvey 1997).

12.6 Religion and ritual

12.6.1 Parish churches and chapels

The dominant ideological role of Christianity in everyday life is clear from the ubiquitous presence of religious structures within the landscape, from parish churches to wayside crosses; the latter continued to be erected through the Medieval period and new well-houses were constructed at some holy wells, demonstrating the continued importance of these structures in popular religious observance. Some survival of elements of earlier beliefs, or at least a popular re-working of orthodox Christian observance, may be indicated by aspects of the iconography within churches and in continuity of use of sites such as holy wells. In Cornwall, the most important Norman church is St Germans, but Tintagel, Morwenstow, Crantock, Bodmin and Minster all have significant early features. The major rebuilding programme on Cornish churches during the 15th and 16th centuries testifies to a degree of material wealth in the county at the time. While there are many individual studies of church fabric there has been little synthesis. Churchyard morphology has been the subjects of a significant study by Preston-Jones (1994). Crosses and holy wells have also been the subject of considerable attention, and the former in particular now have a considerably more refined stylistic chronology. Chapels served a variety of functions – bridge chapels, chantry chapels, lighthouse chapels, chapels in houses and castles – and were widely distributed in considerable numbers. In Devon there has been relatively little work on parish churches, with the notable exception of Buckfastleigh, where a Saxon precursor to the Medieval church may represent the original site of the nearby Buckfast Abbey. There has been some limited recording of church interiors and the preparation of conservation plans for some larger buildings has produced new information. Both Exeter and Wells cathedrals have seen important programmes of recent work (for example Rodwell 2001).

12.6.2 Monasteries and episcopal estates

In Cornwall monastic foundations, lazar houses, hospitals and chapels have had relatively little attention, although it is clear that they were present in considerable numbers. Monastic foundations and priories, for example, included St Michael's Mount, Minster, Tregony, Bodmin, St Germans, Tywardreath, Penryn (Glasney), Launceston, St Buryan, Lammana, Crantock and Truro. There has been recent recording of the standing remains at Launceston Priory (Gossip 2002), excavation of Bodmin Priory (O'Hara 1985) and of associated graves (Thorpe 2000), a Time Team search for remains of St Leonard's leper hospital, near Launceston (Harding *et al.* 1997), and re-assessment of the possible Medieval cathedral at St Germans (Olson and Preston-Jones 1998–9). A short programme of excavation at Glasney, Penryn, in 2003 found significant evidence for the form and fabric of part of the pre-Reformation monastic institution and college (Cole forthcoming).

In Devon, a number of monasteries have been the subject of archaeological research, building on Finberg's (1969) seminal historical study of Tavistock and its estates. The evidence for the urban and suburban monasteries in Exeter is summarised above (on page 199) but, just to the east of the city, Polsloe Priory has seen the most extensive excavations (though they remain unpublished). There has also been recent work at Torre Abbey overlooking Torbay. Some work has also been carried out on the Bishop's Palace in Paignton where examination of a supposed chapel next to the church had led to its re-identification as a lodging block; the earliest fabric is 13th century though the manor is documented from the 12th century. Parts of the Medieval site of Buckfast have been excavated, together with extensive up-standing fabric survey (SW Brown 1988). In Devon there area numerous published and grey literature reports on abbey, priories, chapels and chantries, some of which is available in an unpublished report: *Devon Religious Houses Survey* (Devon County Council).

In Somerset much of the land was held by the church (see Dunning 2001), with Glastonbury being the wealthiest monastery in England and Wales by the 16th century. The monastery itself has seen several programmes of, mostly unpublished, excavations (summarised in Rahtz and Watts 2003). A programme of post-excavation work has now been instigated by the Abbey trustees. Athelney has recently seen extensive geophysical survey giving a complete plan of the site for the first time; there have been limited modern excavations at Cleeve Abbey and Muchelney Abbey. Recent work by Time Team (and others) at the Knights Templar preceptory at Templecombe has been published (Harding *et al.* 2003). There have also been excavations of the urban monasteries at Taunton Priory and Bridgwater Friary. The bishops of Bath and Wells had a palace at Wells that has seen some limited geophysical survey and trial excavations by Bristol University in recent years (Gerrard *et al.* 1998; Payne and Hoggett 1999). The bishops also had a number of country houses including that at Meare

which is most famous for its fine 14th-century fish house: the nearby manor house and church date from the same period (Rippon 2004b). There have also been geophysical surveys of the bishops' houses at Blackford and Wookey as part of a wider study (Payne 2003).

12.6.3 Burial practices

The most intensive analysis of a Medieval skeletal collection in Somerset was carried out by Juliette Rogers on the burials excavated from Wells (in Rodwell 2001). Recent work at Taunton on the site of the church of Augustinian canons has shown that there is good survival of early burials, perhaps from 1158 until *c.*1500. The cemetery served the town and several of the surrounding manors. Detailed analysis of this cemetery evidence has yet to be commissioned but initial indications suggest that there is a range of burial traditions ranging from charcoal burials with layers of charcoal upon which wooden coffins were placed, through to substantial stone-lined graves found inside the priory church. Palaeopathological studies will make a substantial contribution to the study of Medieval populations and burial practice in Taunton and have implications for the county and wider region.

12.7 Defence and warfare

While the varied types of sites and settlements covered in this section have in common a "defensive" aspect, it is important to emphasise that both Medieval castles and town defences had functions and significance that extended far beyond any presumed military capacity. Thus castles were also focal points within networks of estates as well as elite residences and icons of lordship, while town defences had symbolic and amenity values as well as offering communities protective advantages (Creighton 2005; Creighton and Higham 2005). It should not escape our attention that only a small minority of the region's castles saw any military action: of a total of 127 castles recorded in the counties of Cornwall, Devon, Gloucestershire and Somerset in the period *c.*1066–1652, only 48 sieges are recorded in total, many of these in the civil war of the 1640s (King 1983; see also Liddiard 2005, 71). Organised assaults on walled towns were similarly infrequent: for example, of the five times that the city of Exeter was attacked in the period after the Norman Conquest, four occurred after 1485 and the supposed prolonged period of internal peace heralded by the Tudor dynasty (see Stoyle 2003).

Archaeology has proved especially informative with regard to the region's urban castles. The major royal castle at Bristol, for instance, has been subjected to a number of excavations, although many remain to be published in full. Excavations in the late 1940s and early 1950s were important but fairly limited in scale, preceding a major campaign the late 1960s and early 1970s in advance of a new civic centre that was never built. This work uncovered several areas of the castle, including part of Robert of Gloucester's imposing keep of the early 12th century as well as defensive features relating to the earlier earth and timber Norman castle (but see Ponsford 1979; Leech 1998). Excavation of Gloucester's first Norman castle in the early 1980s revealed that part of the bailey overlay a Late Roman building that had been rebuilt and re-used intermittently from the 6th until the 11th century, when it was demolished and levelled in advance of castle-building (Darvill 1988, 45–6). This fortification was a relatively short-lived feature of Gloucester's townscape, being replaced by a new foundation on a fresh waterfront site in the first decades of the 12th century (Hurst 1984, 76). At Lydford, meanwhile, excavation of both an early (11th or 12th century) ring work in the angle of the Saxon burh defences and a later stronghouse and stannary prison has clarified the successive chronological relationship between two unusually closely spaced castle sites (Wilson and Hurst 1965, 170–1; Saunders 1980). Other significant examples of urban castle excavations include Barnstaple, where the Norman motte and bailey was seen to have displaced part of a Late Saxon cemetery (Miles 1986), and Totnes, where the stone-built foundations of a timber superstructure, possibly a tower, were found on the motte top (Rigold 1954). The Bishop of Winchester's castle at Taunton, again built over a Late Saxon cemetery, has been excavated on several occasions, although the most extensive work, by Gray in the 1920s, appears to have been recorded extremely poorly (Bush and Meek 1984; Pearson 1984; Clements 1984). Recent re-excavation of some of Gray's areas has shown that he missed much and that the structure of the "keep" is much more complex than he suggested. More work is planned as part of a major project to update the museum (Chris Webster pers. comm.).

Of those castles located within Medieval towns that grew up around them (as opposed to those imposed in extant urban settlements), Launceston is archaeologically the best known. Within the bailey, a planned arrangement of closely spaced and substantial self-contained stone houses was revealed and the development of its perimeter defences was clarified, while other work concentrated on the castle gatehouses (Saunders 1977). The region's rural castles are less well known archaeologically, although Okehampton is a major exception. Here, a sequence of motte-top stone structures has been revealed as well as a multi-phase complex of domestic structures within the bailey (Higham 1977; Higham *et al.* 1982). As at Launceston, the assemblage of environmental evidence – in particular animal and fish bone – has provided rich evidence not only of aristocratic

consumption but the site's economic inter-relationship with its hinterland. In common with the great majority of castles in the countryside of Devon and Cornwall, this was a relatively secluded site forming a component part of a characteristically dispersed settlement pattern. In Somerset and Gloucestershire the rural contexts of castle sites are more varied, with examples found in association with nucleated villages not uncommon. In certain cases, villages may even clustered within the baileys of early castles, as at Balland's Castle (Somerset) and English Bicknor (Gloucestershire), where churches lay within the outer defences. All counties contain well-preserved earthworks of the Norman earth and timber castles, a large proportion of them completely undocumented, that dotted the landscape: Holwell Castle, Parracombe (Devon) and Nether Stowey and Stogursey (Somerset) are particularly fine examples. Both mottes and ringworks are known in large numbers, although excavations at Castle Neroche (Somerset) provide us with an important reminder that such superficial earthwork forms can conceal more complex sequences, here from an enclosure castle to a motte and bailey (Davison 1972). In Cornwall, meanwhile, confusion may arise in the differentiation between the earthworks of Norman ringworks and earlier rounds.

Many other castle sites are significant not because of surviving earthworks or excavated evidence but because of the quality or importance of their upstanding masonry remains. The gatehouse of Rougemont Castle, representing the principal standing vestige of Exeter castle, is a structure of national importance, representing one of the earliest stone-built features of castle architecture in Britain and displaying an intriguing combination of Early Norman and Late Anglo-Saxon elements (Blaylock 1987). Berkeley (Gloucestershire), Restormel (Cornwall) and Trematon Castle (Cornwall) preserve notable examples of Norman shell keeps, which may represent a regionally distinctive building tradition of sorts. Particularly important examples of Late Medieval castles or defended manorial sites with significant upstanding remains include Nunney castle, a remarkable structure of *c.*1373 resembling a tower-house with French-style detailing, set in a pond, and the late 14th-century courtyard castle of Farleigh Hungerford (Somerset), as well as Bickleigh and Compton (Devon) and Beverston and Thornbury in Gloucestershire.

The region also contains several sites that provide outstanding evidence for the early provision of gunpowder artillery. The defended manor house at Berry Pomeroy (SW Brown 1996) displays unusual gunports from the 15th century, while Dartmouth castle (built from 1481) is an early example of a coastal artillery fort. Other forms of fortification dating to the Middle Ages include siege castles (the ringwork of Dane's Castle, Exeter, dating to the mid-12th century is one of a tiny number to have been excavated, Nenk *et al.* 1994, 203–4), and crenellated ecclesiastical precincts and/or bishop's palaces (such as Exeter or Wells).

Overall, the siting of castles within the region displays little evidence of a military rationale. With the exception of royal fortresses such as the Norman castles at Exeter and Gloucester, these sites were overwhelmingly positioned with an eye for the control of local resources and settlements. Moreover, there is compelling evidence that in at least some cases the landscape settings of castles were manipulated for reasons of leisure, pleasure and aesthetic impact. At places such as Launceston, Okehampton and Restormel, for example, deer parks were important components in designed landscapes that visually complemented these buildings (Herring 2003). The Medieval castle at Tintagel appears to have been constructed not for military reasons but to create a symbolic link between the Earldom of Cornwall and the legend of King Arthur (Padel 1988b). Although St Michael's Mount is often overlooked as a Medieval fortification, it may have been important as a symbol of Cornwall's incorporation into the wider English state and accordingly it became a disproportionately frequent focus for discontent during a variety of civil disturbances and minor rebellions (Herring 1993a).

The tradition of "private" defence represented by the region's numerous Medieval castles contrasts with the "communal" fortifications of Medieval towns (Creighton and Higham 2005). In many cases the defences of urban settlements were of considerable antiquity, maintained and in some cases re-built or extended in the post-Conquest period. Thus the walled Roman circuits around Exeter and Bath survived through the Middle Ages on essentially unchanged lines; in contrast, Gloucester's Roman enceinte was extended out to the River Severn in the 12th and 13th centuries to embrace a greatly enlarged area. Elsewhere, the burghal-period circuits around Barnstaple and Totnes saw at least some limited re-use in the immediate post-Conquest period but went rapidly out of use thereafter, in marked contrast to Bristol, where the defences of the Early Medieval burh on a peninsula site were added to by large walled extensions, to the north and south, in the 13th century. Defensive circuits around towns of post-Conquest origin were remarkably rare: Launceston is the main example, where the town grew up in a semi-circular defended enclosure annexed to the castle. Launceston's walls are probably the work of Earl Richard in the mid-13th century and form part of a carefully designed landscape of power and prestige associated with the town and castle and its setting at this period (Herring 2003).

Taunton's irregular oval circuit is apparently of 12th-century date, while according to the antiquarian John

Leland, Bridgwater was provided with stone gates but the Medieval town "wall" was formed by joined-together sections of stone houses. The port of Plymouth possessed enclosing defences of some sort by at least the 15th century and possibly earlier, although these were disrupted by a massive expansion to the circuit in the Elizabethan and later periods. Compared to castles, archaeological investigations of town defences are few and far between. Perhaps the most important are the series of excavations on the southern extension of Bristol's defences known as the "Portwall", where the wall's sophisticated design may be related to its situation on the edge of the Temple Fee of the Knights Templar (Jackson 1994; BARAS 2000; see also Leech 1998). The only place where detailed recording of standing remains has taken place is Exeter, where a fabric survey of Exeter's city wall has revealed a complex sequence of repair and re-use from the Roman to Post-Medieval periods (Blaylock 1995). In Devon there is evidence of Norman works on Saxon defences (SW Brown 1999; Dyer and Allan 2004a; Henderson 2001; Markuson 1980; Miles 1986 and current work at Rougemont in Exeter not yet published). Devon also has a fair amount of published work on castle/town defences including surveys and excavations (SW Brown 1996; 1999; Dyer and Allan 2004a; Stoyle 2003; Henderson 2001; Higham *et al.* 1982; 1985; Higham and Goddard 1987; Miles 1986; Wilson-North 1991). There is also much in grey literature reports in the Devon HER (including the Dane's Castle excavation in Exeter).

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13

Post-Medieval to Modern Environmental Background

Vanessa Straker

13.1 Introduction

This is not a full review of all the palaeoenvironmental studies carried out in the region, but a general summary with most emphasis placed on the environment in which Post-Medieval and Modern communities lived. It does not provide a comprehensive review of crop and animal husbandry in the region. Reviews of environmental archaeology carried out or commissioned by English Heritage are in progress or complete and will give an account of knowledge in these areas. Those wishing to follow this up should consult the English Heritage website (http://www.english-heritage.org.uk and follow the links Research & Conservation → Archaeology & Buildings → Scientific Techniques → Environmental Studies → Regional Reviews). At the time of writing, the reviews on insects (Robinson 2002) and wood and charcoal (W Smith 2002) were available as PDF files. Reviews of plant macrofossils, pollen, animal bones and geoarchaeology from southern England are in preparation and will be placed on the website when available. Rob Scaife very kindly made available a draft of his pollen review for this resource assessment. The excellent review of environmental archaeology in South West England by Martin Bell (1984) is still a very useful source of information. There are also reviews of environmental evidence in the Urban Archaeological Assessments for Bath (not yet published) and Bristol (Brett 2005), which are of particular relevance for this period. Urban deposits have not generally been referred to, but will be included in the reviews noted above. The inclusion of "grey" literature has not been comprehensive. *The Environmental Archaeology of Industry* (Murphy and Wiltshire 2003) provides a useful insight into the application of aspects of zooarchaeology and other scientific methods to understanding past industry, including that of recent periods.

With regard to climate, the period includes a significant event which must have left its mark in the environmental record, though as noted below, the environmental history of recent centuries has not been the main focus of palaeoenvironmental studies. The Little Ice Age, generally regarded to have occurred around 1590–1850 was characterised by a drop in mean annual temperature of 1°C (Roberts 1998). In marginal areas, new tree growth was prevented and the stunting of mature tree growth is seen in narrow tree-ring sequences. It has been suggested that land at the margins of suitability for arable was abandoned between *c.*1600 and 1750 (Parry 1978), however evidence from some areas such as Exmoor's southern fringe (see below, Fyfe *et al.* 2003b) suggests this was not universal, at least where hardy crops such as rye were concerned.

As for earlier in the Holocene, the coast continued to witness major geomorphological changes although relative sea level rise was minimal in comparison. Several different examples are summarised below.

The breaching of the shingle ridge on Porlock Marsh during a storm in October 1996 provides a useful example of the dynamic nature of salt marsh and associated creek development and movement. Managed realignment of the shingle ridge had been identified as a possibility, given the history of breaches causing flooding of agricultural land and the poor case for continued artificial maintenance of the ridge.

Bryant and Haslett (2002) and Haslett and Bryant (2004) examined the accounts from Instow, Barnstaple and further up the estuary, of the "wave" causing extensive flooding of the Bristol Channel in January 1607. Their 2004 paper concludes that the most likely cause was a tsunami although others (particularly metereologists) believe that a tidal surge is more likely (Richard Brunning pers. comm.).

There are numerous other examples of major coastal events in the South West, including the continued inundation of the Isles of Scilly archipelago, and loss to the sea by cliff erosion of the village of Hallsands in south Devon in January 1917. Similar events will have taken place in the more distant past without the benefit of historical documentation.

13.2 Palaeoenvironmental studies

For recent centuries, as well as palaeovegetation studies, analysis of plant remains (pollen, plant macrofossils and charcoal) can yield information on exploitation of plants for food and fuel, trade, introduction of exotic/alien species, plant breeding and other agricultural and horticultural innovation and landscape design.

Studies of environmental history are rare for this period. This may be because documentary history is thought to provide an adequate record, but this assumption is largely untested. The exception to this is "Garden" archaeology, which is well-established. Murphy and Scaife (1991) discuss the types of evidence that could survive. These include botanical remains from watercourses, ponds and lakes providing information on the local and wider vegetation, land use management and the types of crops grown. The survival of this evidence in useful contexts, is, however rare and there are no examples of studies from the South West where good evidence survived. Redesign or ploughing can remove early garden levels and mixing by soil fauna makes interpretation unreliable.

Wetlands, where organic deposits preserve the record of climatic and environmental change for the last few hundred years, are a scarce and diminishing resource. This record is, for the most part, to be found in parts of the uplands where the peat accumulation of recent centuries has not been removed by peat or turf cutting and drainage. The uplands may be more sensitive to climate change than the lowlands and are a valuable climate record for the last 10,000 years. The drier summers forecast by current climate change modelling would certainly slow down rates of peat accumulation and may also accelerate erosion in vulnerable areas.

Sources of evidence elsewhere are small wetlands, for example on the Culm soils of mid-Devon, where the inputs sources are local and where the history of land use and management is known. Ornamental lakes in planned landscapes, sometimes developed from Medieval fishponds, may be a very valuable data source and this needs to be given consideration when plans are advanced to de-silt lakes and ponds.

The upper parts of many published pollen profiles from the uplands of the region do include the vegetation record from the 17th century to the present day. The drawback is that the levels accumulated over recent centuries are usually very poorly dated and analysed only at a low resolution. This may be because the principle aim of a particular project was to study the vegetation history of an earlier period or because of the limitations of a radiocarbon calibration when applied to recent centuries. Calibrated age ranges after *c.*1450 do not allow detailed interpretation of vegetation change and land management. Approximate dates can be inferred by the identification of introduced species such as plantations of non-native conifers etc. More precise dating will need to rely on chemostratigraphic markers, OSL dating of non-organic sequences or very detailed radiocarbon dating designed with Bayesian modelling in mind.

A few examples of the kinds of information available from palaeovegetation studies are given below, emphasising the variation to be expected in a large and diverse region.

On the Hartland peninsula in north Devon, pollen studies from a spring peat in the Clifford valley showed that Medieval arable cultivation continues into the Post-Medieval period (Hawkins 2005). In contrast, palaeochannel sediments at Moshayne in the Clyst valley of central Devon demonstrate that cultivation of wheat or oats (pollen type *Avena/Triticum*) and rye ceased in the 18th century, but barley cultivation may have continued. There is no evidence of Post-Medieval woodland regeneration, and a pattern of land use continuity is apparent (Hawkins 2005). At Sourton Down, at an altitude of 290m OD on Dartmoor's northern edge, a small expansion in pine and then oak pollen at the top of the sequence is thought to reflect local planting in recent centuries (Straker in Weddell and Reed 1997). There are many other instances of this, for example on Exmoor's southern fringe, a rise in pine pollen which was broadly synchronous with a decline in rye at Anstey's Combe and Long Breach, is estimated to date to around 1750-1800 (Fyfe *et al.* 2003b).

Of the three major uplands in the region, Exmoor is unique in having been the focus of two studies that were designed specifically to study aspects of the environmental history of recent centuries. Crabtree and Maltby (1974; Maltby and Crabtree 1976) studied the soils (iron pan stagnopodsol and stagnohumic gley) and vegetation history (*Calluna* heathland) from the immediate pre 1833 vegetation that was buried by the construction of the Pinkery Canal. This soil also predates by at least 15 years the moorland reclamation undertaken by the Knight family. Maltby (1995) points out the importance of this sequence for scientific research, including enabling spatially separate comparisons between reclaimed, unreclaimed and reverted soil conditions and differences interpreted as a response to change over time.

In the second study, Chambers *et al.* (1999) responded to a recommendation by Straker and Crabtree (1995) for research to understand the nature of the development of heather and *Molinia* dominated landscapes, in order to be able to respond to proposals to alter land use and provide the background for management plans. Their study of vegetation history at Lanacombe (Molinia-dominated "white moor") and Larkbarrow ("grey moor" dominated by a mixture of ericaceous shrubs allegedly invaded by *Molinia*), demonstrated the recent incursion of *Molinia* at Larkbarrow, but also showed a greater antiquity and abundance of *Molinia* in both areas than hitherto appreciated. Similar studies have now been adopted in Wales in order directly to inform conservation and management policy (Chambers *et al.* 1999). This approach would certainly be applicable to other areas in the South West where management for nature conservation purposes is often driven by the need to meet biodiversity targets or achieve "favourable status" for sites of special scientific interest.

13.3 The agricultural landscape

There are few examples of Post-Medieval crop remains from either urban or rural sites. The plant macrofossil analyses carried out as part of the multidisciplinary and multiperiod Shapwick project, did, however, include the study of some Post-Medieval deposits. A range of samples of 17th- to late 18th-century date were analysed. The late eighteen century material came from excavation of four demolished houses which were closely dated to between 1760 and 1800. These samples consisted mainly of cleaned cereal grain (free-threshing wheat, oats and barley) with small amounts of chaff (tough rachis nodes of bread wheat and macaroni/rivet wheat) and weed seeds. The Post-Medieval fills of the moat gave similar results (Straker *et al.* forthcoming).

The UK plant record shows that the diverse wild plant (weed) flora associated with Medieval fields largely disappears in the succeeding centuries. This is in part due to the many agricultural improvements and innovations which started by the late 18th century. These included development of new varieties of cereals and use of early mechanisation. The invention of the seed drill by Jethro Tull at the beginning of the 18th century meant that weeding could be more effective. Broad-cast crops, where the grain was cast at random around the sower, were hard to weed, whereas drill-sown crops in regular rows could be hoed. In the first part of the 20th century, machine threshing and winnowing of grain lead to improved screening techniques and as a result fewer weed seeds were sown along with the crop. The *Seeds Act* of 1920 precluded the sale of seed grain containing a high proportion of impurities and the weed flora still further by the use of efficient modern herbicides (Salisbury 1964, 31–2).

At Shapwick, no clear differences were observed between the Medieval and Post-Medieval plant macrofossil assemblages. Most of the weed species noted from earlier centuries were found in the late 18th-century layers though some plants, notably thorow wax, cleavers and charlock, were absent. Whether this is the effect of the "new technology" or other factors is not clear. Research on other assemblages representing different stages of crop cleaning and processing would be useful, particularly if there is a good record of the uptake of new methods.

Research into breeding of animals has fared rather better and Davis (1987) was able to note that from the 17th century onwards, the average size of domestic cattle, sheep, pig and domestic fowl increased. There is not much published data for the South West, but assemblages from towns like Exeter, for example, (Maltby 1979) have contributed to the study of early modern animal breeding.

13.4 Soil erosion

The effects of ploughing on buried archaeological sites, is a constant concern. The Southern Quantock Archaeological Survey included a study (Wilkinson *et al.* 2006) of the movement modern soils using the levels of a radioisotope of caesium (^{137}Cs). This is a product of fission and is discharged into the atmosphere by atmospheric nuclear weapons testing, which started in 1940 and peaked in 1963, and other licensed or accidental discharges. The application of the technique to monitor soil erosion is not new, but it has rarely been made use of for archaeological purposes. Samples were taken through the soil profiles along transect lines and subject to particle size analyses which suggested that soil redistribution was mainly as a result of ploughing. The analysis of the ^{137}Cs levels allowed patterns of soil movement since 1963 to be reconstructed and the future risk to vulnerable archaeological sites to be assessed. The authors concluded that should present cultivation regimes be maintained, regionally and nationally important archaeological sites will be completely removed in the next 150 years.

There are many other aspects of archaeological science which would make a valuable contribution to the study of industry and lifestyle in the last 300 years (Bayley and Williams 2005). These include the potential for understanding the living conditions and diet of workers in urban and rural trades and industries. Bayley and Williams (2005) draw attention to the wealth of knowledge on human health and population movement that the application of existing techniques such as osteology and isotope analysis could

provide. Molleson and Cox (1993) demonstrate the range of information available from a major cemetery at Spitalfields in London; studies of human health and welfare of a comparable scale are still to be undertaken in the South West. At a local level, the identification of ova of human gut parasites (*Ascaris*, roundworm and *Trichuris*, whipworm) from cess-pits in 16th-century Taunton serves as a reminder that such health problems are likely to have been widespread, though possibly not regarded as serious (Greig in Burrow 1988, 139–49).

The application of scientific techniques to improve understanding of life and environment in the Post-Medieval and Modern periods has barely begun and would benefit greatly from a systematic approach.

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14

Post-Medieval, Industrial and Modern

Edited by Mike Bone and David Dawson from contributions by Mike Bone, David Cranstone, David Dawson, David Hunt, Oliver Kent, Mike Ponsford, Andy Pye and Chris Webster

Introduction

The western aspect of the South West was important in earlier times, but during this period it became paramount as the strategic interests of Britain developed, first across the Atlantic and then globally. The development of the great naval base at Devonport is an indication of this (Coad 1983). Understanding the archaeology of the South West is therefore interdependent on archaeological work on an international scale and vice versa. The abundance of resources in the region (fuels: coal and natural gas, raw materials for the new age: arsenic, calamine, wolfram, uranium, china clay, ball clay, road stone, as well as traditionally exploited materials such as copper, tin, lead, agricultural produce and fish) ensured that the region played a full part in technological and social changes.

It follows that our constituencies also have to be viewed from an international perspective. The Post-Medieval archaeology of the West Indies, or of the North American colonies, cannot be understood in isolation from the archaeology of South West England. Thus, whether one is characterising the interests of individual people (the general public), specialist sectors (education, heritage management, environmental management) or specific interest groups (academic institutions, societies), all have an international dimension. Fortunately, through improved communication, there are many new opportunities and initiatives to foster closer international collaboration and to share and to test interpretations with a wide audience.

14.0.1 Broad themes

There are several broad themes that are relatively under-explored:

- From *c.*1540 there was a step-change in the rate of exploitation of our natural resources leading to radical changes to the landscape. The exploitation of water for power, transport and later the demand for clean drinking water produced spectacular changes which apart from individual monument studies have been largely undocumented. Later use of coal-based technology led to the concentration of production and settlement in towns/industrial villages.

- Exploitation for minerals has produced equally distinctive landscapes and has remodelled some of the "natural" features that are now regarded as iconic of the South West, for example, the Avon and Cheddar Gorges, the moorland landscapes of Bodmin Moor, Dartmoor and Exmoor and lengths of the Cornish and Dorset coastline.

- The period is also characterised by an exponential increase in the amount of waste produced by human society which has both provided the means of transforming landscapes, particularly in towns, and an enormous opportunity for archaeology.

- Use of "artificial" fertilisers and more intensive cultivation in agriculture has affected habitats and wildlife.

- The rise of the 19th- and 20th-century chemical industries has produced significant pollution and contamination.

- Transport improvements have taken up much land and exhaust gases and smoke add to pollution.

- Above all, the "Industrial Revolution" marked a significant change in our relationship with the environment, for example, William Smith's work on geological strata enabled engineers to better understand and thus exploit mineral wealth much more extensively. Conversely, recent appreciation of environmental problems has led to a change to "greener" ways of looking at our relationship with the environment and the growth of the conservation movement.

Given the urgency of our need as a society to understand these mechanisms in order to find strategies to mitigate their future impact, the neglect of archaeological investigation seems almost perverse.

14.1 Material Culture

This section is structured using seven artefact-based headings adapted from those used in Geoff Egan's *The Medieval Household, Daily Living* c.*1150*–c.*1450* (Egan 1998). These are followed by a list of significant large published groups of material and syntheses. Drawing a line between archaeological research and work concerning standing buildings, extant artefacts and collections is problematic. The emphasis here is on context and consumption rather than production, trade and typologies.

Material culture studies take on a different form for the later period as, for the 18th and to the greatest extent for the 19th and 20th centuries, there is a wide range of social and folk-historical studies and of specialist work driven by art and design history and by connoisseurial concerns. These are complimented by specialist museums and collections. Specialist journals in the UK include the *Journal of Material Culture*. These later periods tend to have a corresponding shortage of archaeological research.

Fabric of Buildings Post-Medieval roof tile and roof furniture has a clear regional character across the study area. Slate and pennant roof tiles are locally widespread. There is a discussion of the South Devon types and their distribution in Allan (1984, 300–303). Ceramic was used primarily for ridge tiles and finials until late in the period. Clay chimney pots were an emerging form in the later 18th century. Many archaeological reports include finds reports of this material (for instance Burrow 1988, 131). Acton Court (Rodwell and Bell 2004, 235–42) gives a good Late Medieval and 16th-century group associated with one building. Other material from this excavation includes stonework from fireplaces and screens.

Fixtures, Fittings and Security Early Modern and Post-Medieval window glass has received limited attention. A range of 16th-century domestic plain glass and lead cames have been recorded from excavations at Acton Court together with one example of painted glass (Rodwell and Bell 2004, 261–3). Most archaeological reports include a selection of metal fittings amongst small finds including padlocks, hinges, and nails (for example, C Burrow in Burrow 1988, 134–5). Linda Hall has provided a survey of fixtures and fitting from standing rural houses in South Gloucestershire (Hall 1983, 43–82) and (Hall 2001) including windows, stairs, cupboards, hinges etc but also racks, dressers, chimney furniture and privies placed in the context of the wider architectural context of specific houses.

Heating and Lighting There are no published examples of ceramic stove tiles from the South West but ceramic ovens built into chimney structures are a south-west peninsula regional form exported over a wider area. Brears suggest that these first occur in the early Post-Medieval (Brears 1971, 247) but most examples appear to belong to the 19th and 20th centuries. The relationship with the similar tradition in Spain has not been explored. Hearth fittings in ceramic are a regional speciality in North Devon in the 17th century, where relief decorated fire-dogs and fire-backs as well as flat-irons occur alongside distinctive tiles (Grant 1983). Metal artefacts associated with heating and lighting are archaeologically scarce, but there are examples of candlesticks from Acton Court (Rodwell and Bell 2004) and Exeter (Allan 1984). Ceramic candlesticks and candleholders are common occurring in many Post-Medieval assemblages from the 16th and 17th centuries.

Tableware and other Household Equipment Pottery studies are extensive both for regional and imported wares. Some of the work is regional and international in scope, but much is more local. Studies include Donyatt (Coleman-Smith and Pearson 1988), Exeter (Allan 1984), Bristol, especially tin-glaze (Price forthcoming), Barnstaple and North Devon (Watkins 1960; Grant 1983) and Verwood (Draper and Copland-Griffiths 2002). Peter Brears' and Andrew McGarva's broad surveys of rural potteries are also useful (Brears 1971; McGarva 2002). There are major producers, such as those of Barnstaple, Great Torrington, Wrangway, Bridgwater and others, which have not yet been fully studied but most major consumption centres have pottery type-series. A general form guide for common types found in the Bristol area has been published (Good and Russett 1987) and there are good local collections in Taunton, Bristol and Exeter. New techniques promise a means of reconciling these (Taylor in Allan 1999, 57–59).

The main emphasis has been on trade, dating and distribution. Art historical approaches have been

applied to the Bristol and Wincanton tin-glaze industries (for example by Pountney 1922; Ray 1968; Britton 1982; Lipski and Archer 1984). For the 19th and 20th centuries, published accounts by potters of their own practice include William Fishley Holland (1958) and Peter Brannam (1982).

There are several significant groups of ceramic finds as single assemblages published: Taunton (Leach 1984); North Petherton (Pearson 1979); King Street, Bristol (Barton 1964); Narrow Quay, Bristol (Good 1987), several from Exeter (Allan 1984; 2003) and Plymouth (Allan and Barber 1992). There are also several important unpublished groups from Bristol and North Somerset.

A recent study of copper alloy domestic utensils by Butler and Green (2003) has radically changed our understanding of the nature and location of this industry and complements excavated material from Exeter (Blaylock 1996; 2000), Taunton (Blaylock 2000, 84–85) and, prompted by its publication, South Petherton (Butler and Green 2006). Silver and goldwork have received their own specialist studies for example Tim Kent's study of 17th-century Somerset silver spoons and goblets (Kent 2004).

There is extensive specialist work on tobacco from the region, most directed at identification and dating. Detailed discussions of individual examples and their context include Davey (2003).

Timber artefacts from waterlogged deposits include good groups from Exeter (Allan 1984, 305–22) and Greyfriars, Bristol (Ponsford 1975). These include barrel and other stave-vessel parts, wooden vessels and utensils such as spoons and combs as well as fragments of furniture. The furniture made and used in the West Country is distinctive and has been best studied in the more general works of Chinnery (1979) and Cotton (1990).

Other Activities – maintenance, reading, writing, leisure, religion, personal tools and weapons Many of these fall into small-finds categories and there have been few specific studies. A leather ?tennis ball *c.*1660 from Exeter is a rare survivor (Allan 1984, 333 and pl. 4). Two longbows from Acton Court (Humble in Rodwell and Bell 2004, 405–8) date from the mid-16th century. A firepot from a 16th-century wreck off Teignmouth has contributed to wider discussion of this artefact type (Martin 1994).

Textiles and Clothing Waterlogged deposits have produced and leather artefacts. Two examples of late 16th-century knitting from Goldsmith Street are part of three small 16th- and 17th-century assemblages of wool and silk fabrics from Exeter (Hedges in Allan 1984, 334–6). There are a few other published groups from the region, for example from, Acton Court (Crowfoot in (Rodwell and Bell 2004, 399–403) and Taunton (Janaway in Burrow 1988, 150–1).

Leather is more common, including footwear, clothing and accessories with examples from Exeter (Friendship-Taylor in Allan 1984, 323–333), Taunton (Good in Leach 1984, 160 and C Burrow in Burrow 1988, 136–9), Acton Court (Mould in Rodwell and Bell 2004, 403–5) and Bristol (Good 1987, 110–120).

Transport and Trades Numismatic evidence is widespread. When required, Bristol was the primary location of the mint serving the region (Grinsell 1986; North 1960). It contributed to the issue of the Chamberlain Coinage of 1549 and was licensed to produce copper farthings in the reign of Elizabeth I. During the Civil War the Bristol mint was re-established from 1643 to 1645, together with mints at Exeter (1643–6), Truro (1642–3), Weymouth/Sandsfoot Castle (1643–4) and in North Devon where the precise location of the Lundy and Combe Martin mints has to be determined. The local availability of silver played an important part in the choice of Exeter and Bristol as mints to contribute to the great recoinage of 1696–8.

Thanks to the classic general corpuses of material (Dalton and Hamer 2004; Williamson 1970) and specific local studies such as for example in Somerset (Minnitt *et al.* 1985; Minnitt and Young 1990; Whittet 1986), there is a deal of work which has recorded and interpreted how token-coinage has contributed to our understanding of the minutiae of economic life in the region. Du Quesney-Bird (1970) has shown that a study of regular coinage can add further to our understanding of wider interactions. There is no synthesis which seeks to combine numismatic evidence with that of similar material such as bale-seals.

General Studies and Syntheses

Studies of material culture in relation to household units (such as Allan 2003) are rare. There are a few studies from the later period (Brears 1998; Turner 1947). Syntheses which bring artefact and documentary evidence together to examine consumption are also uncommon and rarely have a regional focus. Exceptions include Oliver Kent's unpublished PhD thesis, *Pots in Use* which uses examples from the South West to demonstrate ways in which this might be achieved (Kent 2005). More specialised examples include Brears (1991), on vessel use for storage and Richards (1999), on the consumption of ceramics in the 18th century. A number of studies of Devon pottery have been carried out by American researchers following up the archaeology of the eastern USA (for example Watkins 1960).

Large published groups of material culture are dominated by ceramic assemblages but the material

from the moat at Acton Court provides a generous cross-section of materials and artefacts from a single domestic context (Rodwell and Bell 2004, 294–408). The waterlogged 16th-century pits from 5–8 Fore Street, Taunton have also produced a range of finds including leather, textiles and metal work as well as pottery (Burrow 1988). Faunal analysis of these latter groups is also able to add information about diet and health.

Themed exhibitions and their catalogues often bring together material culture within a specific thematic context. Examples of exhibitions that draw attention to links between material culture and particular people, events and meanings include Bristol City Museum and Art Gallery's *Bristol and Transatlantic Slavery* (Dresser and Giles 2000), the Hidden Legacy's *The Jews of Devon and Cornwall* (Frielander 2000) and Somerset County Museums Service's *Farming in Somerset* (Walker 2001).

14.2 Identities

The following issues related to identities in the Post-Medieval period could be considered:

Regional

- Cornish. Considered by some as a national identity.
- Forest of Dean, which certainly seems to have a very distinct cultural identity in the 20th century.

National

- English/Welsh. The southern end of the Welsh border is within the region; is this reflected in differences in the archaeological record between Dean and Gwent?
- English/French. Perhaps not strictly relevant for this period – but earlier the concept of "England" and "France" as separate nations separated by the Channel was presumably still forming, and there are continuing links between Cornwall and Brittany.

Broader geographic/maritime

- Can we see elements of an "English Channel identity" along the southern seaboard, and/or of a "Bristol Channel identity" along the north western seaboard?
- To what extent does the region (especially the south-west peninsula) form part of a broader "Atlantic province"?

Social/religious/ethnic

- Gender
- Class identities (obvious at a crude level, but also more subtle differentiations)
- Are there identifiably-discrete local/occupational groups (for example fishing, industrial communities vs agricultural; distinct coal- and metal-mining communities)?
- Nonconformity, Puritanism, Anglicanism, recusancy
- Rural/urban (notably Bristol)

14.2.1 Evidence for identity

- Monument/site types. There is probably not much at this level, except for the few specifically-Cornish monument terms, but, perhaps, the surviving distribution of crosses, holy wells and similar?
- House types, especially internal use of space.
- Styles/extent/absence of decoration.
- Use of space in the landscape.
- Eating habits, for example styles of cooking, joints used, cutlery, eating from communal bowl/individual place settings – all recoverable to some extent from finds/animal bone/environmental assemblages.
- Other choices in artefact types, styles etc.

14.2.2 Existing work

- John Allan's work on Breton influence on house-types.
- The substantial literature on Cornish culture and its material manifestations.
- Dan Hicks' and Mark Horton's work on identities/communities in Bristol.

14.2.3 Historic Environment Records

As the site-identifier level, most HER records do not address this issue. Exceptions are the specifically-Cornish sites types in the Thesaurus, and the distribution of site-types such as crosses and holy wells, to the extent that this represents survival and continuing acknowledgement (and possibly construction within the period!) of these sites during the period, and conversely areas where the record/memory have been obliterated.

14.2.4 Identities in the Modern period

At the beginning of the 21st century, the concept that our historic environment is an important element in determining the identity of a community has become embedded in national, regional and local planning practice. From it has flowed the ideas underpinning "characterisation" of urban, village and rural landscapes using techniques drawn from historical geography and architectural history as well as landscape archaeology. What is as difficult as ever, is defining "community" to which an identity is to be attached when attempts are made to consider the individual person rather than the places where they live and work. An individual may consider themselves belonging to many communities and therefore having many identities.

Anthropological/archaeological studies of these identities help provide a way into analysing the manifestations of these identities. Some identities display themselves through specific insignia – the cross of St Pirran for Cornwall is a recent phenomenon – but some older symbols are remarkably prevalent, largely through 19th-century revival. The golden dragon of Wessex is widely used – most obviously in the arms of the County of Somerset and badge of the Army's former Wessex Division. Specific types of artefact are associated with many types of organisation, for example Friendly Society pole-head badges, chapel and trade-union banners, insignia of municipal corporations and religious communities (see for example, Fuller 1964; Frielander 2000). As individuals our identifiers tend to be language/dialect/accent and our material culture (see Section 14.1 on page 214).

14.3 Food Production

The South West has been (and still is) an important source of food products with major fisheries along its coasts and rivers and diverse farming landscapes ranging from the high moorland of Bodmin Moor, Dartmoor and Exmoor to the rich arable lowlands of east Devon and part of Dorset and Wiltshire. Archaeological coverage of farming and food processing industries in the South West, as in other parts of England and Wales, has been partial (Harvey 1980; Trinder 1993). Landscape archaeologists have, however, taken a keen interest in field systems. The study of the strip lynchets of Worth Matravers and their possible relationship to an open field system is a good example of site specific analysis (Hinton and Trapp 2002). English Heritage's Monuments Protection Programme has covered the minor categories of dove farming and ice houses (steps 1–4 completed) and some of the South West's Industrial Archaeology gazetteers and surveys have included agriculture, processing and support activities more comprehensively than in some other English regions.

14.3.1 Raised in the Region

The South West has some of the earliest farming landscapes in the country and many surviving features from the prehistoric, Roman and Medieval periods, but from the Post-Medieval period onwards agricultural "improvement" has been the dominant "shaping" force. Key features of this movement have been the enclosure of arable "open" fields by agreement or, later, by act of Parliament, and the enclosure and reclamation of waste or common land to extend the cultivated area. This was not an even or sequential process – open fields did not exist in some parts of the South West – but three continue to this day in north Devon (Braunton Great Field), Dorset (Portland) and Cornwall (Boscastle). Most, however, have been replaced by the larger rectangular fields of the successive waves of enclosure that have remained until recent mechanisation of arable farming favoured the removal of hedges and a return to larger fields – but without subdivision into smaller holdings as in times past (Taylor 1987).

The enclosure of former "wastes", moors, and the open downland of Wiltshire and Dorset was a response to increasing population and, in the case of downland, was facilitated by the introduction in the latter part of the 19th century of steam-hauled ploughing sets. Renewed enclosure and "improvement" of Dartmoor dates from *c.*1780 (Somers Cox 1970) and enclosure of the Mendip plateau began after 1770 (Williams 1971). The enclosure of the Royal Forest of Exmoor in 1818 and its subsequent "improvement" by Worcestershire ironmaster John Knight had the "most dramatic and profound effect" on the landscape: when sold in 1898, the estate had been provided with a network of roads, farms, fields, a village and a parish church, moorland had been drained and some converted to good pasture (Riley and Wilson-North 2001).

In lower-lying areas, attempts were also made to reclaim land that was frequently flooded. Plans to drain the Fleet in Dorset never came to fruition but much peatland has been reclaimed in Somerset; the oldest engine house to retain a working steam engine in Somerset has been preserved at Westonzoyland (Stanier 2003). Current arrangements followed the enclosure and drainage acts of the 18th century and early 19th century but many earlier attempts were made by the local monasteries and those who inherited their estates. Sea walls were also built on either side of the lower Avon valley near Bristol and a successful scheme was completed *c.*1814 to enclose some 1300 acres of land at Braunton Marsh in north Devon under the direction of the engineer James Green (Otter 1994).

Other features in the rural landscape include development of water meadows in parts of Dorset, Wilt-

shire and Devon to protect grass from frost and to encourage its early growth in order to maintain an increased number of sheep (Bettey 1977; 2000; Corfield 1978; Minchinton 1986; Ross 1994). On Exmoor and elsewhere, catchwater-leat (or field-gutter) systems were introduced widely in 19th century for similar reasons (Riley and Wilson-North 2001). Fast-flowing water was also controlled to produce watercress in lowland valleys in Wiltshire. On the moors, warrens were constructed and maintained throughout the period to farm rabbits (Minchinton 1986). Decoys were also constructed to catch ducks, that at Porlock, one of many in Somerset, is thought to date from the 18th century and was recorded before its recent submersion in a salt-water lagoon (Riley and Wilson-North 2001). Others at Abbotsbury (Prendergast 1984) and Slimbridge (Heaton 2001) survive.

Inland fisheries were another important source of fresh food. Fish was obtained from ponds and by way of extensive dams, weirs and fish passes on rivers (Dickinson 1987). Attempts to replenish stocks in hatcheries and rearing ponds such as those at the Exe Valley Fish-Breeding Establishment were in operation in the late 19th century (Strong 1889).

Changes in the farming landscape were accompanied by improvements in stockbreeding, crops and treatment of the soil. Major drainage schemes have been mentioned above but much heavy land was drained by provision of underground clay drain pipes or tiles in the later part of the 19th century, many of these produced in Somerset (Warren 1996). The most important soil conditioner in the South West was lime and this industry has left a rich archaeology that has attracted considerable attention. Kilns are located throughout the region and along its coasts, rivers and canals and their survival gives a vivid picture of the importance accorded to lime (Stanier 1993; Isham 2000). Later, "artificial" or imported manures, such as superphosphates and guano, were distributed to rural areas from the ports and manufactories in places such as Bristol. The local pattern of introduction of some of these has been studied from the traces recovered by fieldwalking at Shapwick (Gerrard and Aston forthcoming).

Farm buildings and surviving implements of this period constitute an important archaeological resource and, as Harvey observes, few other industries can show such a comprehensive series of buildings with which to illustrate their past (Harvey 1980). Minchinton (1986) included traditional farm buildings in the final edition of his Industrial Archaeology guide to Devon; the first of the four editions to include "agriculture" as a category. Whilst some traditional buildings, such as the longhouse, were still being built in the early Post-Medieval period, most surviving farm buildings date from the long period of improvement which began *c.*1680. In arable areas of the South West, the most distinctive building is the corn barn which has been adapted to meet the changing technological needs for the storage and processing of the crop before the age of the threshing machine and combine harvester. The tall barn that accommodated manual threshing and winnowing was gradually changed in the early 19th century to house threshing machines driven by horsewheels and, later, by fixed steam engines on larger farms. The "roundhouse" and farm engine house are distinctive features of this transition (Stanier 2002). When corn was processed in the yard or field, the barn continued in use for storage until replaced by more specialised structures such as silos or Dutch barns.

Other surviving buildings include granaries, poultry houses and the distinctive dovecots, which were sometimes situated away from the farmyard. The dovecotes of Somerset have recently received detailed coverage (McCann and McCann 2003). Crops and milk were originally processed on the farm. Dairies are perhaps the most common survivals, as is equipment for making cider. Some small malthouses and breweries also survive (Slocombe 1989). Detailed archaeological and architectural surveys of farmsteads have been carried out in East Cornwall (Barnwell and Giles 1997).

Increased use of the horse, and the introduction of more expensive carts, waggons and implements, led to the construction of specialist sheds and stables. Further changes have been made to accommodate tractors and larger harvesting equipment introduced during and after the Second World War. In the 19th century, major changes were also made to house and feed livestock and to the layout of the farmstead, reaching a peak of development with the "model" and "industrial" farms of the later 19th century, the era of "High Farming" (Wade Martins 1991; Harvey 1980). Further mechanisation, industrialisation and a period of recession and restructuring of agriculture in the 20th century saw the end of local traditions of farm building and the use of larger, prefabricated units.

Wade Martins (2002) has provided a synopsis of model farms by county. Examples in the South West include the home farm for the Longleat estate in Wiltshire (1860), powered by a 16hp Clayton and Shuttleworth horizontal steam engine, and Eastwood Manor Farm in Somerset of 1850 which included a stackyard tramway and a 27ft waterwheel to drive machinery. This elaborate farmstead had two covered yards with flanking buildings for livestock and was designed by Frederick Knight's Exmoor agent, Robert Smith. The farm buildings of the Knight's on Exmoor have been covered by Wade Martins (1991) and Riley and Wilson-North (2001).

14.3.2 Imported and from the Sea

The growth of the railway network and development of the steamship brought cheap, imported food to the South West and the construction of port facilities, warehouses, icehouses and depots, including Second World War and Cold War storage depots, to handle these imported supplies. The extensive coastline of the South West also provided for an important offshore sea fishing industry. Most of Cornwall's coast has been engaged in the pilchard fishery (Noall 1972) and the later offshore drift fishery. Apart from surviving craft, the structures for the support of the fleet and reception/packing of the fish constitute the archaeology of this industry (Kittridge 1989). The study of fish cellars in St Ives is a good example (Newall 2005). Dorset and Devon have had a long association with deep-sea fisheries and facilities for the landing, sale and dispatch of fish survive at Brixham, Sutton Harbour in Plymouth and Weymouth (Rule 1976). The inshore fisheries of the Bristol Channel have left their own distinctive traces for example in the fish traps of Minehead Bay and further up the Severn.

14.3.3 Food Processing (off farm)

The growth of the railway network also stimulated the belated industrialisation of off-farm food processing, one of the last major industries to experience an industrial revolution (Trinder 1993). The subsequent development of motor transport and the modern road system and a "retail revolution" has accelerated this trend. Wind and water mills in the South West constitute some of the earliest processing plant and have received much attention from industrial archaeologists, but more as a source of power than for their role, as grain mills (Addison and Wailes 1963; 1964; 1969). A number of tide mills, also, were once worked in Devon and Cornwall (Minchinton and Perkins 1971). The later transition to steam and electrically-driven roller mills and their concentration in the ports has received less attention. Bread and the baking of biscuits and cakes was, apart from that carried on at the Royal William Victualling Yard in Plymouth, a small-scale operation for much of the 19th century. Many of the small neighbourhood units that are shown on the Goad insurance plans have gone unrecorded but some early steam bakeries survive (Chitty 1971). Many of the larger plants put up in the inter-war years in places such as Bristol have come and gone without much attention from the archaeologist.

The railway provided a major boost for the South West's dairy industry and enabled fresh milk, cream and cheese to be taken to London and to other large cities. One area to prosper in this way was the Blackmoor Vale, and the dairies in and around Gillingham profited greatly from the opening of the railway to London in 1859. There was also a large creamery at Sturminster Newton which closed in 2000 (Stanier 2002) as did another large plant in Torrington. Other creameries were established in Yeovil, at Castle Cary station, Ansford and at Evercreech in Somerset (Stanier 2003). Former textile factories in Chippenham and Staverton were taken over by the Anglo-Swiss Condensed Milk Co, later Nestlé Ltd, for milk processing. Wiltshire is also well known for its bacon manufacture, pigs being fattened on the by-products of cheese making. Harris's of Calne began as a butchers dealing in Irish pigs being driven to London by road and expanded its operations by use of cooling technology to become one of the UK's largest curers. In Trowbridge, bacon and meat industries also took over old textile plants (Corfield 1978). There is much scope for further study of bacon and meat trades in the South West.

Food industries based upon imported crops were also significant. Bristol was a major centre of the sugar-refining industry from the 17th to the 19th centuries and some traces of this survive. Cocoa was also processed in the city's confectionery plants (J S Fry and Sons was probably the first chocolate firm in the world) until the industry was moved to a modern factory in Keynsham (D Jones 1996; Stiles 1969).

14.3.4 Beverage Production (off farm)

The production of alcoholic and soft drinks was mainly locally-based until the 20th century when a period of concentration led to the closure of most South West plants. The major raw material for brewing, beer vinegar and for distillation of spirits is malted barley. Malting has been a specialist trade throughout the period and malthouses were located in most larger villages and towns across the region. A number of these survive but only two of the old floor maltings (in Newton Abbot and Warminster) are currently working. Brewing was a domestic or small-scale industry for much of the period. Larger brewhouses were introduced in the towns from the 16th century with larger-scale commercial breweries developing in the latter half of the 18th century, employing horse and, later, steam power. Brewery construction peaked in the late 19th century and many towns and the larger villages throughout the South West have remains of this era. The last large breweries to close were the Bristol Brewery, the Dorchester Brewery and Ushers in Trowbridge but breweries are still at work in St Austell, Bridport and Blandford Forum and brewing has recently returned to the old Wickwar Brewery. Breweries and maltings await comprehensive survey but studies include those of Bath (Bone 2000), a small malting at Halse (Miles 1989) and a detailed record of the brewhouse and later malting at Haven Banks, Exeter (Parker 2003).

Some of the first large-scale businesses in the drinks trades were the malt distilleries which made spirit to be later rectified to produce gin. Bristol's last distillery – there were many in the 18th century – closed in the 20th century but the Plymouth Gin Distillery remains in business and has some historic equipment (Minchinton 1986; Gaskell Brown 1980). In times of dearth, spirit was also distilled from molasses. Bristol was also a major centre for vinegar brewing and distillation but little is known of this trade. Cider has provided an historic alternative to beer in the South West and has been produced on a small scale throughout the region. In the early 20th century, some larger cider and perry plants developed, at Norton Fitzwarren, Shepton Mallet and Wickwar, where the former brewery was so-employed (Stanier 2003). Farmhouse cider continues to be made and equipment is displayed at Sheppy's Cider Centre near Wellington. Many breweries also produced non-alcoholic or soft drinks and many small firms also specialised in this trade in the 19th century (Edginton 1976). The equipment of the Bath manufacture, JB Bowler, has been preserved and displayed at the *Museum of Bath at Work*, together with equipment from his engineering business (Andrews 1998).

14.3.5 Distribution and Support Services

Whilst our knowledge of the archaeology of the food and drinks trades is limited, we know even less of the distribution and support services that were an essential part of the organisation of these trades. Warehouses and bonded stores have been noted in studies of ports but little has been done on such features as brewers' depots and bottling stores or food packaging plants. The manufacture of packaging and containers such as glass bottles, once important industries in the Bristol region, have been similarly neglected. The South West is well known for its distinctive covered markets and many are recorded by Schmiechen and Carls (1999). Pubs have also been the subject of a recent national study (Brandwood *et al.* 2004). The development of agriculture and food processing has been supported by agricultural societies and the Bath and West has been studied; once itinerant, it now has a permanent showground at Shepton Mallet.

14.4 Rural Settlement

14.4.1 Agricultural settlements

The main pattern of rural settlement, dispersed hamlets and farmsteads in Devon, Cornwall and other isolated parts of the South West such as south-east Somerset (Taylor 1983, 175) and villages in much of the lowland areas of the eastern half, is inherited from the Medieval period. Further colonisation/enclosure of woodland and downland was accompanied by new dispersed farmsteads (Taylor 1983, 206–7) and in some cases by entire new villages such as Simonsbath on Exmoor (Taylor 1983, 225). Some landowners reordered their villages into more regular settlements from the picturesque like Blaise Castle Hamlet (1810–12) and Selworthy Green (*c.*1850) to the more staid like Treslothan (1841), Dartington (1920s), Canford Magna (1850s), Hatherop (1860s) and Talbot Village (1850s–60s) (Darley 1978) or took a cheaper option of remodelling the facades to produce an air of conformity as at Hinton St George (Rowley 1978, 172). Similar in concept are the villages established as utopian model settlements – most notably the Moravian village of East Tytherton (1745) and proto-hamlet at Kingswood (1745), the failed Chartist colonies at Snig's End (1847–53) and Lowbands (1846–58) and the Tolstoyan Whiteway colony (1898).

There are small-scale new settlements in the 19th century which are the result of piecemeal enclosure of marginal land: New Moreton is an example (Taylor 1970, 155). In the 20th century, to meet housing shortages, many villages have had extensions of council and estate housing, often as estates discreet from their parent villages, such as Battleton outside Dulverton and Avebury Trusloe outside Avebury. There are also examples of caravan parks becoming established as permanent settlements in the period after the Second World War; Pathfinder Village west of Exeter is probably the earliest in the South West.

Overall, there is relatively little systematic archaeological survey; unfortunately, programmes such as that started by the CRAAGS never reached fruition.

14.4.2 Industrial Settlements

Some settlements grew because advantages were created to exploit a particular resource. Rowley cites the ribbon development of Curload along the newly canalised Tone as being established to exploit opportunities for planting new withy beds (Rowley 1978, 140). More common are those settlements specifically planted to house the workforce for extractive industries especially in Cornwall (Halsetown and the ports of Charlestown and Portreath) and the coalfields of Gloucestershire and Somerset (such as Watley's End, Engine Common). Some of these especially the more isolated centres of activity such the Brendon Hill village associated with the iron mines have almost totally disappeared (Riley and Wilson-North 2001, 145). Further model settlements are associated with particular industries (for instance, Champion's brass works at Warmley in the 1760s or Clark's leather manufactory at Street from 1829). The prison on Dartmoor has Princetown. The armed forces have been the most prolific producer of new and enlarged settlements, Bovington for example, as well as the

cause of the depopulation of villages like Imber and Tyneham.

Transport developments have also stimulated new settlements: canals (Sharpness, Westport near Hambridge, Brimscombe Port), turnpikes (Cowesfield Gate) and railways (especially the London and South Western Railway's habit of establishing junctions in the middle of nowhere, such as, Halwill Junction, Seaton Junction, South Chard).

Again there is little systematic archaeological survey with the notable exception of the Cornish Industrial Settlements Initiative which has published surveys of over 50 settlements across the county (see http://www.historic-cornwall.org.uk)

14.4.3 Buildings

Houses of the "Great Rebuilding" have probably received the most attention with detailed surveys and studies, such as those by Hall (1983), in what is now South Gloucestershire, and Penoyre (2005) in Somerset, and valuable fieldwork by dedicated groups such as the Somerset Vernacular Building Research Group. There are also good case studies of farms in particular areas such as Exmoor (Riley and Wilson-North 2001) and individual types of building such as dove-cots (McCann and McCann 2003). There is a relative sparsity of work related to the 19th and 20th centuries.

14.5 Urban Settlement

The South West offers a rich pattern of urban settlement and substantial potential for future work. In 1972, the Council for British Archaeology identified no fewer than 188 such places in the region (Heighway 1972) and highlighted the scale of the risk to archaeological evidence. The majority of these places are small in scale and confined to the agriculturally richer lowland areas or the coast. Research by historians and historical geographers in the 1950s and 60s set the general tenor of our understanding of urbanism in the South West (Hoskins 1954; Millward and Robinson 1971; Finberg 1975).

14.5.1 Urban Growth and Change: 16th and 17th Centuries

There are the examples of town centre rebuilding and infilling from many places such as Bristol, Exeter, and Poole and the building of new suburbs such as Sherborne Newlands and Frome. There were even new towns founded, notably Falmouth (1613/1660) and Devonport (1695), as others declined, often for no apparent reason (Aston and Bond 1976, 130–2). The impact of the Civil War in stimulating the building of defensive works and the impact of the course of the war is discussed in Section 14.12.1 on page 244.

14.5.2 Towns in the Industrial Era: 18th and 19th Centuries

The period is characterised by the expansion and increased industrialisation of many market towns and larger settlements. Bridgwater, Bristol, Exeter, Truro, Wimborne Minster and Totnes are a few examples out of many. Some came to be dominated by single industries: Stroud and Bradford-on-Avon by woollen manufactories, Tavistock and Camborne/Redruth by mining. A few, like Bristol and to a much lesser extent Exeter and Gloucester, grew to be major industrial and commercial centres, partly based on their ports – their importance as nodal points in the increasingly complex transport networks giving them even better access to raw materials, labour and markets. Other successful market towns and ports individually developed a remarkably broad agricultural and industrial base which has only been eroded since about 1950. Their prosperity is reflected in the quality of their rebuilding – a particular instance being the rebuilding of Blandford Forum after the disastrous 1731 and earlier fires. Not all succeeded, some, as described graphically by Hoskins (1954), dwindled into sleepy backwaters. Milton Abbas was even removed wholesale between 1771 and 1790 to a new model village.

This too is the era when ideas of urban design come to be applied on a large scale. The major spas of Bath and Cheltenham provided a grand canvas for such ideas as urban terraces, squares and crescents which can be seen imitated in the new seaside resorts of the late 18th/early 19th century (such as Exmouth, Weymouth, and Sidmouth), and also realised in contexts as different as the model town of New Swindon (for the Great Western Railway) and the Bedford estate at Tavistock.

There are also many good examples of later 19th-century thinking: villas as in Torquay, the picturesque as in Lynton and Bournemouth and growing influence of the garden-city concept, applied in places as modest as Street and Glastonbury and later influencing the development of suburbs such as Sea Mills in Bristol. This was the time of growing municipal power and awareness. Local government was reformed to oversee and often provide everything: health (sanitation, public baths, clean water supply, hospitals), education, transport, utilities (gas, later electricity) and leisure. Even places as small as Lyme Regis and Beaminster had their own gasworks and Taunton boasted the first large-scale electric town-lighting scheme.

14.5.3 Towns in the 20th Century

The Planning Age

The application of concepts of planned zoning and sectors from 1905 has had a profound effect on urbanism. Larger scale industry was already moving

out of cramped inner urban areas to new locations on the periphery of cities and towns (Fry's removal from the centre of Bristol to Somerdale at Keynsham, for instance) and the century saw the growth and proliferation of industrial estates, Avonmouth being one of the earliest and eventually the largest in the region. It is probable that the development of electric tramways helped shape the form that rapid urban expansion took, especially in the case of what is now the Poole–Bournemouth–Christchurch conurbation as well as more established cities such as Bath, Bristol and Exeter. Planned housing with the semi-detached house replacing the terrace as the norm demanded ever increasing amounts of land. The pressure on boundary extensions, leading sometimes to the amalgamation of settlements (such as Plymouth and Devonport in 1914), grew and was steadily accommodated until the whole issue was side-stepped by the local government reforms of 1974. The process of zoning has also influenced the way in which towns expanded; the peculiar shapes of Taunton and Bridgwater are determined by mineral extraction licences. By the end of the century even the smallest and dreamiest of Hoskins' urban settlements was pressured into expansion to accommodate new housing for the ever increasing population of the South West.

War

Plans for the redevelopment of most of the larger towns and cities were prepared and adopted in the 1930s. The emphasis lay on renewing the central business district, removing industrial activity to new peripheral locations and clearing sub-standard housing and its replacement in new spacious estates. In many of these plans, there is a curious disregard of the individual character of a particular urban centre and thereby the topography, buildings and other features that comprise its historic heritage. Damage during the war provided the opportunity post-1945 to apply these principles to the whole of the centre of Plymouth, to the Broadmead area of Bristol and the High Street area of Exeter and later in smaller doses to the many other towns.

Traffic

The post war period is characterised by continued change driven by a circle of ever growing population, greater fluidity in working and greater mobility. The motor car which was seen as a vehicle for delivering the prewar concepts of segregated activity can also be seen as an agent for the destruction of so much of the historic fabric of towns: road-widening schemes, pedestrian zones, car parks. Archaeologically, little attention has been paid to the agent or this process. The petrol-station has yet to be studied in the same way as the public house.

What has disappeared is the fine grain of many of our towns: the outbuildings behind the architecturally grander main street frontages, anything ramshackle or industrial in character and most startling of all whole swathes of modest terraced urban housing condemned as "slums" and "insanitary". There is now a huge acreage of undeveloped brownfield sites in the South West mostly representing sites of earlier urban activity of this period.

14.5.4 The Archaeological Response

Urban buildings

The Royal Commission on the Historical Monuments of England (now English Heritage) led the way with recording buildings. The volumes covering Dorset (the only county to be completely surveyed in the traditional comprehensive way in the South West) record, for example, Blandford Forum (RCHME 1971, 16–40) and Poole (RCHME 1970, 189–240). In addition, there are individual studies of Salisbury (RCHME 1980), of the Trinity area of Frome (entirely devoted to a Post-Medieval suburb, Leech 1981a), and of the Railway Village at Swindon (Cattell and Falconer 1995). In addition there is a growing but unquantifiable number of reports and records of individual structures usually commissioned prior to demolition or refurbishment amongst which there are those that relate to this period. In a few rare instances they are published, such as, Christmas Steps, Bristol, but in many cases of full archaeological activity on a particular site it is common to find that structures of this late period are not mentioned at all or just mentioned in passing (for example, the model dwellings for the Poor at St Bartholomew's Bristol in Price and Ponsford 1998). Buildings have been recorded in places such as Exeter but few have been published although this is changing, (see for example Parker 2001; 2004). It is perhaps, therefore, not surprising that there are few published syntheses such as Michael Laithwaite's study of 16th- and 17th-century houses in Totnes (Laithwaite 1984) and no such work from an archaeological viewpoint.

Urbanism

Since the CBA report (Heighway 1972) there has been a great deal of archaeological activity in towns. There are good studies of the archaeological potential of small towns across substantial parts of the region, for example, Avon (Leech 1975), Somerset (Aston and Leech 1977) and Dorset (Penn 1980) and more recently the English Heritage *Extensive Urban Surveys* of many parts of the region (see Section 1.2.4 on page 11). However, these are primarily designed as planning tools and secondarily as statements of archaeological analysis and in this are unwittingly fettered by the concepts, structure and processes of modern planning law. Rarely, as in the case of the EUS studies,

is the attempt made to address the whole archaeological spectrum rather than considering urban sites only up to and including the Medieval period.

There has been much excavation and recording especially in towns known to be significant in the Post-Medieval and Modern period such as Bristol, Exeter, Barnstaple, Poole, Bath and Gloucester. Some of the pioneering excavations of Post-Medieval archaeology have been in such places (for example Barton 1964). However despite all the fieldwork carried out, the situation seems little changed from the reported position in 1987 and there seems to be little evidence of the application of the research priorities suggested then (Davey 1987, 69–70). The English Heritage *Urban Archaeological Database* project (see section 1.2.4 on page 11) may address some of these concerns, although they mostly have a cut-off date in the 18th century and only Bristol and Bath are nearing completion of the assessment of the development and significance of those cities.

Relatively little of the work relates to the Post-Medieval and Modern period and of that relatively little has been published. Many such as James Deetz have argued that the added perspective that archaeology brings to urban studies is essential (Deetz 1993, 159–163). This applies more so now that our understanding of urban places is so dependent on their analysis as places of spatial activity within a temporal context. It is clear that good archaeological fieldwork furnishes evidence for the kind of fine-grained study that is being applied to places as diverse as Roman Pompeii and the slums of New York and Melbourne (Laurence 1994; Mayne and Murray 2001). Here archaeological evidence complements and often allows new readings of the evidence of standing structures and documents. Work is being done that points the way: Roger Leech's detailed analysis of the buildings and records of the St Michael's precinct in Bristol and Oliver Kent's comparative analysis of two pottery groups from Bristol and Exeter both pose a series of questions that archaeology can address (Leech 2000), Oliver Kent pers. comm.). Both demonstrate that there is much valuable evidence that needs putting into the public domain if the investment already made is to be properly realised (see also Section 14.6).

14.6 Designed Landscapes

14.6.1 Rural

Agricultural

Issues here include the consolidation of open fields, pre-parliamentary enclosure of arable land, enclosure of waste and uplands, parliamentary enclosure, smallholdings, model farm complexes. The so-called 20th-century "prairie" landscapes may not be too far away from the open fields of the Medieval pattern.

Parks

Much work has been done on designed parks and gardens but the majority of this has been by documentary study, for example comparing the Repton Red Books with known, unascribed existing garden plans (Bond 2000; Harding and Lambert 1994; Mowl 2002). Apart from the excavation of No 1 The Circus, Bath no excavation work has been carried out.

Forests and National Parks

There has been extensive new planting, particularly following the establishment of the Forestry Commission after the First World War; the first of the Commission's plantings was in the South West at Eggesford Forest, Devon, on 8 December 1919 (http://www.forestry.gov.uk). The years after the Second World War saw the creation of "designed" access for visitors; maintaining a supposedly "natural" beauty in areas such as Dartmoor, Exmoor and the AONBs.

14.6.2 Urban c.1540–1920

Urban planning

Many Medieval towns were extended – mostly in the first instance using traditional Medieval suburban forms: narrow burgage plots lining linear ribbon development (such as in Somerset: East Reach, Taunton; Lyewater, Crewkerne; Garston Street, Shepton Mallet and possibly Bow Street, Langport) or more ambitiously using planned grids of streets as exemplified by the Trinity district of Frome (Leech 1981a). In the 17th century, the traditional Medieval row was transformed first into a regular street form as in New King Street, Bristol (laid out in the 1650s), and shortly afterwards in mid-century using new materials, principally brick and pantile, into the Classical terrace and the new planning form – the square – St James Square (1707) in Bristol, and Castle Street (1723) and King Square in Bridgwater are good examples.

In the 18th and 19th centuries, these new forms were not only applied to the polite face of our towns and cities – Cheltenham, Bath, Clifton and Exeter – but to the burgeoning suburbs for the rapidly growing workforce such as Russell Town and Somer's Town in Bristol and the Kingsmead and Beechen Cliff areas of Bath (all swept away since 1970 without any systematic record). There are relatively few detailed analyses of the development of individual suburbs, of how earlier field patterns and rural settlement were moulded into a new suburban environment. The architectural and historical study of the development of Westbury Park, Bristol, from city-fringe rurality in 1835 to today's mixture of substantial villas, cottages and terraces through to detached housing together with places of worship, pubs and schools, is an excellent example (Bishop and Hurran nd).

A new range of public buildings and monuments was used to provide focal points in planning, such as the civic centres of Plymouth (all gone) and Devonport and the new Council House and remodelling of College Green, Bristol, though rarely (unlike on mainland Europe) were railway stations used in such a way. New roads such as Victoria Street, Bristol, were carved through the urban fabric to provide speedier access but the stations they serve do not provide the visual focus of attention.

Changing functions

The archaeology of the response to the many changes towns have undergone has hardly been addressed. The CBA Historic Towns survey (Heighway 1972) identified Sidmouth, Weymouth and Lyme Regis as particularly good surviving examples of the early development of seaside resorts – all from pre-existing settlements. Responses to changes in patterns of industrialisation of transport, manufacturing and agriculture and in particular in the 20th century the growth of the commercial and service sectors have had a significant impact on the growth and character of most towns in the region.

14.6.3 Urban from 1920

Early Planned Suburbs

A radical point of change comes with the Town and Country planning acts. Before this much development, even on a large scale, was field by field thus accidentally trapping an enclosure landscape particularly visible, at least on maps, in the areas such as that around Bedminster, Bristol. From 1920, discreet areas were set aside to ensure geographically separate development of industrial, commercial and domestic activities. The concept was further applied to replanning existing town centres though the opportunity to put them into wholesale practice did not come until after 1945 (see the pre-war schemes for Taunton and Bristol, for example).

Post Second World War Planned Estates

Some Extensive Urban Surveys (see Section 1.2.4 on page 11) were carried through to the late 20th century. Indeed some, for example, Filton and Avonmouth concentrated on these late developments.

14.7 Transport and Communications

The importance of the South West region since the Post-Medieval period as an industrial and trading area went hand-in-hand with developments in transport systems. As with other parts of this assessment, topography and geology have influenced the development of these and have provided plenty of variety in the surviving monuments. Land transport was often difficult in the far west in earlier times but proximity to the sea and navigable rivers provided ample opportunities to move goods by coastal shipping and river navigation. Bristol's historic role in the transatlantic trade encouraged the development of the UK's second largest port and many smaller harbours also had important overseas connections.

14.7.1 Roads

Roads Before Motors

The South West has examples of some of our oldest trackways and sections of Roman routes, such as the Fosse Way, are still in use today (Otter 1994; Cragg 1997). Road development was much influenced by varied topography and geology and as late as the 1790s travellers such as William Marshall commented upon the lack of wheeled vehicles in areas such as north Devon (Marshall 1796). Whilst many roads remained the responsibility of the parishes, it was the formation of the turnpike trusts that brought surfaces fit for wheeled vehicles and carried out numerous route improvements on the more-used routes. The Bath (1707) and Bristol (1727) trusts were amongst the earliest, the latter becoming the largest outside London, and both were employers of John Loudon McAdam, famous for his cheap and efficient road surfaces. Within the region, the most detailed surveys of routes have been carried out in Dorset (Good 1967), Somerset (Bentley and Murless 1985; 1987) and on Bodmin Moor (Herring *et al.* forthcoming).

Whilst most old road surfaces have been replaced and renewed over time, many of the other structures of the parish and turnpike eras have survived and have attracted more attention from archaeologists. Most obvious are surviving masonry bridges, many dating from medieval times and modified over the years to accommodate vehicles of greater width and weight, such as the Long Bridge at Bideford and that at Barnstaple (Otter 1994). Thousands of examples of more prosaic structures survive in the South West (see, for example, Jervoise 1930; Wallis 1974; Kentley 2005). Bridges did not span every stream, river or estuary and examples of fords and ferries have survived into the motor age (Kittridge 1989). Cuttings and embankments, often the product of the turnpike era, have had relatively little attention, unlike the South West's rare and fine examples of turnpike-era road tunnels, such as the 1832 Horn Hill near Beaminster (Eedle 1994). Many former coaching inns survive in the numerous cities and small towns of the region, although pub-closures and new routes have seen many close to customers. Many, such as those in Barnstaple, had extensive stables and grain stores to the rear of their elegant facades (Bone 1973).

The most visible and numerous survivals of the turnpike era are the tollhouses and milestones that still survive on many of the region's old roads. A number of studies of tollhouses have been made as many of these roadside dwellings were threatened by road-widening and traffic accidents in recent years and in many cases this has led to their protection (Kanefsky 1976). Milestones of this period also survive on many roads and there is now a national society to promote their study and conservation. A number of attractive direction signs also survive. There are fewer surviving vehicles from this period than from the early days of the motor age but significant collections are held at Bristol Industrial Museum and at Arlington Court in north Devon.

Motor Roads

Railway competition finished off much long-distance road travel and most turnpike trusts did not renew their legal powers in the 1870s. Major roads returned to local authority control until the growth of motor traffic encouraged central government to become involved via the Ministry of Transport of 1919. Government funding was hit by the financial crises of the 1920s but progress was made and few roads were not tarred by 1930. With economic recovery, the Trunk Road Act of 1936 intended to create a national system for through traffic and this was accomplished after further delays during World War Two. The most recent phase of road-building in the South West has involved the creation of by-passes, especially on tourist routes that were often congested in the summer months, ring roads and the building of motorways, in particular the M4 and M5 that cross the region E–W and N–S respectively.

New road schemes have created new civil-engineering features and many bridges have been replaced, widened or strengthened. Examples of significant viaducts are those taking the A30 through west Cornwall and significant suspension bridges have been built to cross the Tamar between Saltash and Plymouth and the Severn Estuary, the latter via the "old" (1966, Listed Grade I) and "second" (1996) crossings.

Many signposts on minor roads date from the earlier part of the last century, such as the cast-iron finger posts that have become increasingly vulnerable to damage. The motor age has also created a number of new structures to replace the old infrastructure provided by coaching inns and wayside pubs. These include parking areas, multi-storey car parks in larger towns (1925), garages, filling stations (from 1919) and motorway and trunk-road service stations. Train, bus and coach travel has also created depots and stables (for horse-drawn trams), power stations for electric trams, bus and coach stations. There were some fine examples of bus and coach stations in the South West, that at Barnstaple was opened by the borough in 1922 on the site of the old town quay and has now been conserved. Black and White Motors created their important coach station at Cheltenham in the 1930s – it was known as "the Charing Cross of the coach network" – with booking hall, snack bar, waiting and cloak rooms, cafes and offices for 50 clerical staff. The Bournemouth Bus and Coach Station of 1931 was built in reinforced concrete and was complete with ramps to assist arrival and departure of vehicles (Jeremiah 2004). Road freight depots were created by railway stations and, as long-haul freight took increasingly to the roads, close to the trunk and motorway systems. Many of these features are now being replaced – the Bournemouth Bus and Coach Station, once described as "the finest in the country", has been demolished – and have attracted far less attention than their turnpike-era predecessors. Motor vehicles and tramcars have fared better with many collections (such as Bristol Industrial Museum) and a number are owned and operated by enthusiasts who maintain a national register. A number of early cycles and cars have also been preserved, including some made in the South West in the early days of motor transport.

14.7.2 River Navigation and Canals

At first glance, the South West does not appear to be an important area for the study of river navigation and canals but its situation, topography and transport needs gave rise to a number of schemes that have left some significant remains.

Whilst much of the region is within easy reach of the sea, the River Tamar, the Bristol Avon, the Severn and the Parrett and Tone in Somerset were all important for navigation during the Post-Medieval and Industrial periods. In particular, Bristol's trading connections owed much to its links to the Midlands by trow and barge with the Severn navigable to Pool Quay near Welshpool (Hussey 2000). Powers had been granted as early as 1619 to make the Bristol Avon navigable above the tidal limit at Hanham and this was eventually achieved in 1727 when the first boat from Bristol reached the developing city of Bath and its growing stone quarrying industry (Buchanan and Cossons 1969). The Wiltshire Avon was also made navigable from Salisbury to Christchurch in Dorset in the late 17th century but this has left few traces (Corfield 1978).

The region also has the UK's first (Exeter, *c.*1560) and second (Gloucester and Sharpness of 1827) ship canals, the latter with its impressive docks in Gloucester dating from 1812–1890 and fine warehouses, the earliest of 1827. The Stroudwater Canal Company was formed as early as 1730 but was not completed

until 1779 and navigation was extended to the Thames near Lechlade by the Thames and Severn Canal of some ten years later. The Sapperton Tunnel on the summit of this canal was, when built, the longest canal tunnel in the country (Mills *et al.* 1992). An ambitious programme to restore these Cotswold canals is currently in progress. The most impressive canal restoration in the region has been the Kennet and Avon Canal (1816). Of particular note are, from Bath eastwards, Widcombe Locks at its junction with the Avon, the early Coalbrookdale cast-iron bridges in Sydney Gardens, Bath, Claverton water-powered pumping station, the Dundas Aqueduct at Limpley Stoke, Avoncliffe Aqueduct, and the flight of 17 locks at Caen Hill, Devizes (Corfield 1978; Cragg 1997).

Further west, the canals take on a different character from the grander "trunk" schemes in Gloucestershire and Wiltshire. The St Columb in Cornwall was built as two canals in the 1820s to carry sea-sand inland to improve the land. Like the Bude Canal of 1825, it was a tub-boat canal and employed inclined planes to change levels. More successful was the Liskeard and Looe Union Canal of 1828 which used 24 locks on its 6-mile route to the coast to carry granite and copper ore for shipment and return cargoes of coal and lime inland (Stanier 2005). Impressive structures of these waterways survive, in both restored and abandoned routes, and there is scope for further discoveries as at Nynehead on the Grand Weston Canal where James Green's tub-boat lift has been excavated by the canal trust. Many West-Country canals opened late and soon fell victim to railways, the Chard Canal, for example, opened in 1843 and closed just over 20 years later (Stanier 2002). A few examples of the boats and barges that used these canals survive, some abandoned in or near the waterways.

14.7.3 Railways

In his survey of the archaeology of railways, Richard Morriss comments on the immense volume of both the archaeological resource and research output (Morriss 1999). This is certainly true of the South West, with its variety of early mineral lines, Brunel's Great Western Railway main lines to Bristol, Exeter and Cornwall and a number of scenic cross-country routes and branch lines. The resource is therefore well known though, as with railways in general, not all aspects have received the same depth of coverage.

The pre-locomotive railway developed in the coalfields of the north of England but the problems of moving a bulky load across difficult surfaces to navigable waterways or the sea were the same in the South West and a number of these early lines were constructed in the region. The Branch Tramway (1812) in the Forest of Dean remained in use as a horse-drawn line until 1947 and has substantial remains (Mills *et al.* 1992). To the south of Gloucestershire, the "Dramway" took coal from pits to the east of Bristol to the Avon Navigation near Keynsham (Barber 1986). In Dorset, Fayle's Tramway was built in 1806–7 as a plateway to take ball clay from Norden for shipment on Poole Harbour at Middlebere Quay and some earthworks and stone sleeper blocks survive. On Portland, the Merchant's Railway of 1826 reached Castleton by a massive incline (Stanier 1989). The best-known of the Devon tramways is that of Haytor (1820) which used granite for its track (Ewens 1966). In Cornwall, the mining district around Camborne and Redruth was linked to the north and south coasts by the Portreath tramroad of 1812 and the Redruth and Chasewater Railway of 1826 which took minerals to Devoran (Barton 1966). In Bath, the entrepreneur Ralph Allen had applied northern railway technology to move stone blocks from his quarries on Combe Down to the newly-opened Avon Navigation in 1731 (Buchanan and Cossons 1969).

Richard Trevithick was a pioneer of steam locomotion but his first railways ran outside Cornwall. The first true steam railway to be opened in the county was that from Bodmin to Wadebridge, opened in 1834 and, since closure, adapted as a cycleway/footpath, followed by the Hayle railway in 1837. Steam railways replaced earlier systems, locomotives took the place of horse power on the Redruth and Chasewater Railway and a railway took over much of the route of the Liskeard and Looe Union Canal. However, the railway age proper in the South West began with the construction of IK Brunel's broad-gauge Great Western Railway (GWR) from London Paddington to Bristol Temple Meads, opened throughout in 1841. The line was soon extended to Exeter (1844) and Plymouth (by 1848) and linked with the Cornwall Railway when Brunel's Royal Albert Bridge over the River Tamar was opened in 1859. Other major routes were constructed by the Midland Railway, which gained access to Bristol by taking over the Bristol and Gloucester Railway, and the London and South Western Railway which extended its routes from Waterloo to Exeter and beyond some twenty years after the GWR's initiative. The railway map was completed in the later 19th and early 20th centuries with branch and cross-country lines, many of which were closed in the 1960s. In addition to these standard-gauge lines (the GWR was converted to this gauge in 1892), light railways, such as the narrow-gauge Lynton–Barnstaple (1898–1935) were built to connect with the national system. The South West also has some funicular railways, such as the Lynton Cliff Railway (1890), the Clifton Rocks Railway in Bristol (1893) and more recent examples in the resorts of Torquay and Bournemouth.

Many of the larger towns developed urban tramways in the later 19th century which helped

to ease congestion in town centres and also played a significant role in enabling the growth of suburban districts, as in trams where the transport entrepreneur Sir George White built his business empire upon tramways, early motor transport, urban development and, finally, aircraft manufacture at Filton in south Gloucestershire. Bristol's trams started in 1874, were converted to electric traction from 1895 and closed in 1941 when bomb damage interrupted power supplies. Other tramways in the former County of Avon operated in Bath and Weston-super-Mare (Buchanan and Cossons 1969).

Much of the literature on railways has, as Morriss (1999) observes, featured locomotives, rolling stock and company history. Likewise, preservation has concentrated its efforts on the "moveables" rather than the architectural and engineering infrastructure. The railways have left a rich heritage with surviving examples and traces of early tramways, cuttings, embankments, tunnels and viaducts across the region. Listed items have been recorded by Biddle and Nock in 1983 and the former's much-expanded gazetteer of 2003 (Biddle and Nock 1983; Biddle 2003). Many railway station buildings have been converted for other purposes in recent years and have been catalogued by Oakley in Dorset, Somerset, Gloucester and Wiltshire (Oakley 2001; 2002; 2003; 2004). The railway works and new town of Swindon is one of the most impressive survivals of the steam railway in the UK and has been recorded and interpreted in a Royal Commission/English Heritage publication (Cattell and Falconer 1995). Many of the less prestigious features of railways, such as goods yards and warehouses, have attracted less attention. Fewer remains survive of the region's urban tramways though examples of depots, stables and electric power stations survive in Bristol (Buchanan and Cossons 1969). National collections of locomotives, rolling stock and trams include South West examples and Swindon has a large railway museum ("Steam") in part of the old GWR Swindon works.

14.7.4 Shipping

The South West is a diverse area but has in common a significant maritime heritage; some of the UK's greatest sailors were born here, countless voyages for war, international trade, exploration and emigration started from its ports, and its coast and estuaries were hosts to a substantial coastal trade until the railway and, crucially, the lorry came on the scene. For most of the Post-Medieval period, Bristol was the Britain's second port. Only Wiltshire has no coast while Devon is the only English county to have separate north and south coasts. In recent times, past maritime greatness has been replaced by the rise of the coastal resort and the popularity of the western counties as tourist areas, creating new demands for maritime facilities and transport.

As with railways, shipping, voyages, ports and maritime facilities have received much attention from historians and archaeologists and most of the South West's ports, harbours and quays have been studied and recorded. Bristol and Plymouth have been the region's largest ports in recent times. Bristol's historic quays were at the heart of the city and the early 19th century saw the dockisation of these quays when the Floating Harbour was constructed under William Jessopp's direction. This has only recently been closed to commercial traffic but facilities for larger ships were developed at Avonmouth and Portishead in the later 19th century. Much of the Floating Harbour's civil engineering features survive as a leisure facility but development around its quays has threatened many dockside buildings (Lord and Southam 1983). Plymouth has an important fishing and naval tradition. Sutton Harbour's primacy was challenged by the development of Millbay Dock where Brunel carried out improvements to meet the needs of the new railways; mail and passenger traffic was established here and liners called until the 1960s. Much has been demolished but some historic structures survive in the modern marina and ferry port (Gaskell Brown 1980).

Many of the smaller ports of the South West have had important overseas trades in addition to their coastal business. In Dorset, Poole and Weymouth made use of fine natural harbours for their trade whilst Lyme Regis, with its historic Cobb of Medieval origin, and Bridport (latterly known as West Bay) had to undertake various schemes to keep their harbours open in difficult situations; all had an extensive North American trade (Payne 1953). In Devon, the rival ports of Barnstaple and Bideford in the north and Exeter in the south took advantage of sheltered quays on their river estuaries. All three developed important overseas and coastal trades and maritime features survive (Duffy 1992; Duffy *et al.* 1994).

Cornwall's maritime heritage is particularly varied and important. There are few beaches and coves in the county that have not seen some trading activity. Vessels were run aground on "Porths" to unload at low tide and float off when the tide returned. In this way, coal and lime were unloaded for use in local agriculture and general supplies delivered. As volumes increased, especially mineral and china clay cargoes, small ports were developed by construction of piers and basins as at Porthleven towards Land's End where the present harbour was completed in 1818. It was rebuilt and improved after storm damage in 1824 and purchase by Harvey's of Hayle in 1855 for use in the mining trade. Charlestown was developed by Smeaton 1791–1801 as a floating dock and handled copper ore and, latterly, china clay from the St Austell area. In addition to these coastal harbours, the Tamar

and Fal estuaries were also significant shipping places, there are numerous quays on the Devon and Cornwall banks of the Tamar (such as Morwellham and Cotehele Quays) and the deep waters of the Fal have been used to lay up ships during slack times. Many ports had shipbuilding businesses and Falmouth retains a large working yard and dock (Kittridge 1989).

In addition to these piers, basins and docks, the South West has many surviving examples of warehouses, bonded stores and customs houses – Exeter has a fine group at its historic quay which includes the Custom House of 1681 – and numerous survivals of the land-bound trades that serviced ships and their cargoes. The social archaeology includes premises for the welfare of seamen, such as Ilfracombe's Sailors' Institute and Bethel and the Bristol Sailors' Home (Kennerley 1994). Safety at sea has also produced its archaeology, the region having some historic lighthouses, such as the re-erected part of Smeaton's Eddystone lighthouse on Plymouth Hoe, and the Lizard, famous for its powerful light. Accommodation for lighthouse staff and coastguards also survives throughout the region (Minchinton 1986; Tarrant 1990).

There are many maritime collections in the South West, including the new maritime museum in Falmouth and the museum of Trinity House and its lighthouses in their depot at Penzance of 1866. A number of harbours in the region offer temporary or permanent homes to historic ships. These include Bristol, where the *SS Great Britain* is kept in the dock in which it was built and the steam tug *Mayflower* of 1861 is maintained in working condition, and Charlestown where historic sailing ships are based. There are many hulks of historic craft in South West estuaries and, offshore, a number of Modern wrecks that will yield important data on ships, trade and material culture on archaeological investigation.

14.7.5 Air Travel

The South West has a significant history in pioneering flight and in aircraft production, notably at Filton where Sir George White established his British and Colonial Aeroplane Company in 1910. Later, the Brabazon Hangar was built in 1949 for the first "jumbo" aircraft and wings for the Airbus organisation are now assembled here. Nearby is the Rolls-Royce engine factory which houses its historic collection in former engine test houses. The Bristol Aero Collection is also based at Filton. Apart from military and factory airfields, the region's largest civil facilities at Bournemouth and Bristol International airports have recently been expanded but retain earlier features. Bristol's original airport at Whitchurch served as Britain's main civil airport during the Second World War (Berryman 2006).

14.7.6 Pipelines

Long-distance pipelines have been built in the South West in the latter part of the 20th century to transport gas and oil and in Cornwall to transport liquid china clay to the dressing floors (Herring *et al.* forthcoming). An earlier pipeline system, that of IK Brunel's short-lived "atmospheric" system of traction for his South Devon Railway, has left some original pipeline (at Goodrington) and a number of pumping houses on its route. These were employed to remove air from the pipes to create a vacuum in front of the piston that was attached to the train (Hadfield 1967).

14.7.7 Communications

This is an exceptionally wide subject, which has developed particularly rapidly throughout the 20th century. Many of these developments were technical or equipment matters, which may be preserved in museums, but have not left any tangible monuments on the ground. A major challenge is the current exceptionally rapid development and convergence of both telecommunications services and computers together with the planned obsolescence and short in-service lives of the technologies.

The following attempts to identify some (but certainly not all) of the major milestones and concentrates on those which may have produced surviving sites or monuments or locations where major events in the history of communications took place. A number of military examples are quoted as the needs of defence have often driven the development of communications and associated technologies. It has not been possible to consider the telecommunications industry nor to provide a list of sources and references.

There do not appear to have been any systematic surveys of communications systems and their associated sites, although some individual sites and infrastructure have been recorded. A major exception is Cornwall, where much work has been achieved, particularly on early visual signalling, wireless, submarine cable and satellite sites.

Visual Signalling

Fire Beacons Fire Beacons have been used since the Armada days and between the mid-16th century and the 18th century this was the principal method of attracting attention and raising the alarm. Armada Beacon sites are known by tradition and place names but no systematic survey has been carried out.

Visual Signalling Stations During the Napoleonic wars shore-to-ship and ship-to-shore signalling stations were established along the coast. The typical setup was a signal staff (code flags, canvas balls and cones) and a temporary or permanent building for

the signallers. Some regional and national research exists but few sites have been assessed or entered adequately into HERs.

Visual Telegraphy The first visual telegraphy using shutters appeared from 1806 and in 1816 the Admiralty Shutter Telegraph from London to Plymouth ran thorough Dorset and Devon. Some ruined stations may still exist (such as Lambert's Castle in Devon and Blandford Camp in Dorset). The terminal at Mount Wise in Plymouth has recently been excavated and published (Watts, MA in JP Gardiner 2000, 282–285).

Coastal Lookouts and Harbour Signalling By the late 19th century the Coastguard Service was formed with a network of coastguard stations. These had flagstaffs used for signalling the weather forecast by means of tarred-canvas storm-cones. Little has been done to record the surviving remains along the coast, of which there are many. There are a number of lookout huts on estuaries and harbours where Trinity House and other Pilots waited for ships to enter harbour; these have not been fully researched. Harbour signalling may also include Semaphore signals, for example, that along the Avon Gorge for entry to the Port of Bristol. In Cornwall and South Devon, pilchard fishing and "huer's huts" used a unique system of coded semaphore signals by means of battens, paddles or gorse bushes to guide the seine boats to the shoals of pilchards. Safety flags on beaches and firing ranges might just also be included.

Lighthouses, lightships, lighted buoys and navigation beacons Some studies have been carried out, particularly in Cornwall. Air navigation aids and beacons are a huge associated subject, which has not yet been addressed. These include the special RAF radio navigation bombing aids used in the Second World War, which were developed at Boscombe Down.

Aviation Visual Signals Airfields displayed visual beacons and also used ground displays to warn aircraft of conditions before landing,such as the wind direction or, in wartime, whether the station had been attacked with gas. Approach path lighting, beacons and obstruction markers could also be included here. Air gunnery and bombing ranges often had ground markers to guide practising aircraft (such as the 3 recorded around Bridgwater Bay in the Somerset HER). In the Second World War, Royal Observer Corps (ROC) Posts were equipped with rockets to give warning of airborne or seaborne landings and later Totter rockets were used to indicate low flying raiders to fighters. Flares were used in some ROC posts to warn aircraft of nearby high ground ("Granite" flares).

Postal Services

Royal Mail stagecoaches and the Royal Mail are a theme that obviously develops throughout this period. A posthouse was established in 1637 at Charing Cross for the Western or Plymouth Road mail coaches. An Act of Parliament in 1657 fixed rates for sending letters and established the system for the British Isles. The first Mail Coach service ran between Bristol and London via Bath, on 2 August 1784. Coaching inns, with their associated stables and perhaps smithy, abound across the South West. The improvements offered by turnpike roads significantly reduced mail delivery times.

From the early 1800s, local post offices were set up but the first Crown Offices opened in 1854. Post offices and mail-sorting offices have often moved from their original buildings but many older letterboxes survive. To illustrate the scope of more recent activities, in 1948 Taunton Head Postmaster was responsible for postal and telegraph services in one of the 62 Postal and Telegraph Districts in the South West under a Regional Director in Bristol. His area covered 300 square miles of Somerset and included 108 sub post offices.

The first night mail train formed exclusively of postal vehicles was inaugurated by the Great Western Railway (GWR) on 4 February 1840, conveying mail for Bristol, Bath, Gloucester and Stroud. By 1846 the railways had taken over and mail coach services ceased, although a mail coach parcels service was reintroduced in 1887. "Ocean Mail" landing through Plymouth and the GWR Travelling Post Office trains picking up and dropping mail at speed (known from early OS mapping at Bridgwater) are examples of former postal services with associated infrastructure. The recent Royal Mail move from rail back to road transport appears to have resulted in some sorting offices and depots at railway stations being abandoned for more economic sites.

Other message carrying agencies include the railways and later carriers using motor transport. The Army even ran a pigeon service in 1940 but no infrastructure has survived. Extensive networks of Signals Dispatch Services and Air Dispatch Services were run throughout the Second World War, including in-flight pick-ups and drops of messages from Lysander aircraft based at RAF Westonzoyland.

Aural Signalling

This topic covers the traditional alarm bells, school bells and the ringing of church bells as a warning of invasion, through the use of foghorns, fire sirens and maroons. Even in the Cold War, air raid sirens and maroons were still used to give warning of imminent attack or the arrival of radioactive fallout. Some Army "Flag Stations" or establishments (such as Larkhill in

Wiltshire) fired a noonday gun or lowered a ball (for example at Plymouth) to give a local time.

Electric Telegraphy

Electric telegraphy by landline became feasible in the 1830s. In 1870 the previously privately owned inland telegraph system was transferred to the State and the Post Office took over the service with 1058 telegraph offices and 1874 offices at railway stations connected by some 60,000 miles of wire. Many village post offices had telegraph facilities and these are marked on OS 5th Edition 1-inch maps.

The railways were an early user of telegraph both for communicating between stations and as "block signalling" between signal boxes to control trains, which the GWR pioneered. The latter subject (including railway semaphore and colour light signals and signal boxes) is well documented although few, if any, appear to be recorded in HERs. Fire alarm boxes or pillars also used telegraphy techniques to report the location of the caller.

After the First World War, the use of Morse telegraphy by the Post Office declined and teleprinters came into use. Telegraph offices were then concentrated in towns (in 1948 Taunton District still had 59 subordinate telegraph offices).

The military followed the trend and established teleprinter links and networks; including the wartime Defence Telegraph Network or DTN. A DTN "Southwest Switch" was established underground at Box (Corsham) and at Cheltenham. This defence network was three times larger than the civilian network and elements survived until 1999. After the Second World War, an Army Telegraph "Tape Relay Centre" was established in protected accommodation near Boddington in Gloucestershire and was an important node the Commonwealth Army Communications Network or COMCAN.

Submarine Cables A submarine cable was laid from England to France in 1850. By 1858, the first transatlantic submarine cable had been laid from Ireland. Cable stations were established at Sennen, Treen, Porthcurno, Bass Point and Kennack Sands. Porthcurno is the largest cable station in the world and has a museum of submarine telegraphy. There are also cable landings in Dorset and Devon for cables to the Continent and Channel Islands and for trans-Atlantic cables at Weston-super-Mare.

During the Second World War, a Severn Defences submarine cable was laid connecting the gun batteries on Flat Holm, Steep Holm, Lavernock Point and Brean Down. After D-Day, submarine cables were laid to the Normandy invasion beaches including a cable from Swanage to Querqueville and Southbourne (Bournemouth) to Longues.

Telephony Telephony arrived in the late 1870s with telephone exchanges opening in 1879 including at Bristol. Some trunk lines connecting towns followed a year later and the Post Office trunk telephone system was opened to the public in 1895.

The first public call offices were established in 1886 and there is a significant number of Listed telephone boxes of the famous K series thought the region. Some Police, AA and RAC telephone boxes have also been Listed. After the liberalisation of telecommunications in the early 1980s, new operators have provided public telephone boxes but some of these have already disappeared (for example, Mercury Communications).

A hierarchy of interconnected "trunk exchanges" was set up in the late 19th century to which local exchanges were connected over "junction" lines. Even small villages had their own small manual telephone exchange, often sited within a post office or shop.

On 1 January 1912, the Postmaster-General took over the system of the National Telephone Company and, by the late 1920s, the country was divided into 14 telephone trunk zones with a Zone Centre in Bristol, which served the whole of the South West. Growth of the network in 1930s resulted in an additional Zone Centre at Plymouth with subordinate Group Centres at Penzance, Falmouth and St Austell. The Bristol Zone then served the Group Centres at Exeter, Barnstaple, Taunton, Minehead, Yeovil, Weymouth, Bridgwater, Frome, Devizes, Bournemouth and Chippenham. Cheltenham and Gloucester were connected to the Birmingham Zone. Some buildings may survive.

Automatic telephone exchanges appeared in about 1912 but the main trunk network remained manual until after the Second World War. The last local manual telephone exchange was automated in 1972. None of the "Strowger step-by-step automatic local exchanges" has been preserved. A significant number of telephone exchange buildings are still in use, including those that housed the small "Rurax" automatic exchanges introduced to provide services for rural communities. There is a range of standard GPO and BT buildings for such purposes but no surveys appear to have been made of these. Many are marked on the larger scale OS maps although the description "telephone exchange" appears to be used for most buildings shown, irrespective of their actual use.

In 1958 the first Subscriber Trunk Dialling (STD) telephone service was opened at Bristol. None of the pre-STD manual switchboards or Auto-Manual trunk boards of the initial phases of STD survive, although in many cases the buildings do. There is a splendid example of a GPO Manual Trunk Switchboard in the former Government War HQ at Corsham.

Some major exchanges were provided with underground protected switchboards for the "Emergency Manual Switching System": Taunton was an example. These were abandoned at the end of the Cold War.

The Post Office had a Regional Headquarters at Bristol with seven subordinate Telephone Areas in the South West. The Taunton Area was the second largest of these and covering 1700 square miles of Somerset, North Devon and parts of West Dorset. In the late 1930s an Area Headquarters, "Telephone House", was built in The Crescent in Taunton.

Line Transmission Systems The telephone system originally used open wire "aerial lines" on telegraph poles but increasing use was made of underground cables. A variety of poles from former trunk routes may still survive along main roads like the A30 or A38 (such as on the A30 at Windwhistle Hill near Chard). Local "open wire" lines using insulators on cross arms are becoming increasingly rare.

Underground cables were laid in ducts to reduce the effects of weather and other forms of damage but had significantly poorer transmission qualities. Ducts, joint pits and cable chambers normally continue to be used and the system expanded. Occasional manhole covers still bear the "Post Office Telegraph" name and there is a wide range of other surviving "street furniture" including distribution pillars and cabinets.

The use of "loading coils" inserted at regular intervals in both underground and aerial cables improved transmission significantly. This is an example where relatively simple technology significantly improved services but nothing visible remains. Occasionally cable loading "pots" may survive on former junction routes (for instance at Lillesdon in Somerset).

From 1915 onwards, amplifiers in "Repeater Stations" were used overcome the attenuation of overhead lines and, in particular, cables. Many repeater station buildings have survived (for instance Hamilton Road, Taunton was on the original London–Marlborough–Bristol–Tavistock–Plymouth route).

"Carrier systems", which allowed a number of speech channels to be carried over two pairs of wires, were introduced into repeater stations but additional repeater stations were needed; initially every 22 miles along the route (the one at Rooksbridge in Somerset on the A38 is about 22 miles from Taunton). The world's first 12-channel carrier cable for commercial traffic was laid between Plymouth and Bristol.

With the advent of coaxial systems in the late 1930s, both telephony and television broadcast circuits were provided but repeaters were now needed every 6–7.5 miles. Such cables were important in some Second World War radio counter measures (RCM). The site at Fairmile in Devon was specially connected to the GPO coaxial cable at Honiton for the "Meacon" Luftwaffe beacon jamming system.

Special repeater stations were established on certain routes to provide wartime diversity for key links and a semi-protected example survives near Stockland Hill in Devon. This was on the Salisbury–Exeter route and carried trans-Atlantic telegraph traffic. The next repeater was at Windwhistle Hill on the A30 near Chard.

Later fibre optic systems were introduced with vastly increased capacity. With the opening up of the market to competition from 1981, the first commercial network competitor to BT, Mercury Communications, commenced building networks by laying fibre optic cables alongside railway lines. More recently, Energis laid their communications fibres woven around the wires between electricity pylons, while other cables have followed motorways.

Microwave "Line of Sight" Although a "wireless" technology, these systems act in the same linear (as opposed to broadcast) way. In 1932 the first ultra-short-wave radio telephone link, used as part of the inland telephone network, was set up across the Bristol Channel, over a distance of 13 miles.

Immediately after D-Day the first mobile "line of sight" systems were used to set up telephone and telegraph links into the Normandy Beachheads from Prawle Point and Godingston Hill. The "Number 10 Set" equipment used the then revolutionary digital "Pulse Code Modulation" or PCM for the first time.

The introduction of civilian "line of sight" systems in the late 1950s provided alternative and cheaper circuits for the trunk network, together with TV broadcast circuits and military links. In this respect, microwave systems offered a survivable and high capacity alternative to the Post Office underground cable system. A spur from the Government "Backbone Radio System" ran from the Bristol Purdown tower via East Harptree and Heath Poult Cross in Somerset to Whitstones and Halwell in Devon then onwards to Plymouth and Cornwall. The distinctive lattice masts and buildings are still in use. Spurs connected TV transmitters to the network; for example, the Mendip Pen Hill, Stockland Hill or Caradon Hill transmitters. Increasingly, such links are being used by telecoms companies and private firms to provide cheap and effective point-to-point circuits.

Broadcast Communications The development of radio included the first over-the-horizon transmission (to the Isle of Wight) from Bass Point in Cornwall. The original wireless hut survives in National Trust care and is the oldest wireless building in the world. Marconi's wireless telegraph link across the Channel to France was established in 1901 and the first transatlantic wireless transmissions were made from Poldhu Wireless Station in Cornwall to Newfoundland.

Ship-to-Shore Wireless From 1908 onwards, ship-to-shore wireless stations were established including Bolt Head and the Lizard. In 1909 the Post Office acquired the Marconi coastal wireless stations but the Marconi Company retained its licence for its long distance stations at Poldhu and Clifden (Ireland). In the 1920s, ship-to-shore stations included a station at Devizes. As services expanded, a new transmitter site was built at Portishead, with the associated receivers and control at Burnham-on-Sea. The station was used by the Royal Navy in the Second World War. The advent of satellite systems brought an end to commercial ship-to-shore radio except for local port VHF systems. Operational Royal Navy radio stations are currently mentioned in the Defence Estates List at Penhale Sands near Newquay and Portland.

Transatlantic Radio Telephony The first successful both-way transatlantic telephone communications were established on 7 Feb 1926 and used a transmitter at Rugby with and a receiver at Wroughton, Wiltshire.

International Wireless Stations From about 1925 international "Beam Wireless" telegraph services were established with Montreal, Melbourne, Cape Town and Bombay. Stations included Dorchester (receivers) with the associated transmitters at Somerton. Bodmin transmitted to Canada, South Africa and Australia with the receivers at North Petherton. Some buildings survive. In the Second World War, the Army Wireless Chain operated a receiver station at Windmill Hill on Salisbury Plain with links from Accra, Pretoria, Nairobi and Belgrade.

Ground-air communications These include radio sites associated with airports and sites belonging to the National Air Traffic Control Organisation. In addition, most military airfields and radar stations should have associated remote transmitter and receiver sites. A defence site, currently in the Defence Estate Listing is situated at Queen Camel and serves RNAS Yeovilton.

Mobile Radio Communications During the Second World War the Home Office provided broadcast transmitters to enable instructions to be passed one-way only to police cars. An example was at Shapwick in Somerset. Radio systems were also provided for National Fire Service (NFS) Fire Forces. In the South West this would have included Fire Forces 16, 17, 18 and 19 but little is known of these systems.

After the war, the Home Office provided shared "Police and Fire Wireless Schemes" with the characteristic remote unmanned twin-mast hilltop "main station" sites linked by line and often wireless to "main controls" in police and fire stations, with "mobile outstations" installed in emergency service vehicles. A typical "multi-station shared scheme" might have 3 or more remote main stations on hilltops serving a county. These current schemes are being replaced by the Tetra System.

This Home Office infrastructure was used during the Cold War for the Home Office Emergency Communications Network (ECN) and also for the introduction of radio links for some Royal Observer Corps (ROC) posts. There was a Home Office Wireless Depot at Shapwick in Somerset providing police and fire users with maintenance services across Region 7 (see Section 1.2.3 on page 4) with a sub-depot at Tavistock for Cornwall and Devon. In 1967, as a result of the wide spread issue of personal radios and the introduction of "alerters", for retained firemen, the Home Office Directorate of Telecommunications (D TELS) opened its first maintenance unit at Bishop's Cleeve.

Other commercial VHF radio networks were set up including the Automobile Association Patrol network. More recently, "private mobile radio systems" have flourished. These include radio networks for taxis, local authorities, motoring organisations and public transport. Today "trunked radio systems" share a common infrastructure but provide services similar to those offered by private radio networks.

Cellular Mobile Telephony In the early 1980s, public commercial cellular mobile radio systems were introduced with the BT-Cellnet and Racal-Vodafone networks. The growth of these and competing networks is well-known. Mobile data systems followed and various packet radio systems. There have been rapid changes in the infrastructure of such networks and, in particular with the masts and base stations used on cell sites, which are now in perhaps their 5th generation. Some technologies had a short life span of months; for example the unsuccessful "Telepoint Service" offering users the ability to make calls, using a personal handset, when near a telepoint.

Mobile Data Services, not using the mobile telephone networks, are currently provided in the UK by three national licensed operators, while another provides an Automatic Vehicle Location (AVL) service. Mobile data services have their own distinctive masts. Increasingly mobile Internet access is being provided for roaming computer users by "wireless hot spots" in stations, airports or hotels.

Public Broadcasting Public broadcasting started in the 1920s and the BBC was set up by Western Electric, Marconi, General Electric, British Thomson-Houston, Radio Communication and Metropolitan Vickers. 1924 saw more expansion with the opening

of a relay station "5PY" in Plymouth on 28th March. A regional BBC medium-wave transmitter at Washford was built in 1933 to provide services across the South West. The building is Listed but the masts are not. This transmitter was also used for radio counter measures against Luftwaffe navigation aids after D-Day. Additional high power regional transmitting stations were also established at Clevedon and Start Point. The latter was used for Forces Broadcasting to the Allies after the Normandy Landings.

Short Wave HF broadcast stations providing overseas services included the BBC station at Rampisham in Dorset. In the Second World War the BBC installed a network of 61 low-power relay stations around the UK called "Group H". Another type of emergency transmitter site with mast survives alongside a Cold War emergency VHF broadcast relay station in Taunton.

In December 1955, the BBC started VHF FM radio broadcasting for the West of England and South Wales from a high power transmitter at Wenvoe, near Cardiff. VHF FM Broadcasting services from North Hessary Tor commenced in 1956. Local radio services were first transmitted from Bristol in 1969. The advent of commercial radio has allowed a large number of local radio stations to flourish.

Television Television service was first introduced to the South West from the BBC Wenvoe transmitter in August 1952. Major transmitter sites in the South West included North Hessary Tor, Stockland Hill, Caradon Hill and Mendip. Cable television services, including telephone and broadband services, are now available in some major towns, particularly in their built-up residential areas. These run in street ducting and have numerous roadside distribution cabinets.

Satellite Communications

In 1962 the Post Office Satellite Communications Station at Goonhilly Downs, built on the site of Dry Tree Radar station, in Cornwall began working. The first transatlantic signals were received there and the original dish aerial is now a Listed. The "hotline" between the US and USSR travelled via Goonhilly. A military satellite site of the Defence Communications Network (DCN) was set up at the former Second World War RAF airfield at Colerne.

Communications Intelligence sites

A number of wireless intercept stations were used during the Second World War. In particular, the RAF Y Service station at Strete in Devon played a significant role in intercepting Luftwaffe ground-air communications. The RAF Radio Counter Measures deployed to jam or "bend" the navigation beams used by the Luftwaffe used some 23 sites in the South West. During the Cold War, the Government Communications Headquarters (GCHQ) was moved to Cheltenham (1952). The "Composite Signals Organisation Station Culmhead" was built after the Second World War on the former RAF Culmhead Airfield for GCHQ. It closed in February 1999.

Automatic Data Processing (ADP) and IT

The vast scope of this subject precludes any in-depth treatment. Nevertheless, some mention is necessary for completeness. The advent of ADP resulted in a number of major data centres being set up in the South West. These include the Defence "Bureau West" at Devizes and a Debenhams' data centre in Taunton. The RAF Personnel Management Centre at RAF Innsworth was supported by a major IT system. It is impossible to catalogue the growth of this area and it may be necessary to concentrate on what, if anything, remains of the pioneering systems and the sites that contained them.

14.7.8 Conclusions

The study of communications does not appear to be a mainstream of archaeology and, even within the industrial archaeology sub-discipline, this does not seem to have been given any priority. While major undertakings like the BT and the BBC have excellent archives, the modern IT industry does not. The increasingly rapid developments, together with the planned obsolescence of modern systems, pose a real threat as equipment is scrapped and there is often little permanency of buildings, masts or other infrastructure. There is an enormous wealth of the communications heritage across the South West and many sites where pioneering work was carried out. If these are to be fully identified, understood and recorded for posterity, this subject urgently needs to be reviewed.

14.8 Technology and Production c.1540–present

In recent times, the South West has not acquired an "industrial" identity in the way that one thinks of parts of the North East and North West of England. Its geology and agricultural base have, however, produced at least two industries of international importance: non-ferrous metal-mining and woollen-textile production. Whilst these have pride of place, this large and diverse region has always had a varied industrial economy. Its people have also made an important contribution to technical progress and innovators, such as Thomas Newcomen, Richard Trevithick, Thomas Savery and Abraham Darby I, were born or worked in the region

The archaeology of technology and production has attracted significant attention from industrial archaeologists over the years but, as in other areas of this assessment, coverage has been patchy. Most of the industries referred to below have been noted in gazetteers but systematic recording, study and analysis is less evident. The MPP's coverage of the extractive and manufacturing industries that were important in the region is better than that of other manufacturing, processing and motive power categories in that programme (English Heritage 2002). Preparatory work for the World Heritage Site bid for mining landscapes in Cornwall and West Devon provided further stimulus for synthesis and study of this area. An extensive select bibliography (some thirteen and a half pages) forms part of the project and Greenwood's bibliography for the archaeology and industrial history of the South West is comprehensive for the period up to 1998 (Greenwood 1999).

14.8.1 Obtaining Raw Materials

The availability of raw materials has had a major influence on developments from the Post-Medieval period onwards. The absence of coal in much of the South West has undoubtedly hindered industrial growth in modern times. It has been worked in quantity in the Forest of Dean, north Somerset, Bristol and south Gloucestershire since Medieval times and less successfully in unlikely areas such as north Devon, but the nature of the deposits rarely justified large "industrialised" pits such as those of the Midlands and the North. The survivals have, however, often avoided frequent modernisation and large scale reclamation, and now constitute a varied and important archaeological resource (Cornwell 1983; Acworth 1991; Gould 1999). A shortage of local coal has encouraged use of alternative fuels such as peat on Dartmoor and shale extraction in Somerset and Dorset, where "Kimmeridge Coal" was quarried from the cliffs and supported salt and glass working in the 17th century (Crossley 1987). In recent times, the UK's largest onshore oilfield has been developed in Dorset at Wytch Farm.

The exploitation of the South West's rich geology has produced some world-class products and archaeological sites. Most significant have been non-ferrous metal mining in Cornwall and west Devon and the quarrying, mining and working of granite and limestone, primarily in Devon and Dorset. Whilst these areas are of major significance, other non-ferrous sites have been studied on Dartmoor, Exmoor and Mendip (Newman 1998; Atkinson 1997; Gough 1967).

Iron ore was also quarried or mined in many South West counties. Ore from Hengistbury Head in Dorset in the 19th century was sent via Southampton to South Wales (Popplewell 1985), as was that mined in the Brendon Hills in Somerset (Sellick 1970). Deposits in Wiltshire and around Bristol were smelted close to source at Seend and Ashton Vale but the most significant ironworkings in the region were those in the Forest of Dean where both mines and blast furnaces survive (Hart 1971; Mills *et al.* 1992; Hooper 1978).

Figure 14.1: *Wheal Betsy in the care of the National Trust on the western fringes of Dartmoor. A type of engine house once commonly found from Gloucestershire to Cornwall and a reminder of the rich mineral heritage of the South West and of how little is known and understood about the archaeology of its expoitation. Photograph: David Dawson.*

Granite quarries in Devon and Cornwall expanded rapidly in the industrial age and quarries, spoil tips and arrangements for handling and transporting the stone survive (Stanier 1985a;b; 1999). The South West is also famous for its limestones. There are numerous quarries in the "Isles" of Purbeck and Portland, the latter being dominated by the remains of its historic trade. Bath stone was also very important and extensive stone mines on Combe Down are currently receiving detailed study prior to stabilisation works. Less-prestigious limestones were quarried widely throughout the region for building and for burning into lime and numerous kilns survive. Sand and gravel were quarried and the latter also dredged

from river estuaries and the sea. Fuller's earth was mined and processed on an industrial scale at Odd Down in Bath (Perkins *et al.* 1979; Stanier 2000).

The South West is also noted as a source of china and ball clay. China clay has created some of the most spectacular landscapes in the region and a significant challenge to ventures such as the Eden Project that have sought to deal with this legacy. The industry has been centred in east Cornwall but is also found in west Devon. Ball clay has been mined and quarried in south and north Devon and Purbeck and has provided the raw material for important pottery industries in both counties as well as supplying a national and international market. The legacy of its extraction is much less spectacular than that of china clay and pits are much sought after for landfill (J Smith 1992; Strong 1889).

South West agriculture has also been a major source of industrial raw materials. The woods and forests of the region have provided fuel, wood for manufactures and bark for the tanning of leather by traditional means, once one of the UK's major trades. The Forest of Dean produced much oak for naval yards after 1688 and charcoal for the iron industry before coke smelting was firmly established (Hart 1971). Indigenous cattle provided some of the hides for the tanneries and the extensive flocks of sheep in Devon, Dorset and Wiltshire grew wool for a historic textile industry. Hemp and flax were once important crops in Somerset and Dorset until replaced in the last century by imported supplies.

Imported "industrial" raw materials have also been significant in the economy of the South West throughout the period. Silk and cotton were worked at a number of mills and Bristol obtained tobacco, cocoa and molasses from its extensive trading networks (Buchanan and Cossons 1969). Much timber was imported for shipbuilding and the building trade, as was much of the coal used in the region and most of its oil. These activities have left a heritage of ports, docks, warehouses, storage depots and timber yards throughout the region.

14.8.2 Processing Raw Materials

Whilst many of these raw materials went elsewhere for processing, much was processed locally. Attempts were made to carbonise peat for fuel in the late 1870s at Rattlebrook Head on Dartmoor and a naptha works at Shipley Bridge was supplied from the moor from 1846–50 (Minchinton 1986; Harris 1992). In Somerset, a retort survives at Kilve from an abortive attempt in the 1920s to extract oil from local shale (Warren 1996). A number of oil storage and distribution depots have been established at the larger ports in the South West in recent times.

Processing of iron ores has been mentioned above but the archaeology of the Forest of Dean ironworks merits further mention; its importance peaked in the 17th century and Guns Mill and Newent Furnace survive from this era, as do later coke-fired sites such as Whitecliff Furnace (1798–1810). The conserved remains of Darkhill Ironworks included the Forest Steelworks of David Musnet where problems in the manufacture of bulk steel by the Bessemer process were overcome. Parkend was a major industrial centre in the Forest with blast furnaces and tinplate works (Mills *et al.* 1992). A comprehensive gazetteer of charcoal-fired furnaces has been published and includes those in the region (Riden 1993). Other processing activities included an important arsenic industry in Cornwall and west Devon. Detailed surveys of the late 19th century works at Gawton Mine and the 1920s works at Devon Great Consols have been published (Pye and Weddell 1992; Pye and Dixon 1989). There is also the important brass, zinc and copper smelting industry in and around Bristol.

Whilst much stone was worked at the quarries, sawmills were established in many towns and ports as were smaller masonry yards in many towns (Stanier 1999). Limekilns and larger limeworks were once widespread throughout the region and have attracted much attention from industrial archaeologists over the past 30 years (Isham 2000; Leach 2002). Cement was also produced from local limestone at Lyme Regis (Draper 2001).

Local forest and woodland products were processed throughout the region as were imported bulk timber supplies. Estate and urban sawmills provided wood for local builders and manufacturers whilst logwoods were crushed for dyes for the local textile industry around Bristol and Bath (Day 1974). Tanyards existed in many market towns and the larger urban centres, those in Bristol relying also on hides from the New World. The tanyard at Colyton (and until recently that at Grampound) is a rare survivor. Flax, hemp and wool were prepared and worked in a widespread textile industry (Bone 1986). Important remains exist of the fulling mills, workshops and cottages employed in these trades in the Post-Medieval period, as do remains of later textile spinning, weaving and finishing plants. Detailed studies of the mills of Gloucestershire, Somerset and Wiltshire have been made and a study of the social archaeology of the South West industry has recently been published (Tann 1967; Rogers 1976; Palmer and Neaverson 2005). English Heritage has undertaken a preliminary survey of textile sites in the South West which has revealed a more-widespread industry than was previously thought to exist and this has provided a basis for further, detailed study (Williams and Stoyel 1999). One of the earliest textile factories in the UK was the Sherborne silk mill and the later industry in Somerset has recently been studied by a local group (Doble *et al.* 2001). Cotton mills were also established

in the South West but the Great Western Factory in Bristol was one of the few to work into the later 19th century and parts of this survive (Buchanan and Watkins 2001). Other agricultural-processing works, such as soap manufacture and glue manufacture factories were started in the larger cities such as Plymouth and Bristol (Gaskell Brown 1980).

14.8.3 Production of Capital and Consumer Goods

Whilst some of the above industries produced for retail sale, much of their output went to manufacturers of capital and consumer goods. Non-ferrous metal goods were produced in craft workshops throughout the region and, later, in larger industrial plants. The Bristol area is known for its brass-making which continued into the early 20th century, and for the production of lead sheet and shot (Day 1973; 1988). Copper goods for distilleries, breweries and other industrial plants were also made in the South West and iron and steel were forged, founded and fabricated throughout the region (Carter 2001). It is difficult to summarise the extent of this branch of manufacture and its remains vary from small, rural water-powered edge-tool works, such as that at Sticklepath in Devon, to significant sites such as Perran Foundry and Harvey's Hayle Works in Cornwall, the iron and steel shipyards and dry docks of Plymouth, Falmouth and Bristol, the galvanising works of Lysaght in Bristol and the once extensive crane and engineering works of Stothert & Pitt in Bath, part of which survives (Andrews and Burroughs 2003; Todd and Laws 1972; Ferguson 2000). Several small foundaries are also known from cities such as Exeter, producing domestic wares such as bronze skillets and pots, and also church bells (Blaylock 1996; 2000). There are similar sites known from towns such as Taunton (Blaylock 2000, 84–85) and an industry of regional dimensions has recently been identified based on the villages of South Petherton and Montacute in Somerset (Butler and Green 2003; 2006).

Brickworks were once widespread throughout the region as this material gradually replaced "vernacular" building materials such as cob and rubble-masonry from the later 18th century. The kilns and works were often short-lived in the larger towns as they were built to provide for a particular project or scheme and, in turn, themselves built over in the next phase of development. Larger works near good clay deposits using continuous kilns had a longer life but the concentration of the industry in the last century has seen many losses. The industries in Somerset and Cornwall have been studied and there are survivals in the former county of small and larger kilns (Murless 2000; Ferguson and Thurlow 2005). Dorset also produced large amounts of "sanitary" and architectural ware in its large industrial potteries. The manufacture of clay roof-tiles was important in Somerset but has now disappeared (Stanier 2002; 2003). Dorset also sustained its rural-craft industry in and around Verwood into modern times (Draper and Copland-Griffiths 2002). Other traditional potteries of note were those of north Devon and the Bovey Tracey area where both historic and modern features survive (Brannam 1982). There are still a few remnants of a once-important glass-making industry in the South West, such as excavated kiln-bases at Nailsea and Bridgwater. Another survives as part of a modern hotel complex in Bristol, which was a major centre of the industry in the South West (Witt *et al.* 1984) and has recently seen important further excavation (Williams and Jackson 2006).

It is only in recent years that locally-sawn timber has been replaced as a major component of a wide range of commodities ranging from brushes to furniture, vehicles and ships. Carpenters, joiners and wheelwright's shops were once widespread throughout the South West but have often gone largely unnoticed. The development of machine-made furniture, often employing American technology, developed from the mid-19th century and most of the large Shapland & Petter works survives in Barnstaple. This was built over an old shipyard, one of many around the South West coast. These old yards often had little fixed equipment but later docks for fitting out wooden ships constructed in North America survive at nearby Appledore (Strong 1889). Little attention has been paid to vehicle manufacture in the many smaller carriage works and the larger, industrialised carriage and waggon works that produced a massive range of vehicles for both road and rail in the 19th century (Buchanan and Cossons 1969).

Whilst leather and textile fabrics were produced on an "industrial" scale throughout the South West, factory production of footwear and clothing was a feature of the latter half of the 19th century. Many factories were established for boot and shoe manufacture in Somerset and the Bristol area, as were plants for leather and fabric glovemaking (particularly in Yeovil). Shirt and collar factories were also widespread with many taking over mills constructed for other purposes (Mounfield 1995; Stanier 2003).

The paper-making industry has been studied by historical geographers and historians of the paper trade but little is known of the related and extensive board, stationery and packaging plants that grew to provide for the new consumer industries of the later 19th century. Similarly, the history of local newspapers has received attention but their production less so (Shorter 1971).

Whilst our knowledge of many "traditional" industries of the South West is patchy, it is almost non-existent as regards the "newer" manufactures based

upon advances in our knowledge of science and the application of electricity. Some chemical industries have a long ancestry and notice has been taken of gunpowder and explosives manufacture (for instance, Pye 1994), match production, and soap and tobacco manufacture in Bristol (Mills *et al.* 1992; Buchanan and Cossons 1969). There has been much interest in aircraft but much less on their manufacture in the South West: in Dorset (Bournemouth), Somerset (Yeovil,Warren 1996) and Gloucestershire (Brockworth, Filton, Gillett 1997). Likewise with motor vehicle production. Much modern manufacture has been located on industrial estates, about which we know little (Scott 2001).

14.8.4 Distribution and Support

Modern industry is dependent on much wider and tighter networks of support and distribution. Little work has been done in the region on this aspect – warehouses have perhaps received most attention, but little has been done on the archaeology of technical support from colleges, research establishments and employers' organisations.

14.9 Trade and Interaction

14.9.1 Means of Exchange

See Section Section 14.1 on page 215.

14.9.2 Places of Exchange

Most places of exchange are in towns – market places, corn exchanges, ports, etc. and are discussed under urban settlement (Section 14.5 on page 221). However in the South West whilst the study of minor ports and wharfs has received some attention, little research has been published on the archaeology of inland rural markets like the Priddy sheep fair.

14.9.3 Spheres of Interaction

The development of the archaeology of interaction is dependent largely on the study of the nuances of material culture and not enough has yet been done to test historical evidence except in a few points of detail. Certainly there has been no study on the scale of the post-1994 earthquake excavations in California where documentary sources are being tested against extensive archaeological excavation. The archaeological evidence of trade still mostly derives from numismatic and ceramic studies, though it can be questioned how much this represents trade in the pots themselves or in their contents, let alone any wider aspects of "trade".

Within the South West

Detailed historical studies indicate that there has been a movement of population from the countryside to the towns all through the period. It is only within the last twenty years that the reverse movement has also become significant with the development of more extended commuter zones round cities and towns and the widespread encouragement of second homes so that the continued move from the countryside is as much forced by the lack of affordable housing. In the 19th century, movement into smaller towns was encouraged by industrialisation: the shoe-making and associated industries in Street and Glastonbury are an example (Mozley and Hill-Cottingham 1991).

Pottery studies in Exeter and Plymouth demonstrate how archaeological evidence can elucidate the patterns of sourcing different kinds of ware for different kinds of consumption. The use of redware from South Somerset which must have come overland from an inland production area provides some clue as to the importance of land-borne communication (Allan 1984; Allan and Barber 1992). There is little archaeological work on other aspects of trade for example the large scale annual movements of cattle across the region to supply the market in Bristol.

The South West Littoral and Western Approaches

The seas around the South West have been an important means of communication in the past. There is good argument to regard the Bristol Channel as an early equivalent of the M5 except that the crosswise traffic was just as important. Movement of people in this area has followed similar patterns to those mentioned above with the added dimension of immigration to Bristol from South Wales after a period of reverse movement in the late 18th and early 19th centuries to provide labour for the rapidly expanding industries of South Wales. To a more limited extent there has been movement from the off-shore islands to the mainland.

The main archaeological studies have again centred on ceramics (Good 1987; Barton 2003; Dawson 2004), although there are good surveys of specific monument types which are associated with aspects of trade. The coastal distribution of limekilns to provide lime to enrich the poor soils of large parts of the region has much to do with access to culm from South Wales. Iron mining on the Brendon Hills and in Kingswood (Cleeve) was stimulated and, in the case of the former financed, by the demands of the iron industry of South Wales. The case study of Porlock and its harbour at Porlock Weir provides a snapshot of the local complexities of such links (Riley and Wilson-North 2001, 161–3).

Western Europe

The refuges provided to people subject to religious persecution on mainland Europe, groups like the Jews (since the "readmission" of 1656) and the Huguenots (particularly from 1681, see Mayo 1985), have been reasonably well documented but as Susser (1996) has shown, considerable light on the complexity of such movements can be shed by considering archaeological, particularly epigraphic evidence. The phenomenon of religious and political persecution sadly characterises the whole of our period with later influxes of such groups as Armenian Christians. Not surprisingly most of these communities established themselves in the port towns of the South West, for example early Jewish communities in Penzance, Falmouth, Plymouth and Exeter, and Huguenot churches in Bristol, Barnstaple, Bideford, Plymouth, Dartmouth and Exeter. At certain times, particularly in the 16th and 17th centuries, there were people, such as William Tyndale, fleeing the other way either to Catholic France and Spain or the Protestant Low Countries. The "total" wars of the 20th century displaced so many people that many others have found a refuge in the region but have yet to register in archaeological study.

Trade with Western Europe was and remains vital to the economy of the South West right through the period. Archaeological studies have again tended to focus on ceramics: either the identification and distribution of imported wares such as Allan and Barber (1992) or more occasionally the study of the manufacture and marketing of particular wares and their influence here. Gaimster's (1997) study of German stonewares is a good example.

Initiatives such as that led by the Medieval Pottery Research Group in establishing a Europe-wide database of ceramic production centres will change our perspectives and a reflection of much closer collaboration with archaeological colleagues from the mainland as interest in the later periods develops.

The Wider World

Through the development of closer collaboration with colleagues in North America over the past thirty years, the role of archaeology in elucidating our understanding of the period is growing apace. It is probably true that this has led to an emphasis on the North American connection that is unwarranted by the sheer potential of addressing the issues of a world-wide archaeology but to some extent it is counter balanced by work for example on the slave-stations of West Africa and the ceramics trade with China.

The historical role of the South West is well-studied: in early exploration and attempts at colonisation (for example Quinn 1974), in the development and use of indentured labour and later slaves from West Africa, in the development of trades such as sugar and tobacco, and its contribution to the maritime business which underpinned all this activity. It is known to be a period of mass migration in which, willingly or unwillingly, people from the South West participated and an era of the development of a true world-wide trading network.

What is developing in a most exciting way is the contribution archaeology is making to provide another viewpoint, illuminating, and sometimes forcing a re-reading of, the historical data. It is now almost impossible to consider Post-Medieval and later archaeology without an international perspective. One has only to look at the papers in Egan and Michael (1999) as an example to see how this is happening and how many of these contributions consider evidence from the South West of England – the Donyatt potteries (Coleman-Smith 1999) and the South West ports (Allan 1999) for instance.

14.10 Religion and Ritual

The region had a large recusant population and relatively quickly developed a radical nonconformist tradition, including local denominations like the Bible Christian Methodists and Plymouth Brethren. A wide and relatively sophisticated network of social organisations like Friendly Societies developed.

14.10.1 Places of worship/veneration

There has been relatively little systematic archaeological study in the South West. The potential for investigating the continuing impact of the Reformation on the totality of society must be enormous. Some of the ways in which the discipline can contribute to our general understanding of how our modern world developed have been discussed but greater awareness among archaeologists is necessary if the opportunities that arise through planning- and developer-led archaeology are to be recognised and seized (see Gaimster and Gilchrist 2003).

Features in the landscape

The Dissolution of the monasteries might be held to have had most impact on the Post-Medieval landscape. There has been no overview archaeological analysis to complement the published historical analysis: see Bettey's (1989) analysis for Gloucestershire, Wiltshire, Bristol, Somerset and Dorset. As work at, for example, Torre Abbey and Glastonbury (Woods 1994) have shown, there is much archaeology can contribute at a detailed level.

There have been relatively few attempts to put places of worship in their archaeological context within the landscape (see Dawson 1982; 1987, for Bristol). The Cornwall Industrial Settlements Initiative (http://www.historic-cornwall.org.uk) is

Figure 14.2: *Wesley Chapel, Kingswood, built in 1844 as the successor to the original Colliers' School and Meeting House. It closed in 1978. It is increasingly apparent that nonconformity played an integral part in the industrial development of the South West, promoting entrepreneurship and education, and providing centres of social activity. Photograph: David Dawson.*

a good example of where, at a level of detailed conservation planning, such places are recognised as an integral part of the character of a settlement. The value of county-wide survey and assessment is further demonstrated from Cornwall (see Lake *et al.* 2001).

There are some Listings of such features as holy wells and preaching places but coverage is very patchy. A few, like Gwennap Pit and Hanham Mount, are preserved and maintained as public open spaces.

Buildings for worship

Most of the research on churches, chapels, meeting houses and other places of worship has been architectural (for example, the Hagues' 1986 study of Unitarian churches and Kadish's 2006 of Jewish heritage) or historical (for example, Thorne's 1975 study of the Bible Christians in Devon). There is wealth of evidence to be unravelled of the changes to parish churches but little has been done in identifying significant evidence in surviving buildings. Some commentary has been published on a local basis (see Francis 1995 for Exeter).

For chapels and meeting-houses of pre-1850 date recently surviving, we have the monumental surveys of Christopher Stell to provide a (near) comprehensive inventory and, in each county preface, a commentary on buildings and places of particular significance (Stell 1986; 1991). For surveys including post-1850 buildings, there are some local studies such as for Cheltenham and Kingswood (Blake 1979; Spittal and Dawson 1983). There must be concern that where detailed survey work has been done, for example that of Ron Martindale for the Kingswood Chapels Survey, there remains a major issue of finding a suitable vehicle for publication. Further, there must be a concern that without some form of assessing buildings post-1850, there is a grave danger that places of significance will be lost without record.

Little, if any, assessment seems to have been published on 20th-century places of worship: of changes in building materials such as concrete (for instance, Sidwell Street Methodist Church, Exeter) or tin tabernacles, or new build and conversions to serve new movements (such as the monastic revival) or newly established world religions.

Liturgical spaces

Liturgical spaces are by their nature most vulnerable of all. The South West preserves a small number of pre-Commonwealth arrangements, for example at

Hailes and Deerhurst Priory, and rather more of the 18th century, for example Didmarton and Old Dilton, and on a grander scale, St George Reforne, Portland: all in the care of the Redundant Churches Fund. Nineteenth-century and later arrangements are less well documented and in nonconformist places of worship, the situation is far less certain. A very few, like Loughwood meeting-house (National Trust) have long-term protection, and a deal of work has been done to conserve some others such as the Friends meetings at Come-to-Good and Long Sutton. There is however the interior of only one great meeting left – Mary Street Unitarian Church in Taunton – and the classic Victorian chapel interior such as that of the well-cared-for Bridgwater Baptist Church seems to be disappearing at an ever increasing rate. It is rare to find record and analysis for the change and development of liturgical space for this period.

Isolated fittings and furnishings in parish churches are well catalogued. All county archaeology society transactions/proceedings carry listings of such artefacts as bells and plate and there are a number of national listings of furnishings from acoustic jars to wall-paintings. Most however do not cover the period from 1800. There are few such listings for places of worship of other denominations and religions.

Associated structures

Schools, day as well as Sunday, institutes, manses, rectories and many other buildings are associated with places of worship. There is much scope for analysis in the form of surviving but again a rapidly dwindling number of structures.

Associated settlements

There is much scope for recording in greater detail the relationship between settlement and place of worship. There are places where this is close such as the Moravian settlement at East Tytherton (there are remnants of another more partial attempt in Kingswood). As again the Cornwall Industrial Settlements Initiative shows, there can be a less explicit connection between extensions to existing or completely new housing. Such connections may not be so obvious or so well recorded elsewhere, for example at Upton Cheney.

Associated industrial and commercial activity

It is becoming increasingly clear that a substantial amount of commercial and industrial activity in the region is associated with nonconformity. How close this relationship is remains a matter of debate. Archaeological evidence has an important contribution to make here. A better understanding of the kinds of evidence discussed above is one part. Looking for explanations for some of the changes in artefact assemblages such as in ceramics might be another. It must be understood that archaeology provides valid evidence in its own right but also provides a stimulus for those in other disciplines to see their basic evidence in a new light. The finding of the potter from Over Stowey with the Low Countries name of Renger during the course of the Victoria County History research on Bridgwater is one example.

14.10.2 Burial rite and practice

Interment

The primary rite up until about 1920 was interment. Whilst the Church of England tried to retain a monopoly of burial in the parish ground, this was lost in the 17th century and, in towns and cities, the responsibility was eventually ceded to cemetery companies and municipalities. There are no comprehensive listings of cemeteries, though individual structures such as chapels, lodges and the amazing neo-Egyptian necropolis in Exeter are individually protected by Listing.

There are a few detailed studies of funerary practice: the complete excavation of the parish church of Bristol St Augustine-the-Less provides a well-documented analysis of the use of the interior of a church for personal vaults and the study of the Poulett vault at Hinton St George, an insight into the ritual attendant on the wealthy (Litten *et al.* 1988). A sample of stone-walled middle-class graves was recorded Bathampton during development work (Cox and Stock 1995). Despite the nature of this work, it is one of the very few archaeological records of 19th-century burial practice in the region.

Cremation

Relatively little work has been devoted to the widespread introduction of this new burial practice but see Section 14.11.3 on page 242.

Memorialisation

The headstone is probably the simplest kind of memorial. As work in the United States has shown, this kind of memorial can be the source of much interesting analysis (see for example Benes 1978). Little has been attempted here of this kind of record and analysis although there are still huge numbers of such memorials remaining in cemeteries across the South West. Attention has been drawn to some special cemeteries such as those of the Jews (Susser 1996) and to those where the memorials are of significant variety and importance, such as Arnos Vale, Bristol. Detailed listings and records of individual graveyards have been made and are usually deposited with the local record office, for example, Clifton parish yard and Redland Green chapel yard. A number of individual headstones are also Listed such as that of Scipio Africanus in Henbury churchyard.

Memorials inside places of worship have often been recorded as part of the building and most of those that are notable have been published by either the Royal Commission on the Historical Monuments of England or in the Penguin Buildings of England series. Some have also been treated by art historians especially when originally commissioned from a respected sculptor such as Rysbrack (the monument to Sir John Dutton 1749 at Sherborne). It should be noted that little has been produced of the kind of archaeological analysis referred to above.

War memorials have been well served by the UK National Inventory master-minded by the Imperial War Museum and some have been added to HER records (for example, Somerset). Several commentaries have been published.

14.10.3 Institutional ritual

Structures

Relatively little has been done to record and evaluate civic spaces and places such as society lodges although many occupy buildings significant for other reasons (for example, Langport Masonic Lodge in the Hanging Chapel).

Artefacts

Some especially Friendly Society badges (Fuller 1964) have been well-documented but other forms such as banners have not.

14.11 Social Provision

"Social" provision is a wide area which touches upon other areas, such as burial and cremation (see Section 14.10.2 on the facing page). Coverage by archaeologists and industrial archaeologists has been patchy. English Heritage's Monuments Protection Programme "Power and Utilities" category has included electricity, water and sewage (assessed in steps 1–4) and gas (steps 1–3) and monuments here have been included in the Institution of Civil Engineers Panel for Historic Engineering Works (PHEW) surveys and the gazetteers prepared by the Association for Industrial Archaeology and county Industrial Archaeology societies. Other monuments in this area, such as workhouses and cinemas, occasionally appear in the county surveys whilst many of the others have received little "archaeological" attention. Much, however, may have been done by economic, social and cultural historians. Many surviving structures feature in Historic Environment Records but there is a need to identify and record lost or buried elements or sites to complete the record.

14.11.1 Water supply, sewerage and drainage

The main water provision from the 16th century was probably from wells. Large numbers of "holy wells" would have had a more prosaic everyday function. The exception would have been the continuing use of conduits constructed by most of the (dissolved) religious houses. That of St John's in Bristol still runs and was part of the main city supply during the Second World War. The use of a lift pump to recover the water from wells was a Medieval development. Water carriers were also to be seen transporting water to individual households. In Wells the remnants of a 15th-century supply issues forth from the 18th-century fountain. In Exeter conduits built by the cathedral and city authorities to house the water pipes in the Medieval period continued in use until the 1830s, and are open to the public as the "Underground Passages" (Allan 1994a).

During the 18th century, the use of rainwater cisterns in towns was common to provide water for washing and industrial use if not for drinking. The cloth industry relied on a reliable, if not entirely clean supply. This supply is not always understood and relied on water wheels and channelled, if not piped, water. It was not until the 19th century that piped water supplies were initiated to combat waterborne disease and to supply a growing population. This was speeded up by the cholera epidemics from the 1830s onwards. Edwin Chadwick's report on the *Sanitary Conditions of the Labouring Population of Great Britain* of 1842 was an important first step followed by the establishment of boards of health with powers to deal with sanitary issues. The boards were at odds with local authorities as set above them and the arrangement failed.

A number of studies of water supply in the South West have been published but fewer on sewage disposal, drainage and flood relief works. Studies of rural water supply include those of Somerset (Warren 1998) and a 17th-century system on the Quantocks (Hawtin 1973). Fullagar has examined a Victorian system at Hop House, Marshfield in south Gloucestershire (Fullagar 1992) and Hardiman has covered water supply, sewage and rainwater disposal in Bath 1714–1830 (Hardiman 1994; 1997). Minchinton has noted a number of water supply sites in his gazetteer of Devon, including conduits from the 16th to 19th centuries in Dartmouth, Beer and Hemyock and has appended an archaeological section to his study of water supply in Exeter which covers Medieval to Modern periods (Minchinton 1986; 1987). The early water supply of Plymouth is covered by Hawkings (1982) and is included in PHEW's entries for Drake's and the Devonport leats (Otter 1994). Cragg (1997) deals with Bristol's improved water supply after 1844 (when the city was described as having the

worst water supply of any large town) as does Binnie (1981). Watts has produced studies of Salisbury's water and sewage works (Watts 1972). Arrangements for pumping water have also received attention from those interested in animal, water and steam power (Cooper 2000; Skinner 1978). Alongside water supply was the provision of sewerage systems. This also began as holes in the ground – cess-pits – to resolve the problem of disposal of domestic waste. It is likely that rivers served as a ready way to dispose of sewage, which is recalled by the row of privies built near Bristol Bridge and recorded by William Worcestre. Public lavatories were only invented in the 19th century to accompany the introduction of piped water. Monastic houses, manor houses and castles had sophisticated water-borne disposal systems that in some cases would have remained in use.

Sewers were probably more widespread than acknowledged as shown by the large numbers of stone drains in evidence (the Law ditches in Bristol were multi-purpose drains). These took away all kinds of waste using springs as sources of water.

Major schemes of flood prevention have been undertaken in the region at places such as Exeter in recent times but historic works have received less coverage. An example of failure to come to grips with this problem until recent times is that of Bath, subject to repeated flooding until the 1960s and 70s, when the river authority undertook relief works between Bath and Saltford which included a new weir and flood discharge channel at Pulteney Bridge in the city (Cragg 1997; Buchanan 1998).

14.11.2 Heat, light and public power supply

Domestically, the principal source of lighting would have been oil lamps of several types and candles. The source of oil would have been fish, olive oil and whale or train oil.

The provision of better street lighting from oil lamps and later large-scale provision of gas and electricity for light, heat and motive power has been a major feature of modern industrial society and has left a widespread, if diminishing, archaeological resource as national gas and large regional electricity generation stations have taken over from local suppliers. Early oil and gas lighting schemes have sometimes left finely-wrought and cast lamp standards in places such as Cheltenham and Barnstaple (Chatwin 1984; Bone 1973). The history and archaeology of gas-making has been studied throughout the region with contributions on the early years at Falmouth 1819–1896 (Pearson 1988), Cheltenham (Chatwin 1972) and Bristol (Nabb 1987; 1993) where the development of an early oil-gas works, later converted to coal, at Canon's Marsh has recently been assessed by Croft (2000; 2001). Gazetteer entries on gas are available for Devon (Minchinton 1986) and Dorset (Stanier 1989) which had its first public supply in 1831. None, however, are listed in the HERs.

Electricity was first generated for individual buildings or supplied to a small number of customers at local level, prior to later development of "central" suppliers in the towns and, eventually, of large regional power stations that supplied power via a national grid at high voltage, as originally proposed by Ferranti. Many survivals of early systems in the region have been noted. Hydro-electric power in Devon has been surveyed by Harris (1995) and Tucker (1977a) whilst the supply in towns has been recorded in Bristol (Lamb 1981; 1994), Taunton (Gledhill and Lamb 1986) and Stroud (Wilson 1995). One of the larger power stations in the region at iideNewton Abbotpower station has been covered by Warburton (1974) but many larger coastal stations, such as those at Yelland in north Devon and Poole in Dorset, have now been demolished. The UK's first commercial nuclear power station at Berkeley was commissioned in 1962 and closed in 1989, showing both the rate of technical progress and obsolescence in this industry (Mills *et al.* 1992). The MPP has identified significant station survivals in the South West region at Haven Banks, Exeter and Christchurch in Dorset (Trueman 1994).

14.11.3 Waste disposal, burial and cremation

Waste disposal became an important issue as urban areas grew by migration and natural population increase throughout the period. Municipal waste collection was initiated from the 17th century with rakers and scavengers employed by cities and towns to remove piles of waste in the streets. This does not appear to have entirely halted rubbish disposal in pits and convenient holes in the time-honoured fashion. In the 19th century areas were dedicated to tipping, euphemistically called reclamation, in marshes, hollows etc. Land reclamation in general was going on apace to dispose of industrial waste as well as domestic and to privide much-needed extra building land.

Landfill has until recent times been the major solution and these "deposits" will constitute a significant resource for the archaeologist of the future seeking evidence of past consumption and material culture. Refuse disposal was linked with power generation from the 1870s to *c.*1914 when there were about 340 municipal destructors in Britain. Over 80 also generated electricity – some 20% of all "public" electricity supply stations at the time. Further expansion of these was curtailed by the limited capacity (about 20MW) of such stations. In 1977, two sites of these survived at Gloucester and Weymouth (Tucker 1977b).

Rise in urban populations, occasional epidemics and high mortality rates in the Early Modern age put excessive pressure on the burial capacities of established and non-conformist churches/chapels until this was forbidden after 1850. A number of municipal and private cemeteries were established in the 19th century. Early catacombs survive in Exeter – now open to tourists – and a major conservation project in Bristol includes a range of early cremators in the private cemetery complex at Arnos Vale.

14.11.4 Dealing with poverty, sickness and disability

Ongoing economic and social change and the dissolution of many religious foundations in the 16th century focused attention on ways of dealing with problems of long-term poverty and short-term distress. From Late Medieval times, almshouses provided a modicum of health-care and nursing, and were common in towns, cities and occasionally elsewhere. These were usually endowed by local philanthropists. The problem became more acute at the Dissolution, when thousands of people were displaced by the Crown.

In later centuries, private and public responses have created a range of almshouses, homes, orphanages and "poor" and "work" houses, some of which have continued to serve the agencies of the 20th-century welfare state. Patterns of philanthropy have attracted significant historical attention (for example Gorsky 1999, on Bristol) and workhouses have been surveyed by English Heritage (Morrison 1999), as have hospitals (Richardson 1998). Many of these buildings have had a number of uses, Brentry House and Estate near Bristol serving as the first and last reformatory for inebriates in England, a colony for "mental defectives" and latterly as a long-stay hospital (Carpenter 2002).

14.11.5 Emergencies and law and order

Fire was dreaded in settlements where there was a deal of thatch and wood. It was often specified that party walls should be of stone. The early fire services were run by insurance companies with their own badges and water carriers. Water sources had to be supplied by the customer or if lucky from the river. Original fire stations and stables should be sought and their plans discussed.

The police were usually set up in a barrack-like building. Before the peelers of the early 19th century, the organisation of control of law and order was hit or miss. There were some local militias known as the train bands who were also in barrack-like accommodation. The police forces came into being (as so many functions) after the passing of the Municipal Corporations Act of 1835. In the next decade the town forces came into being.

Prisons were already well-established from Medieval times and individual or small-scale lockups became a feature of the time. Large numbers of stocks were set up to impart peremptory justice to those committing minor offences. The ultimate sanction of hanging is demonstrated by the sites of gibbets but hardly any survive as structures. In the Blackdown Hills, burial places of rural felons can be traced near gallows (forches), usually sites on parish boundaries.

The most durable survivals have been prisons which have been the subject of another English Heritage survey (Brodie *et al.* 2002). In the South West, survivals include the Victorian county jails, specialist prisons at Princetown (Devon) and Portland (Dorset) in addition to relics of the "New" gaol of *c.*1820 at Wapping in Bristol, which was closed in 1883 (Foyle 2004).

14.11.6 Education and learning

Education, both liberal and vocational, has been a feature of the periods with grammar and "public" (i.e. private), schools taking over from church and monastic foundations. Industrialisation triggered competition between the established and non-conformist churches for a stake in elementary education whilst working men sought enlightenment in institutes, such as that in Bridport, Dorset. Many "church" schools survive as do the imposing buildings erected by school boards and the later local education authorities for elementary, vocational and higher education. A recent phase of investment in schools has, however, altered much of this resource as features such as outside toilets are modernised. The 20th century has seen the growth of the historic, provincial and "new" universities of the South West in new, purpose-built sites or housed in redundant buildings such as the Muller Orphan Houses on Ashley Down, Bristol. Historians have linked poor provision of vocational education with economic decline (Sanderson 1999) but few archaeological studies have been undertaken of this area. Public libraries were established in the 19th century and some fine municipal buildings survive. Modernisation can again threaten the integrity of such civic buildings, as in the case of Taunton Library, which has been converted into a public house; the building remains in much its original condition but the character of the internal space has been much altered.

14.11.7 Recreation and leisure

Sport was always an interest of the well-to-do in terms of all kinds of , shooting, fishing and horse racing . This led to the establishment of kennels and stables for the hunt animals as well as those used for business. Horse racing was patronised by the wealthy and followed by

many of the poor and race tracks and grandstands were erected.

More leisurely sports included shooting butts for bows and guns, and . The provision of tennis courts and fives and squash courts is quite late, but they are rapidly being destroyed and replaced. Cricket developed during the 18th century along with the creation of the sports pavilion. Golf is more recent but has had a very significant impact on the landscape.

The 18th century saw the rise of inland spas, seaside resorts and permanent leisure venues but facilities for much of the population were stimulated by cheaper and more efficient transport systems, longer holidays and shorter working hours. Townscapes of leisure in the South West include Bath and Cheltenham and the many seaside resorts of its north and south coasts (Travis 1993) with piers as some of the most noted features.

Theatres are the oldest form of indoor entertainment along with cock-pits and similar attractions. The 19th and 20th centuries saw purpose-built theatres for music hall and later cinema followed by public dance halls and, often earlier, by hotel ballrooms. Private facilities for the rich were incorporated into many a stately home.

Cinemas are probably the most numerous examples of buildings for mass-entertainment and many have closed or are now threatened by multiscreen venues on new retail/leisure parks. Eyles (2001) notes six South West cinemas in his list of best operating sites (one, at least, has now closed) and two in Somerset (Bath and Taunton) that have passed into different use. Roy Day (1985) studied and recorded Bristol's redundant cinemas.

Many amateur and professional sporting clubs trace their origins back to the second half of the 19th century and stadia for rugby and association football are the significant monuments here. Major tragedies in the 1980s have caused many of these to be rebuilt and the open terraces and antique stands at some of the South West's leading soccer clubs have now been replaced (Inglis 1996). The origins and archaeology of football (Association and Rugby) in the South West are worth investigating.

14.12 Defence and Warfare

The South West peninsula occupies a crucial strategic location, flanking the western sea approaches to the English Channel – and thence to the commercial and naval ports of the south coast and to London and the south-east – and to the Bristol Channel and the commercial ports of South Wales and the Severn Estuary. The English Channel is also the gateway to northern Europe, as the main sea route to the former overseas empires of the European powers, and to the growing political and economic powers in the Americas and Far East. As a result, the control of the Channel and of its approaches has been keenly contested in most european and world wars, and the South West has played a crucial role in this.

Its long southern coastline and proximity to the Continent has also made it vulnerable to attack, whether in the form of invasions planned to outflank the narrower and more heavily defended Channel to the east, or intermittent raids on military and commercial targets.

The literature on the subject is extensive with comprehensive overviews such as those by Maurice-Jones (1959), Saunders (1989), Hogg (1974), Coad (1983; 1989), Douet (1998), Duffy (1999) and Evans (2004), together with work on individual complexes, such as Plymouth (FW Woodward 1990; 1998; Pye and Woodward 1996; Coad 1983) or the Severn defences (Barrett 1993) and thematic studies of individual monument types for listing (English Heritage nd a;n).

14.12.1 *c.*1540–1690

With the exception of the Civil War, the military archaeology of the 16th and 17th centuries is dominated by coastal defence. The earliest batteries are found along the south Devon coast, protecting harbours such as Dartmouth (Saunders 1983) and Fowey. These were usually initiatives of the local townsfolk and it was not until Henry VIII's break with Rome, and the consequent threat from continental powers, that state involvement in defence began. Major fortifications were constructed at Portland (English Heritage 2000), St Mawes and Pendennis (Linzey 1999) in a new style based on tiers of conjoined rounded bastions. Between these major forts were smaller works, sometimes only earthworks, but others were like Sandsfoot Castle opposite Portland, where an octagonal gun room was accompanied by a substantial residential block that still survives (Saunders 1989). Coastal defence was later extended to the Isles of Scilly, where some of the best survivals from this period are to be found. Harry's Walls on St Mary's is the earliest design following the Italian theories of bastioned defence in England, although it was unfinished – probably because the designed structure was too large to fit the hill on which it was sited (Saunders 1962). The so-called King Charles's Castle, constructed around the same time, was of a far less modern design which looked back to the Medieval castle (Miles and Saunders 1970). In the 1590s, following the Armada crisis, further defence works were constructed on the Isles of Scilly, principally Star Castle and a bastioned trace cutting off The Hugh on which it stood. At a similar date Henry's fort at Pendennis (Linzey 1999) was surrounded by a bastioned trace, and the first large fortifications

were begun to defend Plymouth. These included the construction of a large bastioned fort which now lies beneath the Royal Citadel (FW Woodward 1987; Pye and Woodward 1996) and the strengthening of the defences of the 1540s on Drake's Island in Plymouth Sound (FW Woodward 1991; Brayshay 1987).

The Civil War in the South West saw few large-scale battles but was characterised by skirmishes and sieges, both large and small. Much of the campaign in the region centred around the retention or capture of the major towns, most of which were besieged, often more than once. Little survives of the defences and siegeworks above ground but excavation is showing that in many places these were extensive. Plymouth's defences are reasonably well-known (Stoyle 1998) while Exeter's – without the benefit of a contemporary plan such as that of Plymouth by Wenceslaus Hollar in 1644 – have seen detailed excavation in some areas (Henderson 2001) but are not yet as well understood (Stoyle 1995). The recent discoveries at Princesshay have however added a lot of new information. A similar situation occurs at Bridgwater, Dorchester, Devizes and particularly at Taunton where, recently, several lengths of ditch have been recorded some of which appear to have belonged to outworks. To the north the war appears to have focused on Bristol and Gloucester (Atkin and Laughlin 1992) with few known sites in the surrounding areas. Bristol has one of the best documented series of sieges and parts of the defences survive. Archaeological evidence has been recorded in several places, including the castle and it has been suggested that areas which now lack pre-17th century buildings were cleared during the conflict. Defensive additions were made to existing castles such as Taunton, Sherborne and Corfe Castle which also saw sieges as did smaller houses such as Abbotsbury in Dorset (Saunders 1989). Other earlier monuments, such as Maumbury Rings at Dorchester (Bradley 1975), Castilly henge (C Thomas 1964) and Castle Dore (Radford 1951), both in Cornwall, were reused and altered to varying degrees but it was the Medieval castles and houses such as Old Wardour and Corfe Castle which suffered the most. Much of the damage at Corfe was caused during slighting of the castle after the conflict and it has been shown that the rubble has sealed archaeological deposits relating to the defence (interim reports in *Proceedings of the Dorset Natural History and Archaeological Society* 1986–91). The Isles of Scilly again contain well-preserved evidence as they held an important Royalist garrison on the route between Ireland and the Channel Islands. The fortifications around Star Castle were improved with earthwork lines and batteries but the Parliamentary forces were able to capture Tresco, build Oliver's Battery and force the surrender of St Mary's. The fortifications on Lundy are also well preserved but did not see action.

14.12.2 c.1690–1914

For most of this period, from the Glorious Revolution of 1688 to the *entente cordiale* of the early 1900s, France, sometimes aided by Spain, was Britain's main political and military rival and the source of most of the perceived threat. Until the development of Cherbourg in the mid-19th century, much of the French navy was based on the Atlantic coast (Brest and Rochefort) or in the Mediterranean (Toulon) as, of course, was the Spanish navy. This reinforced the strategic importance of the South West as a base for monitoring French naval activity and for frustrating any attempts to push up the Channel in support of a planned invasion. This strategic shift, from rivalry with the Dutch prior to 1688 to rivalry with the French, is reflected in Chatham's replacement by Devonport as the second principal naval base after Portsmouth.

After the internal upheaval of the Civil War and the Restoration, the avowed purpose of defence works in the South West was to deter and guard against these external threats; however, some at least may also have had an implicit role of discouraging and, if necessary, suppressing, internal dissent. Thus the Royal Citadel at Plymouth (FW Woodward 1987), built by Charles II in 1665–71, ostensibly against the threat from the Dutch, may also have served as a very obvious reminder to the former Parliamentarian stronghold that the Commonwealth was well and truly over. Similarly, the barracks built in several towns during the French Revolutionary and Napoleonic Wars to counter the threat of invasion, raids, and smuggling (Duffy 1999), would also have provided the government with a means of imposing its authority if necessary on a populace made restive by the revolution in France and the privations of a long series of wars (virtually continuous between 1793 and 1815).

Defence works tend to be expensive to construct, maintain and man fully, in terms of finance, labour, resources and time, particularly in the face of the need to keep them fully up-to-date to cope with technological advances. As a result, throughout this period, and indeed before and since, there were spasms of (sometimes frenzied) activity during and immediately after wars or invasion scares, when the expenditure was either clearly needed and/or could be politically justified, interspersed with periods of peace – characterised on the whole by relative neglect and lack of investment. The history of defence works in the South West and elsewhere is thus linked inextricably with national political history, and the need to keep pace with technology and international rivals.

The main types of defence works present in the region during this period include naval facilities, fortifications, garrison facilities, and communications/monitoring facilities. Most, except for some of the barracks, were sited on or near the coast.

Naval facilities

Prior to this period, the Isles of Scilly anchorage, the deep-water estuaries (such as those of the Fal, Tamar/Plym, and Dart) and the bays of Torbay and Portland had been used for shelter and refuge by naval and mercantile shipping, and as bases for the fleet during emergencies such as the Armada. Several had been fortified during the reigns of Henry VIII and Elizabeth I, but there were few permanent, formal, facilities for the navy itself with the exception of some victualling facilities at Plymouth, for example.

This changed with the establishment of Devonport dockyard in the 1690s. Originally conceived as a dry dock for repairs, it rapidly grew into a fully-fledged dockyard. Further major expansion in the later 18th century and in the mid- to late 19th century put it on a par with Portsmouth, as one of the country's two main naval bases. As well as the main dockyard itself, other facilities were scattered around the Hamoaze and the Sound, such as a watering point at Bovisand (reservoir, pipe and pier), gunpowder mills at St Budeaux, powder magazines at Keyham and then at Bull Point, and victualling facilities at Sutton Pool and Southdown, later (in 1833) concentrated in one purpose-built yard at Stonehouse (the Royal William Victualling Yard). After years of hiring warehouses for the purpose, a naval hospital was built in the 1770s at Stonehouse, matched by a military one nearby, and in 1868 another hospital, for military families, was erected within the Dock Lines.

Torbay was (and is) used by shipping as a refuge from westerly gales, and during the French Revolutionary and Napoleonic Wars victualling facilities were built at Brixham and a naval hospital at Paignton. A breakwater was mooted, but never built. At a similar time a naval depot was also established in the Fal estuary, at Mylor (Duffy 1999; Johnson 2005). After the end of the Napoleonic War most of these facilities were closed or mothballed, and activity and finance was concentrated on Devonport, where the construction of the breakwater in 1812–48 provided a sheltered anchorage in the Sound. Subsequently some facilities were also developed at Portland, after the completion of the breakwater there in 1859.

Fortifications

Virtually all of the fortifications of this period were sited on or near the coasts to defend the naval base at Plymouth and the anchorages and refuges of the Isles of Scilly, the Fal, Fowey, Dart, Torbay and Portland, both from the sea, and in the case of Plymouth in particular, from attack by an invasion army from landward. Others were sited to defend the smaller ports and landing places, and, from the mid-19th century, the approach to the major commercial ports of Bristol, Cardiff, Newport and Gloucester.

For much of this period Britain was at war, and the periods of peace were punctuated by invasion scares. With each crisis, fortifications were reviewed and sometimes improved, either in anticipation of invasion, or to rectify deficiencies highlighted by the war or scare just past. In the later 19th century rapid technological advances, and the developing arms race with first France and then Germany, had much the same effect. As the key naval base, most attention was paid to Plymouth and as a result all phases of fortification activity are represented there in some form (FW Woodward 1990; Pye and Woodward 1996). In other areas activity was more intermittent.

The Royal Citadel in Plymouth (FW Woodward 1987) represents the earliest substantial new work after the Restoration. It was intended to defend the town and Cattewater anchorage against the Dutch initially, and represented the main seat of the new king's authority in the South West. It was followed by spasms of activity during the continental wars of the early 1700s, the Seven Years War in the 1750s, the War of American Independence (with France and Spain allied to the Americans) in 1775–83, the French Revolutionary War of the 1790s, the Napoleonic War of 1803–15, an invasion scare in the mid-1840s, and another major one in 1858–9. Improvements continued in the later 19th century in response to advances in artillery, culminating in the construction of new batteries for long range breech-loading guns and for short range Quick Firing breech-loading guns in the 1890s and early 1900s and the development of other defences such as minefields and land-based torpedoes. This was essentially the last major phase of activity in coast defence prior to 1914.

By the early 1700s several batteries had been planned or built on the inner approaches to the new dockyard at Plymouth, and in the following years major new lines (the Garrison Walls) were built on the Isles of Scilly, and new batteries added at the mouth of the Fal and at Dartmouth. In the 1750s the defences of the Royal Citadel (FW Woodward 1987) were updated and extended, and the batteries of the Lower Fort were remodelled to cover the approach to the dockyard more effectively. At the same time, the dockyard itself was provided with landward defences, the Dock Lines, for the first time, although initially these were rather weak (FW Woodward 1990; Pye and Woodward 1996; Pye 1998; 2000). They also enclosed defensible barrack squares, surrounded by their own bastioned curtain walls.

The American war, and the panic induced by the appearance of a Franco-Spanish invasion fleet in Plymouth Sound in 1779, resulted in probably the most comprehensive programme of coastal defence works since the blockhouses and forts of Henry VIII's reign. Although many were open batteries thrown up rapidly in turf and timber, some, such as Mount Wise

Redoubt (Pye 2000) and Mount Pleasant Redoubt (Pye 1992), were revetted in stone from the start. Around the naval base at Plymouth the Lines were deepened and provided for the first time with detached redoubts, and a series of redoubts was also built on Maker Heights. Several new batteries were erected on the sea approaches to the dockyard, replacing and adding to the earlier ones. To the east the naval anchorage at Torbay was protected for the first time by new batteries on Berry Head and to each side of Brixham. To the west the naval depot and anchorage at Falmouth was protected by batteries at Pendennis and St Mawes. For the first (documented) time, many of the smaller ports – such as Poole, Swanage, Lyme Regis, the Fowey estuary, Looe and Mevagissey were also provided with batteries, probably through a combination of local initiative and government encouragement (Saunders 1989; Duffy 1999).

The end of the war in 1783 resulted in the curtailment of the building programme, with some of the redoubts around Plymouth either not being finished or perhaps even started, and some batteries being abandoned. Work did however continue on Maker Heights With the onset of the French Revolutionary and Napoleonic Wars (1793–1815), many of the earlier fortifications were reoccupied and repaired, and subsequently a further redoubt and barracks were added on Maker Heights. Work also began on realigning, deepening, and re-facing the Dock Lines in stone, but this was abandoned in 1816 on the orders of Wellington. At Torbay the batteries on Berry Head were rebuilt in stone, and the main ones at the headland were protected from landward attack by walls ditches and a detached fort. Barracks and a hospital were provided for the garrison. Elsewhere along the coast a major development was the provision of a further series of batteries to protect the landing places and smaller ports, from Swanage and Bridport in the east to Mount's Bay in the west, and round to Ilfracombe, Avonmouth and Portishead on the north coast (Saunders 1989). These were manned by the local militia companies who proliferated at this time, particularly with the very real threat of invasion in the early 1800s.

After the end of the war in 1815 there was a period of retrenchment, with most resources being concentrated on Plymouth. The batteries and forts at Torbay were abandoned and the land sold back into private ownership; most of the batteries protecting the small ports were probably also abandoned. To the west, although the fortifications protecting the Fal and the Isles of Scilly mostly remained in military hands, there appears to have been relatively little new activity until the late 19th century. The only place to "benefit" from the next invasion scare in the 1840s was Plymouth, where three new stone-built fortified batteries were built to protect the anchorage behind the newly completed breakwater, and the inner approach to the dockyard.

The invasion scare of 1858–9 – arising from the French lead in the arms race following the launch of the first steam-driven, armour-clad warship (*La Gloire*), and from fear of what Napoleon III might do with this advantage – resulted in a massive programme of fortification building on the continental model. However, this was largely concentrated on Plymouth, with smaller schemes at Portland and across the Bristol Channel, although a new battery was added at Dartmouth, and open batteries, manned by militia, were also established again at several small ports, such as at Sidmouth and Exmouth, Torquay and Brixham, and on both coasts of Cornwall around to Padstow (Duffy 1999).

The fortifications at Plymouth (Pye and Woodward 1996; FW Woodward 1998) matched those at Portsmouth in number and cost, reflecting the national importance of the Devonport dockyard. A ring of stone-built forts and fortified batteries – linked by a military road, ramparts and defended ditches, and surrounded by landscaped glacis slopes, protected the landward approaches to the dockyard, and new granite casemated batteries protected by iron shields, including one sea fort – were built to defend the approaches to the anchorage and dockyard. Open batteries were also added to existing ones, at Western King and Eastern King for example.

At Portland, the naval anchorage behind the newly completed breakwater was protected by a sea fort and a fort and batteries at each end (Nothe Fort and Verne Citadel), and other batteries were proposed elsewhere. Across the Bristol Channel the approaches to Avonmouth, Bristol, Gloucester, and the South Wales ports of Cardiff and Newport were protected by batteries at Brean Down (Webster 2001), on the islands of Steep Holm and Flat Holm, and at Lavernock Point near Barry in South Wales (Barrett 1993; Saunders *et al.* 2001).

Within 20 to 30 years however, the casemated sea batteries were largely redundant, and were being replaced by earthen and concrete batteries at a higher elevation. Many of the land forts were also being adapted for different armament, including "disappearing" guns. This culminated in the adoption of longer range breech loading guns in the 1890s, and the construction of new batteries – sometimes on new sites and sometimes on or near old batteries – at Plymouth, Falmouth, and on the Isles of Scilly. These were accompanied by a network of concrete command posts, searchlight emplacements, direction range finders, observation posts, and position finders, the latter often being in separate locations some distance from the batteries they served. Quick-firing (QF) breech-loading guns were also introduced at this time, to counter the threat from fast moving motor

torpedo boats, and were often sited within or on the earlier batteries protecting the same narrow pinch points, such as the approach channels around each end of the Plymouth breakwater. New forms of defence were also introduced, including a Brennan torpedo station at Pier Cellars in Plymouth Sound (a rare and very important survival, as yet with no statutory protection), and minefields.

There was then little change until the outbreak of war in 1914, except for some upgrading of the long range guns, the decommissioning of the torpedo station, and the provision of permanent local defence for the most important open batteries, such as Renney Battery and Hawkins Battery at Plymouth.

Garrison facilities

Prior to the French Revolutionary and Napoleonic Wars the army and marines were generally housed within the fixed fortifications they garrisoned, or at or near to naval bases such as Devonport. Barracks (Douet 1998) were provided within separate buildings or casemates under ramparts at the Royal Citadel, at the Garrison Walls on the Isles of Scilly, and at Pendennis and St Mawes by the mid 18th century. At Devonport bastioned barrack squares were constructed within the Dock Lines in the 1750s, followed later in the century by the Marines' Stonehouse Barracks.

During the French wars in the 1790s and early 1800s the country's armed forces increased dramatically in number, supplemented by numerous militia and volunteer units. They all needed to be housed, and the government embarked on a national programme of barrack construction, most to a fairly standard plan. Many of the barracks which survive to any degree are located within the South West, including cavalry barracks at Christchurch, Dorchester (Marabout Barracks) and Exeter (Higher Barracks), and an artillery barracks at Exeter (Wyvern). Smaller cavalry barracks were also established at other locations close to or on the coast, such as Honiton, Totnes, Modbury, Truro and Barnstaple (Duffy 1999). Barracks, and later a hospital, were also provided for the militia garrisoning Berry Head, Torbay, and a stone barrack block was built on Maker Heights for the garrison there. During the years of relative quiet after 1815 some of the smaller barracks were abandoned, as were the barracks and forts at Berry Head. However, some development did continue, with a barrack block and other facilities being built on Drake's Island (FW Woodward 1991) in the 1830s, and a bastioned defensive wall added to Maker Barracks in the 1840s. An apparent barrack complex at Barne Barton in Plymouth may also belong to this period, as it too has a bastioned wall reminiscent of the one at Maker. Architecturally lavish barrack accommodation was also provided within the new batteries built at Plymouth in the 1840s (particularly at Staddon Point and Picklecombe – built in the style of the medieval Warwick Castle, Figure 14.1 on page 234).

The invasion scares of the 1850s resulted in a revival of the militia and volunteer units, who were to man the new Plymouth fortifications in the event of attack, and manned several of the other coastal batteries established elsewhere at that time. Militia barracks were built in several towns, including Bodmin, Cirencester and Dorchester, and drill halls were built in many others (Duffy 1999; Johnson 2005). Accommodation was also improved for regular units, with the construction of Raglan Barracks in Devonport and extensions to others, such as the Stonehouse marine barracks. There was also more emphasis on catering for dependants, with the provision of married quarters for the first time, and a hospital for soldiers' wives and families at Devonport, for example. Within the fortifications accommodation was also provided, usually in bomb-proof casemates under the ramparts and traverses rather than in separate stand-alone buildings.

With the Cardwell reforms of the 1870s regiments were deliberately dispersed into population centres, in order to foster a sense of ownership by the community and thus to facilitate recruitment. The vastly improved transport links created by the railways made it less important for military units to be located close to the areas most vulnerable to attack, such as the south coast. Localisation depots were built in several towns (Devizes, Dorchester, Taunton and Bodmin, Douet 1998) either as completely new barracks or as a remodelling of an existing militia one. Later in the century more resources were made available for military works, resulting in more architecturally ostentatious buildings being constructed, such as the new barracks at the Royal Citadel (FW Woodward 1987).

Outside the barrack complexes, which themselves included ancillary buildings such as hospitals, magazines, veterinary facilities (if cavalry), guardhouses and, later, churches and schools, were other training facilities for the regular and militia units. At Plymouth permanent firing ranges for the Marines and infantry were built on Staddon Heights in the 1860s where the butts still dominate the skyline. Another similar range was built near HMS Raleigh on the Cornish side of the Tamar, and smaller, less substantial ranges of all periods are to be found on older map editions in many areas around the coast and on rough ground elsewhere. Regular training began on Dartmoor with the establishment of a range and camp at Okehampton in 1875; permanent buildings were added in the 1890s, and facilities were expanded in 1900 with the purchase of the Willsworthy range.

There were also practice batteries for coast and naval artillery, both around Plymouth and elsewhere

Figure 14.3: *Picklecombe Battery. The castellated barracks of the 1840s battery can be seen at the rear with the 1860s multi-tier casemated battery, converted to flats, in front. Photograph: Andrew Pye, Exeter City Council.*

(presumably for the local militia units). Covered batteries or practice facilities of mid- to late 19th-century date survive at Stonehouse overlooking Millbay, and at Shoalstone Point near Brixham. Open practice batteries dating from the mid-19th century onwards are known at Battery Gardens, Brixham (Newman and Salvatore 2003) and around Plymouth at Bovisand, Lentney, the Royal Citadel, and Whitsand Bay (Pye and Woodward 1996). The gun positions at Lentney and the Royal Citadel continued in use, with adaptations, through to the demise of Coast Artillery in 1956. During the latter part of the 19th century, and probably earlier, naval gunners were trained on a series of hulks in the Hamoaze (collectively called HMS Cambridge in the 1890s), and practice firing took place across adjoining mudflats, at the nearby range at Trevol (now in HMS Raleigh), and at sea. In 1956 the modern HMS Cambridge was established as a shore-based facility at Wembury Point, closing in 2001.

14.12.3 The First World War

Most of the combat action in the First World War took placed outside the United Kingdom. There were however shelling attacks by German naval ships on the east-coast towns and, from 1915, Zeppelin attacks on London, with Gotha aircraft bombing raids from 1917 onwards. The South West was not affected by these bombardments and, unlike the east coast, the region was never under any perceived invasion threat.

The major offensive operations carried out in the South West were primarily by the Royal Navy and Royal Naval Air Service against German naval forces and, in particular, in the crucial Battle of the Atlantic keeping the overseas supply lines to the UK open against German submarine attack.

The main military activities in the United Kingdom were the mobilisation of the nation into the armed forces and, after the Armistice in 1918, the demobilisation of these forces. Over 5.3 million men from the British Empire and Dominions were included. Training of both the new recruits and the continuation training of formations, units and servicemen and women took place in the UK, with the South West and its extensive training areas playing a major role.

Armed forces logistics covered not only forces within the UK but also the supply and maintenance of forces deployed abroad. These included the massive deployments on the Western Front in France and Belgium and also most forces deployed worldwide.

The First World War marks a number of major technological changes in warfare. It was the last war where horses played a major role. The British inven-

tion of the tank and its introduction onto the battlefield during the battle of the Somme on 15 September 1916 marked a radical change in land warfare. The unexpected use of gas by the Germans in April 1915 required the production, storage and movement of war gases within UK and then to France. An estimate suggests perhaps 25,000 tonnes of war gases were produced during the war in Britain.

Identified sites

It is clear that there are few First World War sites currently identified in the HERs of the region (Webster 2004j). A review of the on-line Defence of Britain (DOB) Database (DOB 2002) similarly showed few sites in the South West with the majority of 44 being in Cornwall. Bristol, Gloucestershire and Torbay, together with Bath and North East Somerset have no recorded sites. Devon has one site, Somerset 3 and Wiltshire 5. The 44 sites recorded in Cornwall include coastal batteries, Territorial Army drill halls, rifle ranges, dockyards, wireless direction finding stations and Royal Naval Air Service airship sites. The associated *Defence of Britain Project Handbook* (Lowry 1996) includes relatively few descriptions of First World War infrastructure and the surviving sites have often been re-used making the separate identification of First World War use difficult. The handbook was a primary source of information for the volunteers who contributed to the DOB Database, which may help to explain the paucity of First World War sites identified. The Project has now been completed and no further reports are being added to the database (DOB 2002).

Many Royal Navy and Army barracks and forts built in the 19th century or earlier continued to be used during both world wars but are not characteristic of the period (similarly, most coastal batteries dating to the 1890s and early 1900s continued in use during the First World War, and a few also during the Second World War, with adaptations to take more modern armament). Moreover, as many new campsites and airfields were simply grass fields with tentage for accommodation, few remains have survived. Other military sites extensively used wooden huts, which were easily removed for re-use elsewhere or destroyed. Many civilian properties were requisitioned and the majority were later returned to their owners with little to show for their military occupation.

Naval and Military Training

Royal Navy training establishments were concentrated around Plymouth and include HMS Powerful (a new training establishment opened at Devonport in 1913), the RN Engine Room Artificers' School at Plymouth, RN Torpedo School (HMS Defiance) and HM Gunnery School at Devonport. In addition, the RN Engineering College HMS Thunderer was originally situated alongside the Dockyard wall at Keyham.

The major Army Salisbury Plain Training Area from 1897 (McOmish *et al.* 2002) and Dartmoor Training Area, including Okehampton Camp, were two key facilities. Both areas included rifle and field firing ranges, together with artillery ranges. A number of sites have been identified with trenches for training in trench warfare or trenches dug for training in field fortifications. These include on Salisbury Plain (McOmish *et al.* 2002, 139–143) and at Blandford Camp, where the Royal Naval Division trained and some of their training trenches still survive. Other trenches have been identified near Yeovil and also in the Bristol and Portishead area.

Other British training camps have also been studied including Woodbury Common, by a local group, and the Dartmoor Ranges, by English Heritage. On Dartmoor there is evidence for military training dating from the period of the Boer War with pre-First World War trench systems remain in some areas. Okehampton Camp retains some early buildings. Later remains have been surveyed including target tramways and artillery range observation posts. In Wiltshire many features relate to training and there are well-preserved practice trench systems as well as more exotic features such as the gas training area.

The 1906 Haldane reforms embodied the Militia and Volunteers into the Territorial Force (TF), organised in formations with supporting arms and services, which were an important contribution towards success in the First World War. The TF was still administered by the County Associations and their headquarters may still survive. Drill halls, later to be re-named Territorial Army Centres, exist across the South West from this period and have been studied nationally (Osborne 2006). In addition, the TF used existing Volunteer and Militia campsites for their annual and weekend training camps. Many of these survived into the Second World War and later. These camps were normally tented with perhaps some permanent buildings like cookhouses, latrines, ablutions or palliasse straw stores but hutted camps also survive, including Okehampton. Many ranges dating from the Militia and Volunteers are marked on late 19th-century Ordnance Survey maps although some of these had fallen out of use before the First World War started. In Somerset, 26 rifle ranges have been identified and recorded on the HER.

The recruitment of Kitchener's "New Armies" of 100,000 men (*Your King and Country Need You: A Call to Arms* was published on 11 August 1914) brought a massive requirement for accommodation, training and transit camps. Between 1914 and 1915, a total of six "New Armies" were recruited, equipped and trained. The infrastructure for this was based on the County Regiments and was independent of the Territorial Force. Examples of the extensive infrastruc-

ture required include the village of Fovant in Wiltshire and its neighbours Compton Chamberlayne and Sutton Mandeville which became a vast military camp, complete with barracks, a hospital, parade grounds, rifle ranges, a camp cinema and YMCA huts (see page 260). A military railway was constructed to serve the camp, branching off the main line railway from London. Nearby at Codford there were 15 camps, while the other Wylye valley villages had 12 between them. Such camps would have been primarily constructed of wooden huts and have not survived, although there may be buried deposits and artefact scatters.

An indicative example is the use of early 19th-century cavalry camps at Camp Down near Pimperne and Blandford Race Down in Dorset. These were used both by the Regular Army and also by the Volunteers for their annual camps and "field days". A rifle range was constructed there in about 1860. In late 1914 a hutted camp was constructed for the Royal Naval Division and a Prisoner of War camp built alongside in 1916. The RAF, after its formation in 1919, moved into Blandford for a short period. After the end of the First World War the huts of Blandford Camp were sold off, with several surviving locally as village halls, and the area returned to agriculture and scrubland. In the interwar years the area continued to be used for training. In 1939 the site was again used for the construction of a large militia camp with wooden huts. After the war, the site was developed and is now the home of Royal Signals.

The massive involvement of the armed forces of the British empire in the war required staging and training camps before formations were moved abroad. The Fovant area of Wiltshire housed Australian and New Zealand troops. The entry ports for arriving Empire troops have not been identified but may have included Plymouth and Avonmouth. No sources have been found describing any effects on the infrastructure within the UK of the entry of the United States into the war on 6 April 1917 but many US troops appear to have been landed directly in France.

The invention of the tank resulted in the Bovington Heath area of Dorset being used as the major tank training ground. A railway spur to the camp for tank transportation was completed in 1918. Tanks were ferried to the Western Front through the port of Avonmouth.

Medical

In 1907 the War Office devised a scheme for 23 Territorial Hospitals, each with a minimum of 500 beds, to be set up in existing public buildings throughout the country in the event of war. At the outbreak of war, these were supplemented by temporary hutted and tented hospitals, set up with remarkable speed and economy in the grounds of asylums, hospitals, church halls, schools and converted private houses. In addition, there were Royal Navy hospitals including the Stonehouse Hospital at Plymouth. Numerous convalescence centres were also set up. The enormous numbers of casualties in the war (nearly 1.7 million British wounded), particularly from the Western Front, required a casualty evacuation system from the theatres of operations by sea and rail back to Britain. A study of the architectural history of English military hospitals has been undertaken for English Heritage by Kathryn Morrison. Some of these temporary hospitals have been identified including requisitioned country houses but no comprehensive study or lists of sites in the South West have been identified.

Demobilisation

After the 1918 Armistice, British forces were rapidly evacuated from France and sent to the nearest, to their home, of 26 Special Area Centres across the UK. Fovant in Wiltshire is an example of these, which later became a rest camp. Resettlement centres were also set up to help soldiers return to civilian life. Chiseldon Camp near Swindon in Wiltshire was an example. In addition, Colonial and Dominion forces had to be retained in the UK until troop ships were available for them to return home. These forces were concentrated near to their final embarkation ports (for example many Canadians near Avonmouth. No studies of the infrastructure used for demobilisation have been discovered.

Post-war housing included "homes fit for heroes" and smallholdings for demobilised servicemen to earn a living. Examples of the latter have been identified near Taunton. Post-First World War Petter-Nissen experimental houses at West Camel in Somerset have been Listed. Other typical housing projects include the ribbon development of small bungalows along main roads.

Command and Control of the Armed Forces in the UK

The Royal Navy commands covering the South West were Portsmouth Command, which included Portland Subcommand, and Western Approaches Command, which included Devonport, Falmouth and Cardiff Subcommands (the latter covering the Bristol Channel).

There was a major reorganisation of the Army static command structure in 1911 with the introduction of "Commands". The South West came under the new Southern Command but no study of the command structure and the subordinate headquarters, together with their buildings and supporting infrastructure appears to have been made.

English Heritage is currently commissioning a study of the 20th-century military command centres of the

Royal Navy, Army and RAF together with their associated communications facilities in England, including those used in the First World War. It is not yet clear how far down the three service chains of command the study will investigate and in what depth at regional level.

Communications

Since the Boer War, the Royal Navy had increasingly used wireless communications between ships and for ship-to-shore services. A number of Naval wireless stations were established in the South West. In addition, both wireless directional finding and intercept was carried out on German naval transmissions. Some of the sites used have been identified, particularly in Cornwall. German submarine telegraph cables were cut and diverted to Porthcurno, while other German cables off Emden were cut and re-routed to Falmouth for British use. The English Heritage command centres study should address some of this, while civilian communications are addressed in Section 14.7 on page 224.

Logistics

The Armed Forces logistics organisations supported forces both within the UK also those deployed abroad. This subject covers an exceptionally wide area of activities from the factories to the front line and includes dockyards, depots, dumps, parks and workshops.

Naval logistics sites around Plymouth include the Royal Dockyard at Devonport, the Royal William Victualling Yard in Plymouth and the Royal Naval Ordnance Depot at Bull Point, St Budeaux. No survey of First World War Army Ordnance, Supply or Remount Depots (known to have been sited at Shirehampton, Avonmouth, Gloucester, Templecombe, Sherborne, Bulford and Purton) has been found. Number 3 Western Aircraft Repair Depot, which serviced aircraft engines, was based at Yate.

The vital subject of the infrastructure of the naval and military logistics chains, including their air components, in the South West does not appear to have been studied and they are an element that is not identified by Schofield (2004). Nevertheless, the overwhelming importance of Armed Forces logistics in the First World War cannot be ignored.

Transport

The First World War was still very much in the age of the horse. For example, an infantry division needed 5592 horses while a cavalry division needed 9815. The infrastructure associated with a mounted army includes stables, indoor riding schools, outdoor equation areas, veterinary hospitals, hay and forage stores, farriers and blacksmiths' shops. A remount depot near Avonmouth has been identified as well as with a depot for 600 mules at Compton Bishop in Somerset. At the same time, motor transport was increasingly used.

The railways provided the primary means of wartime military transportation within the UK and carried vastly increased munitions and war stores traffic together with troop trains. New sidings and connections to Government dumps were constructed, while some garrisons like Bulford Camp, Fovant and Tidworth enjoyed their own branch railway. Considerable tonnages of coal from the South Wales coalfields were required for naval purposes and coal for warships had to arrive at naval ports to coincide with the berthing of the warships. This placed a considerable load on the Great Western Railway through the Severn Tunnel, and through Gloucestershire for deliveries to Scapa Flow and northern ports.

Munitions Manufacture

The extensive Royal Naval Cordite Factory at Holton Heath dates from the First World War. In Gloucestershire, remains survive from the shipyard and naval college at Beachley and a shell-filling factory at Quedgeley. A wood alcohol factory was developed in the Forest of Dean. A series of industrial plants around Avonmouth and to the north supplied materiel for the Western Front. These included petrol production, a shell-filling plant, and mustard-gas factory at Berwick Farm in South Gloucestershire.

The enormous demands for shells from 1915 onwards lead to the formation of the Ministry of Munitions and the passing out of government contracts for manufacturing shells to civilian firms, for example the GWR workshops in Swindon. The involvement of industry in war and munitions production across the South West may have resulted in some new infrastructure but this requires investigation.

Aircraft Manufacture

The aircraft industry included the British and Colonial Aircraft Company at Filton, the Gloucestershire Aircraft Company at Brockworth and Westlands at Yeovil.

Agriculture

The German blockade of the United Kingdom from 1916 onwards made it imperative to maximise agricultural productivity. This was mainly achieved through the ploughing up of existing pastures, rather than reclaiming land, together with the use of prisoner-of-war labour and women to replace conscripted men.

Prisoner of War (POW) Camps

Several POW camps have been identified in Gloucestershire and one at Sandhill Park, a requisitioned country house near Taunton. A POW camp at Princetown has been surveyed by RCHME. Many POWs

were landed at Avonmouth and moved by rail to camps. The recent English Heritage study of POW camps by Roger Thomas only covers the Second World War. With the number of POWs moved to the UK, particularly in the later years of the war, many more camps must have existed. Repatriation camps are mentioned at Blandford Camp in 1919.

Naval Ports and Docks

Major ports, for example Portland, Plymouth and Portishead had coast artillery batteries for their seaward defences. Early 20th-century coast artillery sites in Devon, like Renney Battery and Lentney Battery have been studied by Pye and Woodward (1996). Some underwater archaeology recording work has been carried out at the former naval base at Portland and a wreck survey is underway.

The docks at Portishead were at their most active in the early 20th century with their associated oil industry. Activity peaked during the First World War when most of the petrol for the Western Front was shipped from here, after being filled into 2-gallon cans. Avonmouth was used for the concentration and shipping out of motor transport, including tanks, to France. Both the ports of Avonmouth and Portishead were heavily involved in the movement of troops to and from the Western Front, the reception of Empire and Dominions troops in Britain and their return after the war.

The importance of coastal shipping throughout the war and the demands placed shipping and the associated ports and facilities may be a subject worth studying.

Military Aviation

Military aviation in the South West commenced in 1911 at Larkhill in Wiltshire on an existing civilian site. In May 1912 flying training for the newly formed Royal Flying Corps commenced at the Central Flying School at Upavon in Wiltshire, which is claimed to be the oldest UK airfield that is still operational. By the outbreak of the First World War, there were only seven service aerodromes in Britain and three of these (Larkhill, Netheravon and Upavon) were in Wiltshire. The Army Balloon School was also established at Rollestone in Wiltshire in June 1916 and Old Sarum (Ford Farm) was acquired in 1917. A number of important structures remain including balloon hangers. Flying training also took place at Lake Down (Druids' Lodge) Wilts, Leighterton and Minchinhampton Gloucestershire (for Australians), Stonehenge, Larkhill (Bristol's Flying School) and at Yatesbury.

To west of Salisbury Plain almost all air activity was confined to anti-submarine warfare with landplanes, seaplanes and airships bases mainly around the coast. In the battle against the submarines in the Atlantic, a number of Royal Naval Air Service (RNAS) airship stations including Merifield and Mullion in Cornwall, together with Moreton and Upton in Dorset, were established along the coastline. Seaplanes were deployed at sites including Newlyn, Portland, Torquay, Falmouth and Mount Batten, the last became an Royal Flying Corps seaplane base in 1917 and retains hangers from that period (Ashworth 1982; A Smith 2000).

On 1 April 1918, the Royal Flying Corps became a separate service: the Royal Air Force. Upavon became RAF Upavon and continued to be the home of the RAF Central Flying School. Blandford Camp was converted for use by the RAF Recruit Wing, Record Office, Equipment and Personnel Depot and Discharge Centre. In addition, a 99-bed RAF hospital was also established there and a railway connection laid, but in 1919 the RAF abandoned the camp.

Combat Art

English Heritage guidelines (English Heritage 2004) outline this new subject. There are excellent examples of combat art preserved in the 20 surviving military cap badges carved into the chalk at Fovant in Wiltshire together with a single badge nearby at Codford. The distribution of less-formal works is poorly known.

Commemoration

This subject includes wartime cemeteries and memorials to commemorate the use of sites by units or establishments, exceptionally noteworthy achievements of individuals or the loss of life in major accidents or operational deaths. Military museums form part of this and a significant number are present in the South West. Some museums are in former operational sites or fortifications.

With the appalling casualties and deaths, (over 703,000 killed), particularly on the Western Front, commemoration of the fallen came to the forefront. Large numbers of war memorials were constructed; some of these during the war, and a database has been produced by the Imperial War Museum (UK National Inventory of War Memorials). Nearly 6800 memorials have been identified across the South West and about 93% of these are on the database (July 2005) but more sites are being discovered. Wiltshire has a large number of war cemeteries with links across the empire. For example, 60 British and Australian soldiers are buried in the local churchyard at Fovant but other churchyards in the South West also hold the graves of service personnel.

The Imperial (now Commonwealth) War Graves Commission ordered half a million headstones from a special quarry, which was opened at Wakeham in Dorset. The carefully selected stone were shaped, carved with names and badges and shipped from Port-

land to the Western Front. Portland stone was also used for the Whitehall Cenotaph.

Miscellaneous Government Activities

Government logistics included food storage, particularly during the submarine blockade of the sea supply routes, to relatively minor activities like storing the Crown Jewels in a place of safety in Truro Prison. Other activities may have included anti-terrorism measures, particularly after the 1916 Easter Rising in Dublin. It is not clear whether any special infrastructure was created to meet these threats. A number of conscientious objectors were locked up in West Country prisons including Portland and Princetown.

14.12.4 The Second World War

During the Second World War there were two major campaigns where the South West played a unique and decisive role: the Battle of the Atlantic and as the area which hosted and supported the vast American contribution to D-Day and the invasion of Normandy.

A complication, when studying the archaeology of the Second World War is that units moved around and sites were re-used (often for short periods) for a number of differing purposes throughout the war. In particular, the US forces arriving in the South West under Operation Bolero in 1942–1944 used many existing sites that British Forces had previously used. It is therefore obviously not possible to take one single "snapshot" to understand the complexities of the history of military activity. Equally, some older sites were used, sometimes with only modernisation and at other times with completely new roles.

Many Second World War studies concentrate only on the offensive and defensive operations conducted from Great Britain and tend to ignore the vital background activities that were so essential for success. These include the vast organisations that trained civilians to become effective sailors, soldiers or airmen, the logistic chains from the front lines worldwide, and the factories that supplied them.

In this respect, it must not be forgotten that the United Kingdom supplied men and materiel to support offensive operations worldwide. It also exported some goods and received the imports and US support, without which the war could not have been successfully waged and eventually won. Sustaining the civilian population and their will to fight-on was a key factor. "Defence of Britain" was therefore defence of all these crucial activities and not just our homeland.

The much used term "total war" sums up how every facet of life was affected during, and for many years after, the Second World War. It suggests vast avenues of study that might be carried out to better understand the war. The legacy of the war lies not only in the abandoned fortifications as it also affected greatly the civilian infrastructure of the Region. While some defence works were quickly abandoned, the repair of bomb damage took years and some temporary housing is still in use some 60 years later.

With the Second World War there are still many survivors who can still relate their experiences and share their knowledge. This is important to understand fully the systems that were actually in place and how they worked in practice rather than relying on the official versions. In some cases, there are few surviving records and the knowledge of survivors is crucial; the Home Guard Auxiliaries or the British Resistance Organisation are examples of this problem. If information is to be obtained before it is too late, priority must be given to this research.

The Council of British Archaeology and English Heritage studies by Colin Dobinson, which starting in 1995 in a series titled *Twentieth Century Fortifications in England*, covers many, but certainly not all, aspects of Second World War sites. His works list examples of sites extracted from contemporary documents and give a very good guide to the types of infrastructure.

The Defence of Britain Project Handbook (Lowry 1996) also describes the main items of infrastructure to be found. This led to local surveys of infrastructure by volunteers, which have been recorded in the Defence of Britain Database. The results are variable depending on the knowledge, enthusiasm and whether local researchers could be found to carry out the work. The results have been passed on for inclusion in local HERs and no new information is being added to the national database (DOB 2002).

Barracks and Camps

Militia camps were constructed between May and September 1939 to accommodate the newly raised 35,000 strong Militia (later 50,000 strong); examples are at Norton Manor camp and Sherford Camp near Taunton. Other major camp construction programmes included the War Office works for units returned to the UK after Dunkirk (some 350,000 men from May 1940 onwards), Prisoner of War camps (from 1941 onwards, RJC Thomas 2003), camps for incoming US units under Operation Bolero (1942–1944) and for UK units moved to provide accommodation for incoming US units.

Between 1941 and 1944 camps were also constructed for the National Fire Service and Civil Defence. In preparation for D-Day, camps were built in 1943 for Phoenix workers and also as "preliminary camps" for D-Day, while in 1944, bomb damage repair workers camps were constructed to cover major D-Day sites. Camps during the Second World War also include temporary and bivouac camp sites and permanent tented camp sites, some of which were established long before the war. Some tented sites

had permanent cookhouses, latrines, straw stores and other buildings for the use by visiting troops. Many temporary hutted camps were also constructed to accommodate personnel based at requisitioned country houses.

Wartime Housing

Hostels were constructed for ordnance factory workers from 1940 to 1945 and for the Ministry of Aircraft Production from 1941 to 1945. The Ministry of Agriculture built hostels for agricultural workers from 1941 to 1942 including special hostels for the Women's Land Army. Wartime housing includes factory worker housing and married quarters; examples of the latter are can be seen in Corsham. "Prefabs" were used to overcome the immediate post-war housing crisis and 158,748 were produced in the UK. The Ministry of Works designed 9 different types of temporary housing (Arcon, Uni-Seco, Tarran, USA, Phoenix, Spooner, Universal, and Miller) while the Ministry of Supply produced aluminium homes, some of which still survive in Bristol.

Command and Control

This covers the armed forces and civil command structures, the headquarters sites and their associated communications facilities. It includes the "machinery of government in war" with Regional Commissioners and central government sites prepared for use if London became untenable.

The Royal Navy chain of command in the South West included Portsmouth Command and Western Approaches Command with their associated Sub commands of Portland, Dartmouth and Plymouth, and the supporting RAF 15 Group Coastal Command co-located at Plymouth. The control of convoys in the Western Approaches moved to Liverpool during the Battle of the Atlantic.

The Army chain of command within Great Britain from General Headquarters (Home Forces) in London down through Southern Command at Salisbury changed significantly during the war, in particular with the introduction of the Corps level of command during the summer of 1940 resulting in the formation of III, V and VIII Corps together with some divisional areas. The district, area, sub-district and sub-area organisations were also changed several times.

The RAF organisation in the South West included Groups from Fighter Command (10 Group), Coastal Command (15 Group) plus units from 32 Balloon Group, Maintenance and Training Commands.

From 1942 to 1945, the US Army and US Army Air Force (USAAF) were stationed in the South West. The US First Army headquarters was at Bristol with V Corps at Taunton, VII Corps at Salisbury and XIX corps at Warminster. At least 12 USAAF "AAF Stations" (mainly ex RAF airfields) were operational in the South West. The US Navy Fleet Air Wing 7 was based at Dunkeswell with headquarters at Plymouth.

No study appears to have been made of these command structures, their locations, hierarchy and boundaries together with the communications infrastructure they used in the South West. Many requisitioned buildings were used, in particular country houses. English Heritage, however, are currently commissioning a study of 20th-century military command centres, and their associated communications, to include those used from the inter-war years onwards. This could prove to be extremely useful but the numbers of headquarters involved, the many moves of army formations and the complexity of the logistic chains may not produce sufficient details at regional level.

The "machinery of government in war" included evacuation plans for central government if London became untenable and sites selected included West Country options. The Regional Commissioner for Region 7 was based in Bristol.

Air Defence

The Air Defence of Great Britain (ADGB) in the South West consisted of Fighter Command with 10 Group at Box with associated Sector operations centres and RAF fighter stations. Anti-aircraft gun and searchlight support came from 5 (AA) Division of the army's Anti-Aircraft Command. In addition, Royal Observer Corps and RAF Balloon Command were an integral part of the defences. After the fall of France in June 1940, the fighter cover, with associated radar and Observer groups, were extended westwards through Somerset, Devon and Cornwall.

Airfields RAF airfields are well covered in such works as Ashworth (1982) and Countryside Books' Airfield Series (G Smith 1999; 2000; Berryman 2002; 2005; 2006). Copies of original airfield plans are available from the RAF Museum for most sites. Dobinson's (1997; 1998a) work covers the basics. Management or planning related reports have been prepared on several airfields by Paul Francis: (Exeter, Dunkeswell, Upottery (Smeatharpe) and Culmhead (Somerset, prior to major demolition there, Francis 2001). These reports suggest that there is considerably more work to be carried out on the other (*c.*80) airfields in the South West. In addition, there were flying boat stations at Plymouth (Mount Batten) and Poole (Hamworthy) with their own unique infrastructures. Fleet Air Arm stations (such as Culdrose, Henstridge, St Merryn or Yeovilton) must also be included.

Radar Dobinson (1999b) gives a clear outline of the development, although there are some gaps, such

as Ground Controlled Intercept and Coastal Defence radars. An ongoing project studying radar in the South West by Andrew and Mike Passmore started at Exminster Radar Station in 2004. Shorter reports are planned for other sites.

Anti-Aircraft Artillery Anti-aircraft defences in the South West included gun-defended areas from 5 (AA) Division at Holton Heath, Brockworth, Plymouth, Bristol, Yeovil, Falmouth, and Portland. ADGB logistic installations include the ADGB magazines (such as Burnett Magazine near Keynsham) and Intermediate Ammunition Depots (such as at Dimmer in Somerset). Dobinson (1996a; 2001) explains the anti-aircraft organisation and gives a gazetteer of sites. Chris Webster is studying the unique survival of a rocket (ZAA) battery at a bombing decoy on Mendip.

Searchlights During the war there were at least three major redeployments of searchlights in the South West. Before the autumn of 1940, searchlight cover does not appear to have gone further west than a very approximate line from Burnham-on-Sea to Portland with an area around Plymouth. As the searchlights were deployed westwards, they were initially placed singly, later clustered in threes and, later still, deployed in "fighter boxes". As an example, Somerset had some 58 cluster sites in 1941 and 124 sites in the 1943 "fighter box" deployment. In addition to searchlight sites, there were also Anti-Aircraft brigade, regimental and battery headquarters sites, together with training regiments. Dobinson's (1999d) report does not give a full list of sites but includes examples from Devon and Dorset.

Royal Observer Corps (ROC) The Observer Corps (Royal Observer Corps from 1941) included Group headquarters at Yeovil, Bristol, Exeter, and Truro together with the associated ROC lookout posts. The basics of the Royal Observer Corps has been studied in depth. The standard work is Wood (1976), although this contains some anomalies.

Balloon Barrages Barrages in the South West included Plymouth, Bristol, Gloucester, Yeovil, Weston-super-Mare and Portland with Balloon Centres No 11 at Bristol (Pucklechurch) and No 13 at Plymouth. In addition, there was balloon gas production at Weston-super-Mare. John Penny has researched the Pucklechurch Centre and the associated barrages.

Camouflage and Concealment, Deception and Blackout

Dobinson (1999a; 2000) lists most, if not all decoy sites using the National Archives as his base source. Not all of those listed have been successfully identified on the ground or surveyed. Daytime decoys were primarily built for all satellite airfields (K sites) while night-time Q sites were provided for many airfields. QL sites had lighting to divert bombers from the target before an attack and QF had fires to divert subsequent waves of bombers after an attack. Special fire (SF) or "Starfish" sites were set up to protect major towns. The site on Black Down to the south of Bristol has been studied (Schofield *et al.* 1998) and subsequently Scheduled. Special decoys were also used for D-Day sites.

Most airfields and many factories were camouflaged and no survey has been made of the schemes used and what survives; particularly in disruptive painting or deception (for example, painting factories to appear like terrace houses, as at the Westland Factory, Yeovil, Gittos and Gittos 2004a). Pillbox and gun emplacement camouflage is a wide subject and few contemporary records or pictures exist of camouflage scheme. The main information source may be older people who still remember some of the details.

Intelligence sites

Y Service Y Service (radio intercept) sites or RAF "Home Defence Units" provided number of "VITAL" wireless intercept stations. In particular, the RAF Y Service station at Strete in Devon played a significant role in intercepting Luftwaffe ground-air communications. A Foreign Office intercept station was sited at Shaftesbury.

Radio Counter Measure sites (RCM)

The RAF Radio Counter Measures deployed to jam or "bend" the navigation beams used by the Luftwaffe used some 23 sites in the South West. Some of these sites have been identified by name but progress is slow as the contemporary records in the National Archives are almost devoid of any grid references. The initial search for the German beams was carried out from RAF Boscombe Down.

Radio Navigation Aids

Radio navigation aids together with flying control and radio aids became increasingly important as the war progressed. Some of these were associated with individual airfields, while others were deployed to give geographical coverage. They range from visual beacons (such as Occult) or searchlights (Sandra Lights) to Standard Beam Approach or Beam Approach Beacon Systems. In addition, some bomber navigation aids like "Gee" had sites in the South West. English Heritage have identified that this subject needs further research.

Anti-Invasion Defences

This subject is wide and covers beach defences, inland defences, stop lines and anti-tank islands/centres of resistance. The pioneering work of Henry Wills (1985) on anti-invasion defences, and in particular, pillboxes, drawing on appeals to the public and his own research work has resulted in lists of varying accuracy and completeness, dating from the 1980s and covering most of Britain. Wills, however, did not recognise the vast amounts of information available in the National Archives. The Defence of Britain Project led to large numbers of defences being identified by volunteer field workers, which are recorded in the DOB Database (DOB 2002). The results have been passed to HERs but it is not always easy to reconcile the results with information already in the HERs from other sources. Dobinson (1996b) covers the subject well and includes some infrastructure lists.

Stop Lines Within the South West at least 13 stop lines were planned and the majority built. The main stop line was the General Headquarters (GHQ) line with Green, Blue and Red sectors. Southern Command stop lines included the Taunton line, Salisbury West, Ringwood and Salisbury East lines, while Corps lines included the Dorchester, Blandford, Sherborne, Bodmin, Exeter and Tiverton lines. A recent combination of documentary research, by David Hunt, and fieldwork has shown that the Taunton Stop Line is one of the best-documented and preserved examples in the country. The states of knowledge of the other lines is not clear although there has been some work on the GHQ line (Alexander 1999; Green 1999).

Anti-Tank Islands There were some 60 anti-tank islands, some of which later became "centres of resistance", across the South West. Some were based on the major crossing points on stop lines, while others were major route centres. The latter appear to have had fewer pillboxes and anti-tank obstacles around them when compared with stop line islands. Some town islands had a significant number of road blocks (for example, Yeovil had 23 blocks), while the defences and blocks in Taunton were significantly changed at least three times during the war. Permanent road blocks were added to the defences in other places. Somerset had some 337 permanent road blocks, in addition to Home Guard blocks, suggesting that the totals throughout the South West would have been large. There were also semi-permanent vehicle check points with some 78 in Devon, Cornwall and Somerset. No serious study appears to have been made of the anti-tank islands and their defences or roadblocks across the Region.

Home Guard

Jeffrey Wilson (2003) has extensively studied the Somerset Home Guard. There are a considerable number of former sites in the South West including numerous road blocks, check points, defended positions, observation points, ammunition stores, headquarters and ranges, many of which are not documented and are only known to former members. Few sites survive. The Home Guard also manned flame fougasse positions and David Hunt has identified over 80 sites in Somerset. Defence of Key Points (KP) or Vulnerable Points (VP) was also undertaken by the Home Guard and although lists of these are available in the National Archives, the actual sites and their significance are not always obvious. The Home Guard were also deployed in anti-aircraft and coast artillery, including rocket anti-aircraft (ZAA) batteries, beach batteries and railway anti-aircraft defences.

Home Guard Auxiliaries

Somerset Home Guard Auxiliaries with their operating bases (OB), stores and dumps are being researched by Tim Wray, building on the extensive work of Donald D Brown (1999). This research includes the British Resistance Organisation (BRO) covering both personnel and facilities like message drops, radio stations and control stations. As few records survive and those involved only knew their own duties, it is important to interview survivors before memories fade.

Coast Defences

Dobinson (1996d) covers the main sites of both coast and emergency batteries with a site gazetteer. There are still many details to research including Coast Artillery radars and beach batteries but there has been some work on individual sites, for example Teignmouth (Shaldon), Brixham (Newman and Salvatore 2003), Kingswear (Wilson-North 1993) and Brean Down (Webster 2001). There is a lot of unpublished research on coast defences by the Fortress Study Group South West, Defence of Britain Project volunteers and Bill Horner of Devon County Council. The Second World War defences of Plymouth have been extensively covered by Pye and Woodward (1996). Other port defences include anti-torpedo boat batteries, beach batteries, block ships, booms, mine fields control towers and flame throwers.

US Forces (Operation Bolero)

Operation Bolero covered the move of nearly 1.5 million United States troops into Britain between 1942 and 1944 before the Invasion of Normandy. Many of these troops moved into the South West and it was first necessary to move British units out to vacate their accommodation and facilities for the US.

Major railway improvements were made to facilitate the arrival and support of US forces. Accommodation and camps included hutted or tented camps, hospitals, facilities for billeted troops (dining, latrines and recreation) and Overlord camps. US leave centres were also provided.

Depots included General, Quartermasters (QM), QM (fuel), Ordnance Services, Ordnance Ammunition, Ordnance Vehicles, Transport Corps, Chemical Warfare, Engineer and Medical. Special sites included tunnelled headquarters, vehicle parks, post offices, special schools, parachute packing plant, salvage plants and tyre repair shops.

US Hospitals Apart from civilian hospitals loaned to the Americans, General Hospitals (1084 beds) and Station Hospitals (834 beds) were specially constructed together with conversions of existing camps (in many cases 1939 "Militia camps") and tented extensions to existing hospitals. These were provided to primarily meet the needs of the US troops training or working in the UK before D-Day and, afterwards primarily for US battle casualties evacuated from Europe. The final target was 94,000 beds ready by 30 April 1944.

The impact of American forces and the infrastructure they used is a topic that requires more work. Initial research suggests that much relevant documentary information is probably only available in the USA.

Research and Development (R & D) Establishments

No survey appears to have been made of R & D establishments in the South West. The Radar and Telecommunications establishment moved from Bawdsey on the east coast to Worth Matravers in Dorset but later moved to Malvern. Experimental ranges include Pawlett Hams, Chesil Beach, Birnbeck Pier (Weston-super-Mare) and Brean Down.

Production and Manufacturing

The military aircraft industry in the South West included factories at Brockworth, Filton, Yate (components) and Yeovil. "Shadow factories" for aircraft construction were built at Filton and in 1940 at Weston-super-Mare. Filton was also used to construct aircraft that had been brought from America in kit form. Underground factories include Spring Quarry at Corsham and Temple Cloud. Examples of other factories are the Royal Ordnance Factory built at Puriton, Standard Telephones (evacuated to Ilminster) or torpedo boat construction at Teignmouth but these are only a sample. No study of wartime manufacturing or production in the South West has been identified.

Training

Ranges and Training Areas The South West has a number of major training areas including Salisbury Plain, Bovington, Lulworth and Okehampton. During the Second World War other areas were requisitioned and extensively used, including parts of Exmoor and the Devon South Hams. Artillery ranges, tank gunnery ranges, armoured vehicle driver training, field firing ranges, anti-aircraft gunnery ranges (such as Doniford or Bude) and a large number of temporary rifle ranges were used, including Home Guard ranges and training areas. Naval ranges in coastal waters are marked on some wartime "overprinted" maps. Fighting-in-built-up-area sets included the villages of Imber, Tyneham and around Slapton Sands. At least 20 bombing and air-gunnery ranges have been identified in the South West, some well inland and others on coastal sites. Examples are Chickerell, Crichel Down, Lilstock, Steart and Pawlett.

It is difficult to establish the full range of service training units and establishments across the South West. They range from major prestige establishments like the Britannia Royal Naval College Dartmouth to smaller training centres like the Infantry Training Centre in Taunton.

Civil Defence

This subject does not appear to have been researched to any extent. In Dobinson (1999c) most of the information is about shelter policy and design, and no infrastructure lists are included. The implementation of such policy was at local level. A survey by Colin Lacey in Southampton reported a significant survival rate for exterior domestic shelters. The following topics indicate the scope of this subject: Civil Defence controls, warden posts, shelters (public, works, private, domestic and military), Air Raid Precautions (ARP) rescue (bases, training facilities), gas and decontamination, emergency feeding and British Restaurants. Most information is likely to be in local sources and a quick search in the Somerset Record Office indicates that the records are likely to be extensive.

Fire Service The fire services in war include from 1937 onwards the Auxiliary Fire Service (AFS) and the National Fire Service (NFS) from 1941, when all local authority fire brigades were taken over. The NFS was disbanded and local authorities regained control in 1948. The NFS organisation from Region level consisted of Fire Forces, typically split into Divisions of 100 pumps, Columns of 50 pumps, Companies of 10 pumps and Sections of 5 pumps. The organisation changed during the war but the South West was covered at various times by Fire Forces 16, 17, 18, 19 and 39. The NFS organisation used

existing fire stations together with new accommodation; particularly for headquarters, maintenance, training and supply facilities. In addition, regional reserve camps, and patrol bases were set up at various times. NFS observation posts, together with firewatcher/fireguard posts were also used in major urban areas. Water supply includes special tanks, basins, dams on streams and rivers, static water tanks, flooded cellars and steel surface water mains. On rivers borehole pumps, moored pontoons with pumps, sunken barges (on tidal rivers) and pump access routes including draw docks were used. There is little evidence of any research into the AFS and NFS and its infrastructure. Moreover most of the pre-war fire stations have been superseded by more modern buildings, particularly in rural areas and smaller towns. Military depots, airfields and some camps had their own fire stations and "passive air defence" (PAD) water tanks.

Government Storage

Considerable government storage was needed in the Second World War ranging from coal dumps (for example at Hewish, Somerset, on the Southern Railway), to stores for the Ministry of Supply, the Stationery Office and the Ministry of Works. The Ministry of Food storage included meat cold storage, grain silos and food "buffer depots". Near major ports "inland sorting depots" for imports were established to provide a quicker unloading and turn-round of ships. Safe repositories for national treasures included Shepton Mallet Prison and Montacute House.

Preparations for D-Day

Operation Overlord Preparatory Sites Some aspects of the subject have been studied by Dobinson (1996c) but he covers a very restricted range of sites. The scope of this subject is, in contrast, wide and includes "Mulberry" harbour construction sites, "Phoenix" block-ship building sites, maintenance and repair areas for landing craft, embarkation sites, hards, dolphins, reserve landing craft storage, fuel pipelines and fuelling facilities, hard masters' offices, roads, bridges and embarkation camps.

Other D-Day associated sites include decoys, bomb-damage repair-workers camps, and camps for National Fire Service redeployment to cover Overlord. Advanced landing grounds were brought into use to allow aircraft to fly the minimum distances from the South West to support the Normandy landings.

Training for D-Day included such areas as Slapton Sands, Woolacombe Amphibious Training Area with concrete mock-up landing craft or simulated German defences of the Atlantic Wall. There has been a lot of unpublished work by Richard Bass, Bill Horner, Defence of Britain Project volunteers and English Heritage (MPP) on the US Assault Training Centre at Woolacombe, embarkation facilities in South Devon estuaries and other D-day preparations such as hospitals and depots. These include Paul Francis's 1997 report for the planning authority on the US Naval Amphibious Supply Base at Exeter. British training camps have also been studied at Woodbury Common (by a local group), Appledore/Northam/Instow (by Appledore Maritime Museum) and Dartmoor Ranges (by English Heritage).

D-Day Logistics The logistic systems to support both the American and British landings included depots, dumps and other installations. The use of coastal shipping for cross channel transportation and road and railway transport within the UK needs further study to give a full overview.

Medical The expansion of the medical systems to cope with battle casualties post D-Day includes the provision of additional hospitals. These included requisitioned hospitals, hutted hospitals, Militia camp conversions, convertible/dual-purpose huts and tented expansions. Ambulance trains, stabled at key railway junctions, supported the air and sea evacuation routes, while airfields were supported by road transport. Some had on-site tented hospitals (such as Merryfield in Somerset).

Armed Forces Logistics

The logistic infrastructure and organisations of the armed forces during the Second World War does not appear to have been studied in depth. Logistics were critical for the success of all operations. The infrastructure was extensive with storage depots, parks and dumps for rations (supplies), petroleum, ammunition, vehicles, stores, engineer stores, salvage, returned stores and medical stores, workshops maintenance and repair facilities, bakeries, laundries together with remount depots and veterinary hospitals. Little is recorded about Royal Navy logistics.

RAF logistics was based on Maintenance Units (MU) (an example of which was 67 MU in Taunton, which was responsible for the recovery of crashed aircraft throughout the South West). RAF storage included "satellite landing grounds" for aircraft storage (5 are listed in the South West) and ammunition depots (forward, advanced parks and reserve depots).

Underground storage facilities included Chilmark (RAF), Corsham and Monkton Farleigh (Army) and Copenacre, Monks Park and Beer (Royal Navy).

Personnel Services Facilities

These include recruiting facilities, basic training, holding/drafting units, training establishments, rehabilitation units and military prisons. Welfare facili-

ties included clubs, the Navy, Army and Air Force Institutes (NAAFI), chapels, cinemas and voluntary organisations like Church Army, Young Men's Christian Association (YMCA), Young Women's Christian Association (YWCA) and Toc H.

Medical and Hospitals

The infrastructure programmes for hospitals and medical facilities covered the Emergency (Civilian) Hospital Programme (1939 to 1943) and the US hospitals described above (page 258). In addition, British armed forces provided their own military hospitals and medical reception stations (MRS). These were supported by blood banks and medical stores depots. Veterinary hospitals were also required.

Inland Transport – Railways

Railway wartime Air Raid Precaution measures included black-out sheds, blast protection, shelters, protected accommodation, decontamination and water supply. From 1943 onwards, Home Guard Light Anti-Aircraft guns protected key railway facilities (such as Taunton, Exeter, Axminster and Templecombe).

At least 15 major government funded infrastructure schemes for improving rail transport in the South West were funded during the Second World War, primarily on the Great Western Railway (GWR). These included passing loops, sidings, marshalling yards, rail access to military sites and loading facilities. In addition, "capacity measures" such as "interconnects" to allow alternate routing between railway companies (for example, an interconnect was built between the GWR and the Southern Railway (SR) at St Budeaux Junction in 1941 allowing GWR and SR trains to use each other's routes between Plymouth and Exeter) or the quadrupling of lines between Gloucester and Cheltenham for the GWR and London, Midland and Scottish (LMS).

Additional works for Operation Bolero (the arrival of US Forces in the South West) and D-Day included further capacity interconnects (such as between the GWR and SR at Launceston, Lydford and Yeovil in 1943), additional passing loops to increase line capacities including, in 1943, nine places on the GWR between Bristol and Plymouth, and additional sidings.

Countryside at War

English Heritage (Schofield 2004) suggests this as a subject for research including activities by the Ministry of Agriculture such as land drainage schemes, reclamation of moorland and hill fields, and forestry. No studies have been identified that cover this aspect in the South West.

Submerged archaeology and aircraft crash sites

Underwater archaeology is active in the South West and some aircraft crash sites have been listed.

Combat Art

English Heritage guidelines outline this new subject (English Heritage 2004). Significant Second World War examples survive in the Corsham underground aircraft factory but the overall distribution and survival is poorly known.

Commemoration

This includes wartime cemeteries and memorials to commemorate the use of sites by units or establishments, exceptionally noteworthy achievements of individuals or the loss of life in major accidents or operational deaths. These include military, enemy, allied and civilian war cemeteries. An example of the latter is at Bath where 400 civilians were buried after the initial "Baedeker" raids on the city from 25–26 April 1942. To date 392 war memorials have been identified in Somerset from the United Kingdom National Inventory of War Memorials. Examples of other monuments and statues include the 43 Wessex Division memorials at Wynards Gap and Mere.

Conclusions

The topic of the Second World War in the South West is enormous as "total war" affected all facets of life. Much of the research appears to have been carried out on a local or county basis or to have been part of national initiatives. There is little evidence of regional studies but Cornwall is probably the main exception .

There are some major topics in the South West concerning the Battle of the Atlantic or the US Contributions to D-Day, where full regional studies would be invaluable. Equally, there are areas where most of the records are local and research can be carried out effectively on that basis. Such studies may offer opportunities to students or amateur researchers.

The importance of collecting information from veterans before their memories fade or they pass away is important and, in some areas, personal knowledge may be the only information available.

Many of the "unfashionable" areas of war like logistics deserve study; although these are complicated.

Lastly, Second World War studies should not be confined to the period of hostilities between September 1939 and August 1945. Much significant work was carried out in the period of re-armament from 1933 onwards (for example, the RAF Expansion Scheme) while the challenges of repairing the damage, demobilising the Armed Forces and returning the country from a state of war took many years.

14.12.5 1946–1989

The period after the Second World War was dominated by the Cold War but there were many other major military activities including the enforcement of the terms of surrender on Germany and Japan, occupation duties in Germany, the maintenance of security within the diminishing Empire and the re-establishment of British influence in the world, particularly in the Middle East. These include major wars like the Korean War (1950–53) or internal security operations like Kenya, Cyprus, Aden, Malaya, the Suez Crisis in 1956 and Borneo, often against the threat of Communism. The Defence Review of 1957 initiated a difficult period of major transition with its requirement for a rapid deployment force with modern weapons and equipment. There was also the increasing threat of terrorism and the deployment of forces in an internal security role in Northern Ireland, particularly from the late 1960s onwards.

The period includes the run down of the wartime armed forces and civil defence, and disposal of land, infrastructure and materiel. This has resulted in camps, depots, dumps, ranges, airfields and training areas vanishing from the landscape. No studies appear to have been undertaken to establish the extent and purpose of this lost infrastructure or any memories of those who worked or served there.

All these post-war activities now cover a span of almost half a century and may be divided into:

- Cold War defences and precautions of the United Kingdom both national and through the NATO Alliance
- UK contributions to NATO, primarily in the NATO Central Region in Germany
- UK national military activities in both the UK and worldwide, including aid to the civil power (for example, disaster relief or during strikes) or on humanitarian missions worldwide

The policy of defence through deterrence implied bluff and deception and well-publicised plans may suggest capabilities that in reality existed only in limited forms. The political use of "spin" should not be underestimated and it is therefore important to capture the views and experiences of those actually involved in Cold War activities to ensure that a balanced view can be recorded for future generations. The attitudes, beliefs and fears of the ordinary civilian are also definitely worth recording.

This report gives some limited examples of the scope of all these activities in the UK with particular reference to the Cold War and the South West; it cannot be comprehensive and relies on personal knowledge backed by limited research.

Previous Studies

Much information about the Cold War infrastructure and planning still remains to be uncovered. The "30-year rule" for the release of public documents means that documents are not available for the latter half of the 60 years since the end of the Second World War. Many of those with personal experience or knowledge may feel unable to contribute due to their life-long obligations under the Official Secrets Act. Moreover, much was kept on a "need to know" basis and there are few, if any, who enjoyed the complete, detailed picture. Researchers may therefore be unaware of major areas worthy of investigation. However, there is much conjecture and guesswork, not to mention expanding rumours from enthusiastic amateurs, in particular on some of the websites devoted to the topic.

There is no obvious evidence that the Cold War in the South West has been researched in depth although a number of installations have been identified and recorded. The earliest sources appear to be two books: *Beneath the City Streets* (Laurie 1979) and *War Plan UK* (Campbell 1982), both of which were believed at the time to be the work of "moles". Some consider that Campbell got a surprising number of things right but certainly not in every case and there are said to be many omissions and misunderstandings!

Two carefully researched books by McCamley (2000; 2002) cover radar stations, the Central Government War Room at Corsham, Regional Government Headquarters (RGHQ) together with many local authority "bunkers". His lists, however, are incomplete. Subterranea Britannica has investigated a number of sites, concentrating on underground bunkers (see http://www.subbrit.org.uk).

The recent English Heritage book *The Cold War* (Cocroft and Thomas 2003) is an authoritative study of many, but not all, aspects of the Cold War. The "30-year-rule" limited the authors' access to public documents from the later years of the period, although access to abandoned sites (for example Cruise Missile facilities) enabled them to partially overcome this limitation. Activities like Military Home Defence (MHD), the formations assigned to MHD, their war headquarters and associated communications were not included in the scope of the book. The Ministry of Defence Joint Operation Centre, the national Northwood facility and the major NATO headquarters in the UK (CINCCHAN and UKAIR) are also omitted (none of these were in the South West). Royal Navy, Army or RAF fixed and strategic communications and the Defence Communications Network or earlier defence systems are also not covered.

The *Defence of Britain Project Handbook* (Lowry 1996) describes the basic infrastructures of the period. The DOB database lists the sites identified

by local enthusiasts in the early 1990s including those categorised as "Cold War" but the list is primarily of Royal Observer Corps (ROC) sites with a few radars; the database is no longer being updated DOB (2002). An authoritative book describing the Royal Observer Corps systems is *Attack Warning Red* (Wood 1976).

Documentary research on the Cold War by Colin Dobinson in the National Archives (Dobinson 1998b) concentrated on just four topics: 1950s "Rotor" programme radar sites, Bloodhound surface-to-air missiles, Thor missiles, and ROC warning and monitoring posts. Neither Bloodhound nor Thor was deployed in the South West.

English Heritage has issued discussion document *Modern Military Matters* (Schofield 2004) aimed to give a clear and coherent statement of the state of knowledge, with future research priorities relating to 20th-century military remains in Britain. This identifies a number of specific areas for research and lists objectives for improving the understanding of the built and surviving resource, including the period since the end the Second World War.

English Heritage are currently commissioning a study of 20th-century military command centres and their associated communications in England including those used in this period. This could prove to be extremely useful but the Official Secrets Act may restrict the scope of this study, particularly where facilities are still in active operational use.

The NATO Alliance in the UK

UK Independent Deterrent The UK maintained, and continues to maintain, an independent nuclear deterrent, which included the Polaris submarines and, from 1955 to 1982, the V-Bomber Force. Although independent, these forces could also be included in the UK contribution to NATO. Associated infrastructure identified in the South West includes V Force dispersals at St Mawgan, Yeovilton, Boscombe Down, Lyneham, Tarrant Rushton and Kemble. "Gee-H" bomber navigation transmitters were operated from a South West Chain Master Station at RAF Sharpitor (Dartmoor) with secondary stations at Sennen and Worth Matravers. Submarine maintenance facilities were built at Devonport in 1980, which included nuclear submarines.

NATO Infrastructure Funding for NATO infrastructure for both UK and US assigned forces produced some facilities in the UK. These include NATO war headquarters for NATO Major Subordinate Command-Channel (CINCCHAN) at Northwood (Middlesex, alongside but separate from the headquarters of Commander in Chief Fleet) and Principal Subordinate Command UKAIR (High Wycombe, Buckinghamshire) collocated but separate from the headquarters of the Air Officer Commanding in Chief of RAF Strike Command. Significant parts of the sea and air defences of the UK were therefore integrated into the NATO system.

Other NATO Funded Infrastructure includes Cruise Missile bases (GLCM) reinforcement facilities, ammunition storage, port facilities, control and reporting centres, UK Air Defence Ground Environment (radar) (for example at RAF Portreath), communications, fuel facilities including pipelines, forward ammunition storage facilities, airfield survival measures (ASM), training facilities and ranges. Very few of these NATO funded infrastructure facilities were built in the South West but no systematic review of any possible NATO infrastructure in the region appears to have been undertaken.

UK Contribution to NATO There are a number of UK sites, which were primarily concerned with the UK's contribution to NATO but were not NATO funded. These include the UK Air Defences including the RAF Rotor and Chain Home sites, such as the Chain Home Extra Low (CHEL) site at West Myne, Minehead (ongoing study by Chris Webster) and GCI radar at Charmy Down. During the Cold War, up to 12 radar stations of varying types are listed in the South West. Training for some NATO navies was carried out at Portland. The Naval headquarters at Mount Wise Plymouth, which reused Second World War tunnels, is understood to have had a role in the NATO Channel Command; it has recently been decommissioned.

US Facilities in the UK There were relatively few US facilities in the South West. US sites include the US Forces Hospital at Little Rissington airfield, RAF Fairford (used for in-flight refuelling tankers) and the GCHQ/US site at Morwenstow. The USAF also used RAE Boscombe Down as a reserve base during the 1980s where NATO Airfield Survival Measures (ASM) hardened structures were constructed. Some US installations and facilities in the UK may not be associated with NATO and may be provided through bilateral UK-US agreements.

Intelligence Sites Intelligence was particularly critical throughout the Cold War and key sites in the South West include GCHQ (which moved to Cheltenham in 1952 on the site of a former US hospital – the original buildings have now been demolished.), the associated Composite Signals Organisation Station at Culmhead (which closed in February 1999) or the GCHQ/US site listed at Morwenstow. The Official Secrets Act is likely to hinder detailed research and other sites may have existed.

Support for the UK NATO Assigned Forces on the Central Front These forces were primarily 1st (British) Corps in Northern Army Group and RAF Germany units for 2nd Allied Tactical Air Force (2ATAF). The equipping and logistic support of NATO assigned forces remained a national responsibility. To support these assigned forces, the British Rear Combat Zone in Germany and British Lines of Communication from the channel ports to Germany, required major reinforcement from Regular and Territorial Army (TA) units; together with RAF and RAFVR units from the UK, including the South West. Associated operations included the possible evacuation of service families from the Continent in times of increased tension to sites across the UK including in the South West.

Logistics Significant quantities of war materiel needed to be out-loaded from depots in the UK to Germany. Typical installations in the South West include the Central Vehicle Depots at Ashchurch (wheeled vehicles) and Ludgershall (armoured fighting vehicles), (now BVD Ludgershall), the Petroleum Reserve Depot West Moors, Dorset, or 3 Supply Reserve Depot near Taunton. There would also have been a need to re-supply the forces in combat and for battle casualties to have been evacuated to the UK. However UK installations served not only NATO assigned forces but also other UK forces deployed in the UK on Home Defence and also UK forces deployed worldwide. An example is the Admiralty Hydrographic Office at Taunton (whose collection of maritime surveys is an outstandingly important archaeological research resource for the Post-Medieval and Modern periods).

Training The units assigned to supporting UK forces on the Central Front required training in the UK including use of the Dartmoor and Larkhill range complexes, Lulworth Tank Gunnery Range or the special "Fighting in Built-up Areas" (FIBUA) facilities at Copehill Down, Wilts. Other training facilities included air gunnery and bombing ranges (such as at Lilstock and Steart) or anti-aircraft ranges (Doniford from 1925), all on the north Somerset coast. The large number of TA units required to support British Forces in Germany and the Lines of Communications in a period of tension and in war all needed a number of local TA Centres, pre-stocked unit equipment (PUE) stores, Weekend Training Centres (such as Cribbs Causeway, Bristol), rifle ranges (for example, Yoxter on Mendip) and training areas in the UK. Dr Mike Osborne is carrying out a national study of TA Centres and Drill Halls which will cover this period.

National Service An important feature of this period was National Service. The 1948 National Service Act, effective from 1 January 1949, fixed the period of National Service to eighteen months with 4 years in the reserves. In 1950, the Korean War led to an increase in the period of service to two years, with three and a half years in the reserves. The "call-up" finally ended on 31 December 1960 and the last National Servicemen left the Army in May 1963. The training organisations for National Servicemen (such as recruit training centres, War Office Selection Board sites (WOSB), Officer Cadet Training Units or OCTU), the barracks and camps they occupied and the welfare facilities that were provided (for example, NAAFI, Toc H, Salvation Army, Church Army, YMCA, YWCA, Malcolm clubs etc) have not been specifically recorded. Neither have the Navy, Army and Air Force recruiting offices, through which volunteers joined the services. The Regular Commissions Board at Leyton House, Westbury assessed all potential regular Army officers.

Cadets The inevitability of National Service for most of the youth of the nation led to a growth in the volunteer cadet organisations like the Sea Cadet Corps, Army Cadet Force, Air Training Corps, Junior Training Corps, the Combined Cadet Force, the Senior Training Corps, University Officer Training Corps and the University Air Squadrons. There is unique infrastructure associated with these cadet forces and university training units, and examples include training huts, miniature rifle ranges, small aircraft hangars and gliding centres. Some will be found in schools or universities (such as Bristol), others in public areas or associated with TA Centres.

Training Establishments Armed forces training establishments with specific Cold War roles in the South West included the Defence Nuclear Biological and Chemical Defence School at Winterborne Gunner or the Joint Service School of Languages (JSSL) at Bodmin for Russian courses. Other military training establishments include the Britannia Royal Naval College Dartmouth, RAF Radio School Locking, Defence ADP Training Centre Blandford Camp, RAF Central Flying School Little Rissington, RNAS Yeovilton, Royal School of Artillery at Larkhill, School of Infantry at Warminster, School of Signals at Blandford Camp, Royal Armoured Corps Training Centre Bovington and the Lulworth Tank Gunnery Ranges. The services also ran junior training organisations like the Army Junior Leaders Regiments (Denbury in Devon and Norton Manor camp in Somerset) or the RAF Apprentices School at Locking. No comprehensive study of services post-war training facilities in the South West has been undertaken.

UK Home Defence (UKHD)

The Cold War also required both Civil Defence and Military Home Defence (MHD) to protect the UK and the population. These activities were a national responsibility and not part of the NATO commitment.

The role of the reserve forces, and in particular the TA, included both units committed to the NATO role and others specifically for Home Defence, including Civil Defence roles. From 1955 to 1959 the Mobile Defence Corps was formed from Army reservists trained in Civil Defence skills, particularly light rescue. In the early 1960s, Territorial Divisions assigned to NATO in Germany were re-roled into Civil Defence. Army District headquarters became Divisional Districts and took on an additional Civil Defence role. The HQ of Southwest District and 43 (Wessex) Division in Sherford Camp Taunton and, later, Bulford was responsible for Region 7. This included manning some communications for regional government headquarters, light rescue, maintenance of law and order, support in evacuation from fallout, ambulance transport, field engineering, damage repair and reconnaissance. Some RAF units were also included (for example University Air Squadrons were assigned to post-strike reconnaissance and radioactivity survey).

Defence of Vulnerable Points (VP) A key part of MHD was the defence of VPs against terrorist or Special Forces (such as Soviet *Spetsnaz*) threats. Some defences (such as "Yarnold Sangers": circular pillbox-like structures made of concrete pipe sections, seen for example at RAF St Mawgan) may have been built to protect VPs. The threat posed by Irish terrorism and the deployment of substantial forces into the Province in an internal security role warrants a mention. Special urban training facilities were provided for units assigned to this role. Many defences and security measures at military establishments may originate from the threat of Irish terrorism, particularly in the late 1980s, rather from than the Cold War. The revival of the Home Guard between 1952 and 1957 is unlikely to have left any associated infrastructure or defences.

Coast and Anti-Aircraft Artillery In the early stages of the Cold War, the UK was still protected under national (not NATO) forces by Army coast and anti-aircraft artillery. These were disbanded in 1955–56. Although RAF Bloodhound surface-to-air missiles were deployed to replace anti-aircraft guns, none were considered necessary to protect facilities in the South West. Colin Dobinson's English Heritage report (Dobinson 1996d) and book (Dobinson 2001) give an excellent background and identifies the key sites. These include:

- Anti-aircraft defences (pre- the 1955 disbandment). Bristol: Lansdown, Plymouth: Crownhill, Portland: Ridgeway Hill and Cheltenham: Ullenwood, and in Cornwall at Carkeel and St Winnolls.
- Coastal Artillery (pre-1956) at Plymouth and Portland

Civil Defence (CD)

The Home Office provided central training facilities like the Fire Service College and School (Moreton-in-Marsh) and the CD School (Eastwood Park, Gloucestershire). It also provided equipment and training sets for rescue including the Mobile Defence Corps and the Auxiliary Fire Service (AFS). Home Office Reserve Stores Depots were also set up. After the return of fire fighting responsibilities from the National Fire Service to local authorities in 1948, many pre-war, wartime and even post-war fire stations have been replaced. At local authority level, training facilities (including rescue-training sets, such as Exeter City Council's at Alfington) may have been provided, and buildings earmarked for warden's posts and emergency feeding facilities (often school-meal service kitchens) identified. Civil Defence and Fire at local authority level has not been studied in depth but records are likely to be available in local Records Offices.

Machinery of Government in War (MGW) There were several major changes in the government war regional structure over the period. Government installations include the unique Central Government War Room at Hawthorne-Corsham. This facility deserves in-depth study both of the infrastructure and the associated communications and support facilities. The Regional Government Headquarters (RGHQ) was established at various times in Bristol, Exeter and at Hope Cove (Devon). The former Anti-Aircraft Operations Room at Ullenwood, near Birdlip, was selected as one of the Sub-Regional Controls for Region 7 and later became RGHQ 7.2. The site closed in the late 1980s and was replaced by a purpose-built bunker at Chilmark in Wiltshire. The changing MGW plans through the Cold War in the South West need further study and site visits.

Armed Forces War Headquarters (AFWHQ) Sites for AFWHQs for each military district were planned and many cases equipped while County Military Headquarters were set up primarily in existing service establishments, such as RAF Locking (covering the former County of Somerset). This aspect of the Cold War has not been studied, although there has been some survey work at Locking.

Local Authorities In addition, local authority war headquarters (or controls) and their alternative sites were planned and, in many cases protective accommodation constructed, for example, Somerset County Council beneath County Hall, with Taunton Deane Borough Council in their own protected accommodation nearby. In Plymouth, the city council built an emergency command centre in the gatehouse of Fort Austin, a 19th century fort on the fringe of the city. In Cornwall, the County Council had an emergency bunker and others were provided for the District Councils of Penwith, Kerrier and North Cornwall. Other authorities initially re-used their Second World War facilities; in 1960–61 Exeter used their former control in St Germans Road.

Subterranea Britannica has carried out some work but this is more concerned with the infrastructure and not the rational behind it or the *modus operandi* of government in war. The subject is covered by McCamley (2002) and also by Cocroft and Thomas (2003) but no source covers all the changes nor has any comprehensive study has been carried out, particularly of the earlier headquarters or MHD sites, their locations and current status.

Warning and Reporting The Royal Observer Corps has been well studied and facilities like ROC Group Headquarters (Yeovil, Bristol, Exeter, Truro), ROC Posts (both Orlit and underground posts) are well-documented. The UK Warning and Monitoring Organisation at Corsham/Box and its Sector Operations Centres are not so well known. Neither are the locations of individual sirens nor the carrier receiver points recorded.

Population Survival in War This covers central government funded facilities like grain silos, cold stores (such as at Wells), buffer depots, bore holes for water supply, emergency docking facilities at small ports, fuel storage and civilian pipelines. While Cocroft and Thomas (2003) explain some of the principles, there is no list of the facilities provided in the South West Region. The Cold War measures undertaken by the gas, water, electricity and sewage utilities are also not documented. An example is the partially constructed hardened control bunker for Bristol Water at Stoke Bottom. Little is known of measures that may have included water bore holes, alternative supply routes or stand-by power systems. Plans for the emergency feeding and accommodation (including the earmarking of disused service camps) or emergency hospitals are not obvious. The subject is massive and needs extensive documentary research, both locally and in the National Archives.

Cold War Communications

Communications in War Communications were vital in the Cold War. In a period of tension, the Government needed to consult with international allies worldwide and particularly alliance partners. Broadcasting overseas (for example from the Rampisham, Dorset, transmitters) and monitoring of foreign broadcasting was another key activity. If hostilities commenced, secure survivable communications were vital for controlling the NATO response and coordinating with allies within NATO. At the same time, communications were still needed to British forces around the world. Were Britain to have been attacked with nuclear weapons, communications to warn the population would be paramount. After an attack, survivable communications would have been vital to assess the damage and to coordinate the post-strike survival. These would include international communications. Emergency broadcasting to the surviving population was essential, particularly if other communications failed.

Defence Communications A Defence Telegraph Network or DTN "Southwest Switch" established in the Second World War remained in use underground at Box (Corsham) and an Army Telegraph "Tape Relay Centre" was sited in protected accommodation near Boddington in Gloucestershire. This relayed traffic within the worldwide "Commonwealth Army Communications Network" (COMCAN) and to sites within the UK. Later, the Controller of the Defence Communications Network (DCN) was located underground at RAF Rudlow Manor near Corsham. A DCN Satellite ground terminal was sited nearby at Colerne. In the 1980s HQ 2 Signal Brigade, which was responsible for Army national communications across the UK, moved to Corsham. Single service networks including a UK-wide Army fixed VHF Home Defence radio system.

GPO and BT Communications Significant Government investment was made in increasing the resilience of the GPO, and later BT, networks across the UK. Key GPO/BT repeater stations were hardened and some placed underground. The incidence of these in the South West requires investigation. The Emergency Manual Switching System to provide a limited alternative to the public trunk network was provided in semi-protected accommodation at certain GPO/BT Group Switching Centres. The subject is vast but BT has excellent archives.

Microwave Systems The introduction of civilian "line of sight" radio systems in the late 1950s provided alternative and cheaper circuits for the trunk network, together with TV broadcast circuits and military links.

In this respect, microwave systems offered a survivable and high capacity alternative to the Post Office underground cable system. A spur from the Government "Backbone Radio System" ran from the Bristol Purdown tower via East Harptree and Heath Poult Cross in Somerset to Whitstones and Halwell in Devon then onwards to Plymouth and Cornwall. The distinctive squat lattice masts and associated buildings are still in use. Spurs connected TV transmitters to the network.

Home Office Emergency Communications Network (ECN) After the Second World War, the Home Office provided shared "Police and Fire Wireless Schemes" with the remote unmanned hilltop "main station" sites linked by line and often wireless to "main controls" in police and fire stations, with "mobile outstations" installed in emergency service vehicles. This Home Office owned infrastructure was used during the Cold War for the Home Office Emergency Communications Network (ECN) and also for radio links from some ROC posts to their associated Group Headquarters (such as Yeovil). Some work on this subject appears to have been carried out by Subterranea Britannica but on a site-by-site basis.

BBC Broadcasting Survival measures were provided for BBC transmitters and studios. These included the BBC controls (such as Wotton-under-Edge), hardened transmitters and VHF relay stations serving major towns (for example, Taunton). Further study is needed.

Defence Research and Development Industries

The demands of the NATO role in the Central Region in Germany required the UK to develop tanks, guns and other major equipments specially to counter the Soviet threat in that theatre. This had repercussions on infrastructure (larger tank hangars to take bigger tanks) and ranges, where more powerful weapons required significantly increased safety zones (such as at Lulworth Tank Gunnery Ranges). Important sites in the South West associated with the Cold War include the Chemical Defence Establishment (CDE) Porton Down with outstation at Nancekuke, Cornwall and the Microbiological Research Establishment (MRE) at Porton Down. Both these establishments, together with the Defence NBC School at Winterborne Gunner, were very much involved in countering the massive threats of Soviet nuclear/biological/chemical (NBC) weapons.

Other Research and Development sites in the South West included:

- Admiralty Torpedo Development Unit ATDU (Helston)
- Aircraft and Armament Experimental Establishment (A&AEE, Boscombe Down)
- Royal Aircraft Establishment guided weapons testing range at Larkhill
- Military Engineering Experimental Establishment (MEXE) (later became part of the Military Vehicles Engineering Establishment, MVEE) at Christchurch
- Proof and Experimental Establishment (P&EE at West Lavington)
- Royal Radar Establishment trials of over-the-horizon radar at RAF Downberry in Cornwall
- Royal Navy Gunnery Establishment at Portland
- Torpedo testing stations at St Martins (Scilly) and Porth Kerris – Nare Point
- Wild Goose swing-wing aircraft experiments at Predannack Airfield

Defence Communications and Electronics Industries

Cocroft and Thomas (2003) note a marked concentration of defence communications and electronics industry in the Bristol region. The aircraft industry in the South West may also be worthy of study. These subjects do not appear to have been investigated.

Other aspects of armed forces' activities

Military Aid to Civil Power and Humanitarian Missions These include such activities as support after the oil pollution following the wreck of the Torrey Canyon, flood relief, fire cover during firemen's strikes, running temporary prisons (such as Rollestone Camp in Wiltshire) and disposal of carcases after foot and mouth disease. Some of these activities may have left some infrastructure or traces in the countryside. The important role of RAF Lyneham as the mounting base for many overseas missions and the supporting camps and infrastructure for mounting and recovering overseas operations deserves a mention.

English Heritage's *Modern Military Matters* (Schofield 2004) has identified the topics of the "Peace Movement in the Cold War", "Cold War Combat Art" and "Commemoration". These are outlined in the following paragraphs.

The Peace Movements To give the Cold War relevance in considering social inclusion and cultural diversity, English Heritage are assessing the material remains of the peace movement (Schofield and Anderton 2000). No work appears to have been undertaken in the South West to study this and other associated aspects (such as local authorities declaring "nuclear free zones").

Combat Art The English Heritage guidelines on *Military Wall Art: Guidelines on its Significance, Conservation and Management* (2004) outline this new subject but no Cold War examples are known in the South West.

Commemoration This subject includes cemeteries and memorials to commemorate the use of sites by units or establishments, exceptionally noteworthy achievements of individuals or the loss of life in major accidents or operational deaths. No commemorative sites relating to the post-war period appear to have been identified in the South West.

Conclusions

Over the past half century, there has been an enormous change in the facilities and infrastructure used by British armed forces and also for civil defence and emergency planning in the South West. Some areas have been well researched, particularly on a national level. There are many other areas, outlined above, that are worthy of study, both nationally and locally. Although many of the national and NATO facilities used in the Cold War were not in the South West, the region played an important role in the support of both UK military operations worldwide and the NATO assigned forces in Germany. This deserves recording for posterity.

Acknowledgements

The original structure of the project envisaged two groups, one looking at the Post-Medieval period and the other looking at the Industrial and Modern periods. Very early on, the groups decided to amalgamate as no clear chronological boundary could be defined. We are grateful to many other colleagues who commented at the seminars and since.

15

A Research Agenda for Archaeology in South West England

Edited by Chris Webster

15.1 Introduction

The Resource Assessment has shown the breadth and depth of archaeological research in this very diverse region; a region perhaps largely characterised by its coast but also containing the mineral-rich uplands of Cornwall, Dartmoor and Mendip, the dry chalk uplands of Salisbury Plain as well as the great inland river valley of the upper Thames. The predominantly maritime nature of much of the South West has, however, produced a region always open to external influence and increasingly during the Medieval and later periods influencing an ever wider geographical area of the globe. This means that the archaeology of the South West of England is of significance to the archaeologies of many other parts of the world. The region also occupies an important place in the origins of the discipline itself: as home to the birth of modern British archaeology in the work of pioneers such as General Pitt Rivers, OGS Crawford and WG Hoskins.

This diversity of landscape and long history of research has, however, led to an unevenness of knowledge that is set out in the following Research Agenda. A list of aims for the future to redress the balance will be addressed in the forthcoming Research Strategy.

Chronological Overview

In the earliest periods, the research framework for the Palaeolithic and Mesolithic of Britain and Ireland (Prehistoric Society 1999) set out a series of themes for research (colonisation, settlement and social organisation) whilst also highlighting methodological issues (survey, assessment and publication) and the need to promote wider understanding of these periods. Whilst embedded in those guidelines, the research agenda themes presented here also reflect developments since 1999 (in methodologies, scientific techniques and research priorities) and the specific requirements and needs of the Palaeolithic and Mesolithic archaeology of the South West.

Published literature (such as Jacobi 2004; Wymer 1999) and ongoing research (for instance, Wessex Archaeology's *The Colonisation of Britain by Modern Humans* project) in Palaeolithic archaeology has indicated a relatively (in comparison to other regions of southern and eastern Britain) sparse archaeological record, consisting of a mixture of key cave-based assemblages, surface scatters, and deeply-buried secondary context assemblages. With regards to Mesolithic archaeology (Jacobi 1979; Wymer 1977), there is a similar mixture of key sites (cave and open-landscape) and surface scatters. In both cases, the key limitations of the extant resource include the currently available chronologies and frameworks, difficulties in interpreting the lithic scatter resources, and the problems of identifying fine-grained and/or organic deposits with high archaeological potential.

Parts of the region have featured prominently in synthetic accounts of the Neolithic and Early Bronze Age (for instance Barrett 1994b; J Thomas 1999; Parker Pearson 2005); though the archaeology of Wessex is frequently perceived to have an unhealthy domination in terms of providing an idealised "norm" for social life during these periods against which other regions might be measured. Despite this problem of bias, such focus does acknowledge the supra-regional, even international, significance of this part of the South West's Neolithic and Early Bronze Age archaeology. As a consequence, any agenda for this region will be asking questions and setting research aims that may have a greater than regional significance.

Interest in the Neolithic and Early Bronze Age remains healthy, as indicated by major projects currently underway or reaching completion (such as the

Cardiff Neolithic enclosure and long barrow/cairn dating projects, the Avebury "Longstones" Project or the Stonehenge Riverside Project). Recent discoveries continue to surprise, including several Neolithic enclosures in Devon (Griffith 2001). Large-scale developer-funded projects more than anything have altered our perception of the region's prehistory.

The chalklands of Wessex have also been important in the study of later prehistory; a period seemingly dominated less by the monuments and ritual of the Neolithic and Early Bronze Age and more by an intensification of farming and enclosed (and increasingly defended) settlements. Development-led archaeology has broadened our knowledge of the settlements across the region but there are still important questions to be answered about the intensification of agriculture and regional diversity. Questions of diversity are also evident in our lack of knowledge of the defended settlements across the region and also in the effects of an increasingly visible cross-channel trade.

The South West has not been at the forefront of Roman studies, probably because of the traditional Romanist's attachment to military activities in the North of England and the "civilised" South East. It is becoming clear, however, that the reasons that made the region less attractive to earlier scholars may actually make it more interesting; military activity was short-lived but covered a period of change in the Roman army which may be reflected in sites that here have no later changes and the less "Romanised" towns and countryside may give better clues to the response of people to the empire. The region may also be important for the study of the later Roman period with hints that the four provinces of the late empire followed different trajectories after the end of imperial control; did this follow from differences during the Roman period or does it only reflect the Germanic influences in the east of Britain?

Sub-regional differences are also seen in the succeeding Early Medieval period where the region has seen some of the most important work over the last 50 years. The increasingly late date of Anglo-Saxon take-over as one moves west should produce an ideal area to test hypotheses on the the nature of this change but this is hampered by the extreme dearth of material culture. Scientific techniques may hold the key to important questions such as the scale of Germanic immigration but they are also limited by the non-survival of bone from many parts of the region. In the later first millennium the historical sources become much more reliable but the archaeological evidence for such things as the effects of Viking raids, appears as elusive as before.

Research into the post-Conquest Medieval period has proved (with a few notable exceptions) to be one of the weaker areas of archaeological activity in the South West. There appears to have been very little work in the eastern counties of Dorset and Wiltshire, with the exception of some development-led work in towns, and few of the large-scale projects that have proved so fruitful in the Midlands have been undertaken in the South West. The evident gaps in our current knowledge need to be addressed to test if they are evidence of real variations in the past or the results of fieldwork bias and this is a period where the lack of synthetic work is clearly hampering research.

Archaeological research in the Post-Medieval and Modern periods (SPMA 1988) is of recent origin and, in the main, work has been carried out by volunteers and/or professionals working outside colleges and universities. Work has often been interest-driven, but much has been stimulated by actual or perceived threats to surviving structures, artefacts, landscapes and below-ground survivals during the long post-war boom which ended *c.*1975. Believers in long-waves, or twenty-five year economic cycles, suggest we are now in the first few years of another such period of growth and development. This will bring similar threats to those of the 1960s which gave birth to industrial archaeology.

Archaeology applied to these recent periods should not be seen as a secondary and very junior partner to those disciplinary approaches (architectural history, local history, historical geography, etc.) that traditionally occupy this territory. As has been shown since the 1960s, collaboration with these disciplines as with newer disciplines such as palaeoecology and anthropology can be extremely fruitful. Collaboration however depends on understanding the different outcomes that archaeological approaches can contribute. Ways of widening such understanding need to be found to inform the general public and more specialised audiences.

Finally we should not forget that the resource takes the form of objects, people and institutions as well as field archaeology. There are rich archival and artefactual collections within many of the region's museums, research-active University archaeology departments, contracting units, local societies and some very talented non-professional archaeologists. All these need to be harnessed if we are to maximise the potential of the region.

15.2 Research Themes

15.2.1 Methodology

Many of the research aims identified during the project can be classified as a need for improved methodologies; not questions about the past itself but suggestions to improve the way we find out about it. In some periods this extends to the very discovery of sites and deposits that could be studied; in early prehistory because of geomorphological change and later because of a lack of diagnostic artefacts. There are

also techniques that, once developed, are not applied routinely when they would provide very valuable basic data.

- Research Aim 1 on page 274

Synthesis

The study of several periods is also hampered by the lack of synthetic studies with only the Iron Age relatively well served. Even here, much is due to the work of a single individual: Barry Cunliffe (2005). For the period from the Mesolithic/Neolithic transition to the Iron Age a first attempt at national synthesis based on "grey literature" has been made by Richard Bradley (2006) and this method is being extended into the Roman period (Neil Holbrook pers. comm.).

- Research Aim 2 on page 276
- Research Aim 12 on page 280

Spatial and Temporal Biases

The Resource Assessment exercise has highlighted the uneven coverage of some periods across the region; whilst some of this is due to a bias towards areas with good evidence at a certain periods, there does seem to be a worrying lack of interest in the later periods in the east of the region. As well as providing an incomplete picture in any one area these gaps also masks any intra-regional variation and prevent us from answering the old "is absence of evidence, evidence of absence?" issue.

- Research Aim 3 on page 276

Public Interest

Public interest in archaeology has never been higher and we need to respond to this. Increased public involvement is a requirement for many funding streams and also raises the profile of the historic environment with decision-makers. Thousands of people already volunteer their time and enthusiasm to care for and interpret the archaeological resource in the South West and to draw in other resources to help them achieve their goal. They work for major national organisations such as the National Trust, a plethora of local museums and trusts and through local societies. They have a vital role in conserving the archaeological resource, in spreading sympathy for archaeology and an enormous potential for improving public understanding of archaeology. Finally, most archaeological research is now funded by developers and we need to show that their money is being spent in ways that benefit research, community interests and the profile of the industry.

- Research Aim 4 on page 277

Recording

Many of the artefacts that survive from the past are not found in the secure contexts of an archaeological excavation. Whether found by field-walkers, dog-walkers, earlier excavators or metal detectorists, these finds need to be addressed to provide the widest possible evidence-base for study. Responsibility for collection, recording and preservation of archaeological remains needs to be recognised as a fundamental role held in common by all archaeological institutions including archaeological societies. There is scope for far greater collaboration in carrying out research and applying standards of approach, process, preservation and dissemination of the resulting information.

- Research Aim 5 on page 278
- Research Aim 6 on page 279
- Research Aim 7 on page 279
- Research Aim 8 on page 279
- Research Aim 9 on page 279
- Research Aim 56 on page 292

Transitions

Most of what we study is visible to archaeological research because it has changed from a previous state; the periods that cause us most trouble are characterised to a large extent by a lack of change. Large-scale transitions are used too often as academic boundaries between one period and another. Study across boundaries should be encouraged to define and explore the changes that occur in these transitional periods.

- Research Aim 10 on page 279

Hidden Resources

Many of the archaeological resources of the region lie not in the ground but in the stores of museums, archive offices, contracting units, individuals and HERs. Study of these records and artefacts can be far more cost-effective than excavation or other fieldwork.

Museum collections need constant reworking to ensure that material is reassessed and where appropriate reclassified in the light of recent fieldwork. Skilled identification of any artefact type of any period can only derive from such research. Some of this work can be very low cost and on-going (such as the work of the South West Implement Petrology Committee); other programmes can be more intensely dedicated to artefact assemblages (the Early Bronze Age grave-goods project) or involve the reinterpretation of previous fieldwork (for example Coles and Minnitt 1995).

Museums contain not only collections of chance finds but also some large excavation archives that have

never been published. The current post-excavation work on the Crandon Bridge site (a small Romano-British port) shows that it is possible to revive these old excavation projects but writing up large urban excavations will be far more expensive.

- Research Aim 11 on page 280
- Research Aim 12 on page 280
- Research Aim 13 on page 281

Artefact studies

There has been a move away from "traditional" artefact studies over the past few years which has led to a slowing in the growth of our understanding of this fundamental class of archaeological evidence. There have also been advances in analytical techniques which have shown the potential for improved provenance studies, with their implications for improved understanding of trade and social relations. Most of the effort appears to be concentrated on the development of novel techniques with few resources available to follow this up with large numbers of routine analyses that provide the quantity of data that we need. These techniques could be more widely employed, given better dissemination of their benefits and the availability of appropriate personnel and equipment.

- Research Aim 14 on page 281
- Research Aim 15 on page 281

15.2.2 Science

It was widely felt that the routine application of archaeological science would bring great benefits, particularly in the areas of chronology and past environments. These are issues where the study of the past has a direct relevance to modern issues such as climate change.

Dating

Many areas of research in the region are hampered by the lack of the detailed and accurate chronologies that should be available with modern techniques. More radiocarbon and other scientific dates are required on well-contexted samples where the date obtained will accurately reflect the archaeological event. Existing dates need to be re-evaluated by a stringent examination of the taphonomy, composition and final contexts and associations of the samples on which they were measured. This should include the collation of radiocarbon determinations available from watching briefs, evaluations, excavations and environmental recording projects that are occurring across the region, many of which are unpublished in "grey literature", unpublished, or in geological publications. The timescales, of developer-funded work in particular, mean that dates are often produced after the report has been written and can become "orphaned" from even "grey literature".

The example of the (re)dating programme at Stonehenge (Allen and Bayliss 1995) and of several southern British long barrows (Bayliss and Whittle 2007) shows what can be achieved by the combination of rigorous sample selection and Bayesian modelling of the results. Targeted key-hole excavation could provide an efficient technique for obtaining dating and environmental samples.

- Research Aim 16 on page 281

Past Environments

As well as providing information on the conditions in which people lived in the past and their relationships with nature, environmental archaeology has a valuable part to play in the great debate of our time: the evidence for environmental change and the likely impacts of global warming. The South West has a wide variety of modern environments which preserve evidence from the past and for early prehistory this study is vital, whether there is direct evidence of humans or not. In later periods, roles are to some extent reversed and it is human impact on the environment that holds the greatest interest; in some areas whole landscapes were remodelled and there was a huge increase in pollution levels.

The location of the coast has changed in the past and the submergence of once-occupied land holds the potential for enhanced preservation of structures, landscapes and environmental evidence.

- Research Aim 17 on page 282
- Research Aim 18 on page 283
- Research Aim 21 on page 284
- Research Aim 19 on page 283
- Research Aim 20 on page 284
- Research Aim 22 on page 284
- Research Aim 23 on page 285
- Research Aim 24 on page 285
- Research Aim 25 on page 285
- Research Aim 26 on page 285
- Research Aim 27 on page 286

15.2.3 Settlement

Rural

The South West has always been predominantly rural and the changing patterns of land-use and settlement form a key component of any study of the past. The size of the resource means that innovative techniques will be needed to study it at an appropriate scale. There is also a need to recognise activity that took place off traditional "sites", including the locations of boundaries and also understand the locational forces that produce settlement patterns in different periods.

- Research Aim 15c on page 281
- Research Aim 28 on page 286
- Research Aim 29 on page 286
- Research Aim 30 on page 286
- Research Aim 31 on page 286
- Research Aim 32 on page 286
- Research Aim 33 on page 287

Urban

Towns formed an important part of life for many people in the past and not just for those that lived in them. The increasing effects of a city such as Bristol can be seen in the rural area that surrounded it. Towns also provide concentrations of buried deposits containing well-stratified artefacts and, often well-preserved, environmental evidence that have a wider relevance.

- Research Aim 32e on page 287
- Research Aim 34 on page 287
- Research Aim 35 on page 287
- Research Aim 36 on page 287

15.2.4 Production and Trade

Maritime and Fishing

The South West is a maritime region with only one land-locked county and 79% of its border defined by the coast. As well as providing a food resource, the sea was vital for communications, bringing the South West into contact with Wales, Ireland, Brittany and, later, Africa, America and the rest of the world. The location of the coast has changed in the past and the submergence of once-occupied land holds the potential for enhanced preservation of structures, landscapes and environmental evidence.

The archaeology of fishing has received little attention, and cross-cuts the maritime/land divide. As well as the the strictly maritime resource there is also a considerable intertidal resource, notably of fish-weirs, fish-traps and netting installations existing from (at least) all post-Roman periods. Onshore assemblages of structures, artefacts, and fish-bones, and isotopic studies of human skeletal remains, also need to be integrated into any understanding of fishing and its importance.

- Research Aim 37 on page 288
- Research Aim 47c on page 291

Mineral extraction

Mineral extraction, whether for metals, stone or peat has affected large areas of the region. In the earliest metal-using periods it is assumed that the region was the source of tin and much copper but little evidence for this has been found. Later extraction has obscured this but is also an important field of study in its own right; an importance highlit by the inscription of the Cornwall and West Devon Mining Landscape in the list of World Heritage Sites.

- Research Aim 38 on page 288

Food Production

Food production is central to human existence, from the earliest periods of hunting and gathering, through the development of agriculture and animal husbandry to the predominantly farming landscape with associated industries that we see today. While the overall picture is well-understood there are specific periods, places and processes that need more work.

- Research Aim 39 on page 289
- Research Aim 40 on page 289
- Research Aim 41 on page 290
- Research Aim 42 on page 290
- Research Aim 43 on page 290

Technology

in certain periods technological change appears to be important. This may involve social changes brought about by new technologies or, more difficult to understand, a return to "lower-level" technologies presumably for social reasons.

- Research Aim 44 on page 290
- Research Aim 45 on page 290

Trade, Transport and Communications

The movement of objects, people and ideas is most widespread in the more recent periods but, obviously, began with the first humans to explore the region. Ports, from the Roman period onward, and the fast-disappearing remains of modern communications are identified as important areas to be considered.

- Research Aim 46 on page 290
- Research Aim 47 on page 291
- Research Aim 48 on page 291

15.2.5 Social Relations

Identities and Interactions

Perhaps the most difficult area of human existence for archaeology to attempt to understand, issues such as social groupings, population movements are key in some periods. Modern identities, such as that of Cornwall, have their origins in the past but are poorly understood in material terms. Information may also come from studies of religious activity, mortuary behaviour or conflict (see below).

- Research Aim 49 on page 291
- Research Aim 50 on page 291
- Research Aim 51 on page 291
- Research Aim 52 on page 291
- Research Aim 53 on page 292

Religion

Religious activities are another difficult area for archaeology but have produced significant archaeological remains in some periods. At other times, for instance in the later Roman period, we know from historical sources of significant change which is, as yet, practically invisible to us.

- Research Aim 32 on page 286
- Research Aim 54 on page 292
- Research Aim 55 on page 292
- Research Aim 56 on page 292

Mortuary Practice

Often seen as part of religious behaviour, new approaches are stressing the social processes that influence the treatment of the dead by the living. Study of key episodes can, hopefully, be used to shed light on wider social questions as can scientific analysis of the body itself.

- Research Aim 57 on page 293
- Research Aim 58 on page 293
- Research Aim 59 on page 293
- Research Aim 60 on page 293

Conflict

Conflict usually manifests itself in the archaeological record as defensive structures but may also be represented by battlefield artefact scatters or evidence of trauma on human remains. There has been much study of surviving monuments but some types of site, particularly those peripheral to actual fighting, are less well known. Broadening the study of conflict archaeology may throw light on wider social questions, large-scale historical change and changing technology.

- Research Aim 61 on page 293
- Research Aim 62 on page 294
- Research Aim 63 on page 294
- Research Aim 64 on page 294

15.3 Research Aims

15.3.1 Methodology

Research Aim 1: Extend the use of proven methodologies for site location and interpretation, and encourage the development of new techniques.

See also Research Aim 39c on page 289.

a. There is a need (and potential) to exploit aerial survey technologies such as lidar in order to create high resolution landscape-scale digital terrain models (DTMs). Lidar intensity can be used to show variations in soil moisture to look for ditches and palaeochannels that may have no surface visibility using other techniques. Existing aerial photographs (verticals) also offer the potential to highlight geomorphic features which have not previously been plotted.

b. We must try to integrate cave-based and open landscape (lithic scatter) archaeology, for all periods, but especially for the Upper Palaeolithic and the Mesolithic where recent improvements in chronology have offered the opportunity for the relationships between cave and open sites to be explored for and between the different periods of the Upper Palaeolithic and Mesolithic respectively.

c. There is a need for controlled excavation of stratified Palaeolithic and Mesolithic sites in order to address research questions that have arisen in recent years. Such excavations have not taken place in the South West for the last two decades, while over the same time period investigative and analytical techniques have markedly improved (e.g. OSL and AAR dating). The need for controlled excavation is particularly strong in the

South West given the general failure of PPG-16 work to generate appropriate archaeological information for the Palaeolithic and Mesolithic periods, and the limited range of aggregates extraction-derived archaeology for these periods.

d. Identification of potential stratified sites will best be pursued through the development of methodologies and strategies underpinning the prospection for, and the assessment of the preservation potential in, deeply buried Pleistocene and later deposits. Specific reference should be made to organic sediments (including palaeoenvironmental evidence) and/or low energy sediments conducive to the recovery of in situ archaeology, following Wilkinson's (for example Wilkinson 2001) successful predictive modelling of fine-grained sediments. In particular we need better understanding of deep stratigraphy in river valleys, underlying urban development on flood plains (including in established towns) and in the intertidal zone. These challenging areas can be investigated using a range of techniques including boreholes (cores), cone penetrometry, GPR and many more. However care should be taken that boreholes, for example, should not be used as an excuse not to excavate when excavation is warranted and feasable.

e. It is also important to consider the archaeological potential of all Quaternary deposits likely to be impacted upon by development, including those often termed "natural". This is particularly important for the study of the Middle and Lower Palaeolithic as primary context sites or secondary context artefact assemblages of this date may be buried within or beneath "natural" deposits. There is a clear need to understand deposit stratigraphy (through commercial boreholes, dedicated archaeological boreholes, and GPR) and the potential of that stratigraphy to preserve Palaeolithic material. Chronology is an important part of assessing the potential of Pleistocene deposits (see Research Aim 16 on page 281) and therefore there is a need to make extensive use of techniques such as OSL, uranium series and AAR dating. Work in the Hampshire basin and West Sussex, the Lea valley, and the Middle Thames tributaries have demonstrated that studies to investigate the potential of Pleistocene strata can be built into the PPG-16 archaeological management cycle, particularly where a large development is planned. Deposit modelling and prospection of the type described above needs to be fully integrated through GIS-based mapping into county HERs and the minerals planning process, with regard to management of the archaeological and minerals resources, and supporting integrated, landscape-scale research.

f. Greater use should be made of ceramic petrology, lipid analysis and other techniques to track pottery production and use in all periods.

g. Considerable potential exists to study life-time mobility, diet and health through re-analysis of human remains. Extensive analysis of oxygen and strontium isotopes, in both people and animals, should revolutionise our understanding of patterns of mobility during these periods periods (see, for instance, the current Sheffield "Beaker People" project).

h. The value of focused research on a town, village or parish (as has been shown, for example, at Shapwick and Eckweek) has provided a model for a detailed research objective at the local level. Further work is needed at a larger scale to look at sub-regional area or thematic topics such as has been done for Exmoor Iron or landscape surveys such as Exmoor, Bodmin or the Quantock Hills by English Heritage (Riley and Wilson-North 2001; Johnson and Rose 1994; Herring *et al.* forthcoming; Riley 2006). It is notable that all these have been carried out on uplands and also that the wider regional research approaches such as the Whittlewood survey (R Jones *et al.* 2006), carried out in the Midlands are largely absent in the South West region.

i. Trace-element analysis of pottery has produced extremely interesting results in the Medieval period but needs to be developed and extended throughout the region and across other periods.

j. It is not yet agreed practice that Post-Medieval and later monuments will be recorded in all HERs. Guidance needs to be agreed on the systematic recording of monuments and landscapes of these periods in HERs and means found of ensuring that existing HERs have resources to adhere to this guidance.

k. The English Heritage programme of recording landscapes and monuments related to specific activities should be developed and its findings far better publicised.

l. Initiatives such as the Medieval Pottery Research Group's development of a European-wide study of ceramic production sites should be further encouraged.

Synthesis

Research Aim 2: Encourage works of synthesis within and across periods, settlements, monuments and areas.

a. Syntheses need to be made of existing palaeovegetational data from different zones of the South West.

b. Archaeological frameworks for all the earliest prehistoric periods need development and refinement (as appropriate), acknowledging regional and sub-regional patterning in the South West. Such work is heavily (although not exclusively) dependent upon the re-assessment, dating and discovery of stratified sites (see also Research Aim 1c on page 274 below).

c. Landscape use models need development and refinement, principally for the Mesolithic, including raw material transfers, human mobility (including the relative usage of upland, lowland and coastal environments and topographical locations), subsistence strategies, and landscape modification, amongst other factors. In the case of the Mesolithic this goal reflects the relative richness of the archaeological record for this period, especially, but not limited to, Somerset. Although similar approaches can (and should) be applied to the more limited data sets of the Upper Palaeolithic, due regard must be given to the issue of coastline "mobility" during the Pleistocene and the changing "upland/lowland" status of the same location at different periods. Within these models attention should be paid (as appropriate) to the integration of key sites (such as Westward Ho!, Balaam *et al.* 1987) with their surrounding landscapes and sites.

d. It would be extremely useful to draw together existing information on earlier Bronze Age grave assemblages. This may facilitate a better understanding of material sequences, object biographies (such as the presence of heirlooms), the expression of social identity through material culture, and bodily display.

e. The Later Bronze Age is lacking in synthetic treatment and thus interpretation often remains at the site level. This is exacerbated by the large and increasing amount of data for the Middle Bronze Age, particularly for settlements. A systematic regional review of these data would significantly increase out understanding of the period, particularly if it is integrated with the often good burial data and well-documented metalworking traditions.

f. In many periods, and particularly in the Early Medieval period, the current interpretive framework is still conditioned by the meagre historical narrative. Greater weight needs to be attached to multi-disciplinary work with colleagues in areas such as landscape studies, historical geography, history etc.

g. In the Industrial and Modern periods personal interest and responses to threats have produced gazetteers, assessments of significance and, latterly, emergency investigation, recording and, sometimes, excavation under the aegis of PPGs 15 & 16. Much work is still to be published, some of the "grey" literature is not easily accessible and the uneven nature of HERs reflects this (see Research Priority 12 on page 280). There is, therefore, an urgent need for synthesis to develop our understanding of work already completed and to encourage the development of a broader archaeological view of the period.

Spatial and Temporal Bias

Research Aim 3: Address apparent "gaps" in our knowledge and assess whether they are meaningful or simply biases in current knowledge.

a. Fieldwork and the assessment of extant collections should focus upon the explicit evaluation of apparent regional biases. For example, the relative paucity of Lower and Middle Palaeolithic archaeology in the western half (especially Devon and Cornwall) and the extreme north (e.g. Gloucestershire) of the region, the limited presence of Upper Palaeolithic archaeology in the extreme west, north and east of the region, and the over-emphasis of coastal archaeology for the Mesolithic period in Cornwall.

b. Our knowledge of the region's Neolithic and Early Bronze Age archaeology is inevitably uneven, not least because of the huge disparity that exists in levels of archaeological investigation. Certain areas, such as the Mendip Hills, the Isles of Scilly and parts of Gloucestershire, have seen little work. Overall, there has been an undue emphasis on uplands, with little attention so far being paid to river valleys, coastal plains and lowlands in general (work on the Somerset Levels being a notable exception: for instance Coles and Coles 1986). In eastern and central England, it is becoming clear that lowlands and river valleys can have a different kind of prehistoric archaeology to the uplands (see Barclay *et al.* 1996; Dawson 2000; Cotton and Field 2004). Stray artefact finds show a Neolithic-Early Bronze Age presence in many lowland areas, and use of the whole landscape by prehistoric populations, but this is needs to be investigated further.

c. The Wessex chalklands are better studied than most areas, particularly in the prehistoric periods, but there are significant gaps in our knowledge. The long barrows of Salisbury Plain, extensively investigated by early antiquaries but receiving little attention beyond field survey (McOmish *et al.* 2002) since, provide an example of a topic where more work is needed.

d. Apparent gaps in Neolithic-Early Bronze Age settlement across landscapes need testing. Which areas have had work carried out under PPG16? Which have been the focus for research-based fieldwork?

e. Can we identify different regimes of mobility and sedentism? What is the significance of agriculture at different times and in different places across the region?

f. Where farming is concerned, local distinctiveness may be the result of social and cultural factors as well as the constraints imposed by geology, soils, topography, aspect, etc. One example is the new finding of the cultivation of Emmer wheat in parts of the Thames valley in the Saxon period (Pelling 2003), but with better data coverage and resolution of radiocarbon dating, other examples showing regional or local distinctiveness should emerge.

g. The rocky uplands of the south-west of the region, particularly Cornwall, have provided the context for new approaches to understanding monuments within natural landscapes (i.e. the relationship between "natural" and "cultural" forms). Are comparable approaches possible for the "softer" landscapes of the chalk and the lowlands?

h. Are there regional traditions of pit digging and deposition, and what might these tell us of residency, settlement duration, composition, social relations and relations with places and other agencies?

i. Is the apparent intensification in plough agriculture during the Early Bronze Age, evident at least in the east of the region, real and wide-spread?

j. How do the ceramic sequences and types of the Neolithic and Early Bronze Age differ across the region and what are the overlaps?

k. In later prehistory the pioneering role of the study of the Wessex chalklands has also produced biases. At a broad level there are clear and enduring differences between the south-west peninsula and the rest of the larger South West region. There are also important differences between areas such as the presence of Trevisker or Deverel-Rimbury pottery in the Middle Bronze Age, and cist burials or Durotrigian burials in the Later Iron Age. Difference as well as similarity is worth exploring.

l. In the Roman period the South West appears to show several unique features when compared to the rest of the country: the apparent late founding and wealth of the villas, later Roman pagan temples etc. These need to be understood, not just for our understanding of the Roman period but also to understand the way the region developed in succeeding periods.

m. There is a very marked bias in the amount of fieldwork and synthesis in the Medieval and later periods across the region; Cornwall and Somerset have been well-served but Dorset and Wiltshire are in particular need of synthetic treatment.

n. In the Post-Medieval and Modern periods the South West region has, to some extent, examples of most of the sites, monuments and features of these periods that are found elsewhere in England. But it has some significant groups of national importance such as mining heritage (Research Aim 38 on page 288), the remains of textile manufacture and associated housing, telecommunications and military survivals. Also, it has some things that are unique, such as china and ball clay extraction sites. These important topics need further study.

o. In the Post-Medieval and later periods (if not before) it is also becoming clear that there are real variations in material culture across the region. Without further synthesis (Research Aim 2 on the facing page), we cannot start to describe more fully what these are and offer reasons for them. There are also cultural similarities outside the region which are evident (with Breton house-types, for example). All of this is masked to an unknown extent by the marked intra-regional biases in recording Post-Medieval and later sites and landscapes. The "real" variations may well, at least in part, be the manifestations of genuine regional and other identities (see 15.2.5 on page 274).

Public Interest

Research Aim 4: Encourage wide involvement in archaeological research and present modern accounts of the past to the public.

a. Museums have a vital role to play in engaging the public in archaeology and landscapes. For example, museums such as those at Alicante

and Leipzig indicate that this can be successfully achieved for the Palaeolithic and Mesolithic periods. Single, large displays at major regional museums are necessary to complement the multiplicity of necessarily small scale displays in local museums. Particularly in these early periods, museum presentations should also emphasise the close relationship between archaeology and landscape evolution and change.

b. The active promotion and maintenance of public reporting of Palaeolithic and Mesolithic archaeological material and Pleistocene and Holocene geological exposures should be encouraged (ideally through the Portable Antiquities Scheme, county archaeological societies, the regional British Geological Survey office (Exeter), and geological organisations such as the RIGS groups), alongside sufficient resourcing of the local and regional museums permitting them to cope with the generated information and material. Promotion of artefact finding and reporting should also highlight the lithic raw material diversity in the South West, and the potential for lithic scatters consisting of non-flint (for instance, chert and quartzite) artefacts.

c. The location and importance of key collections (e.g. the CE Bean artefact collection at Dorset County Museum, Dorchester) should be highlighted, both with regards to archaeological research and public engagement.

d. Relationships need to be built (and re-built) with civil engineering and aggregate extraction companies. Although in the past such companies often informed the British Geological Survey of borehole finds (and other discoveries), this now tends to occur less frequently. Yet such finds (e.g. 10m of till identified in a recent borehole from the north Devon coast (Tony Brown pers. comm.) can be highly significant for our understanding of the Palaeolithic. It should be acknowledged that the extraction industry in the South West is distinctive to that of the South East for example, with a much greater emphasis on hard rock products over "soft" rock aggregates such as Pleistocene sands and gravels.

e. The Early Medieval period holds the key to the origins of the current nations of Great Britain and yet current academic thinking is divorced from popular ideas of the nature of these origins. We need to ensure that the latest thoughts on the period are fed into current debates.

f. The origins of many of our towns, villages and farmsteads can be traced back into the Medieval period and these places provide an important physical link between the 21st century and the landscape of Medieval England. There are important regional and local variations that help to provide a sense of place and define the character of settlements. The story of the Medieval manor, the Medieval church, monastic estates, Medieval agriculture and the management of the Medieval landscape provide clear and tangible links between the present day and the Medieval period (see, for instance, the work of the Shapwick Project: Aston and Gerrard 1999; Gerrard and Aston forthcoming).

g. The public continue to visit and enjoy Medieval castles, abbeys, towns and villages often without understanding the true story about what they are visiting or looking at. Presentation of archaeological sites, earthworks, monuments and castles is an important priority for the region. Existing audiences visiting the South West often state that heritage sites are one of the key attributes of the area.

h. Understanding and presenting the full story of the later use of monuments is crucial. This is true, for instance, for the interpretation of sites such as Medieval castles and abbeys where the later uses, which explain how anything survives to look at, are very often ignored. Matters are improving but we could do a great deal better.

i. Industrial heritage is important in the public perception of the South West, from rural heritage in the form of farming and rural life museums to mining remains on the uplands. Recent interest in Brunel and the promotion of the Great Western Railway as a World heritage Site should be capitalised upon.

j. The media, especially television, and adult education programmes are known to have a major impact on public appreciation of, and support for, archaeology. Approaches need to be examined for their effectiveness and relevance – and good practice encouraged.

Recording

Research Aim 5: Encourage the study of artefact scatters using innovative methodologies both in the field and on previous collections.

a. Attention should be paid to lithic scatter resources, in particular the specific evaluation and/or re-evaluation of "grey collections", and the development of appropriate interpretive methodologies which maximise the potential value of this landscape-scale, off-site resource. The "grey collections" principally consist of

artefact assemblages from both museums (see Research Aim 11 on the following page) and private collections. Emphasis should also be given to assessing the presence and potential size of the non-flint lithic component of the South West's archaeological record.

b. Lithic scatter artefacts remain problematic, given the frequent absence of independent dating and the tendency of much of the material to be highly undiagnostic. There is therefore a need to review the relationships between the resource, the Portable Antiquities Scheme (PAS), and the local/regional museums, and consider developing or modifying strategies to promote the accurate reporting of lithic material and providing (where possible) artefact identification services.

c. Approaches to the investigation and interpretation of lithic scatters have become rather mechanical. We need to think of new forms of interrogation and interpretation, perhaps working within finer temporal and spatial scales.

Research Aim 6: Encourage the accurate reporting and identification of metal-detected items in ways that benefit archaeological research as a whole.

a. The continuing popularity of metal detecting combined with the rolling out of the Portable Antiquities Scheme will continue to offer new opportunities to examine the depositional contexts and associations of new finds. This will also represent a great opportunity to increase our understanding of older "isolated" or "stray" finds.

   However, the data produced by the Portable Antiquities Scheme needs to be critically reviewed to assess its quality – both in terms of identification and locational accuracy. There is an urgent need to link PAS data to HER records across the region and see if it tells any stories other than chance loss!

b. The potential for identifying (and the costs of dealing with) any surviving context for the finds also needs to be considered.

Research Aim 7: Increase and develop the recording of the built environment and improve the recording of archaeological collections and other information sources.

a. Recording buildings, which should embrace recording evidence and analysis of current and earlier active use of space. There needs to be a greater understanding of different kinds of structure and the detail to be recorded.

b. Methods of recording and analysing settlement landscapes need development from the approaches tested in Cornwall and Somerset.

c. Museums should be recognised as the proper repositories of archaeological material and archives by all involved in the process of acquiring archaeological evidence. Museums, particularly the MLAC and its constituent domains, should explicitly acknowledge the duty of care to preserve contextual information. There is is a duty on all in the archaeological community to apply the standards and good practice developed between 1975 and 1995 in the accessioning and choice for retention of archaeological material.

Research Aim 8: Utilise the survival of Medieval and later artefacts and buildings to their full extent.

The survival of buildings, landscapes, artefacts, archives and the availability of oral testimony for these periods contrasts with earlier times. It is important that we take an holistic, or interdisciplinary, approach in future research which exploits all of the above. The development of specialist disciplines, and divisions within some disciplines (e.g. debates on the role of buildings archaeology within archaeology) will need to be addressed by joint-working arrangements. Post-Medieval vernacular architecture is relatively neglected compared with the study of Medieval structures.

Research Aim 9: Prioritise a recording strategy for buildings related to Post-Medieval to Modern social provision.

Social archaeology is now attracting academic attention and there is an urgent need for the archaeological consideration of many of the buildings included under this heading (other than public utilities). Urgency is again indicated by rapid change affecting such things as football stadia, leisure facilities retail outlets and social housing.

Transitions

Research Aim 10: Address our lack of understanding of key transitional periods.

a. Understanding of the processes behind, rates of change, and local consequences of the Mesolithic–Neolithic transition is hindered by a long-standing scholarly divide between people working on these periods. We need to adopt a "joined-up" approach to the events of the late 5th–early 4th millennium BC. What does the apparent absence of "complexity" in the region's late Mesolithic tell us about the Mesolithic–Neolithic transition? Were there really no monumental shell middens (such as in the West-

ern Isles or the west coast of Brittany), or complex mortuary rites (such as at Hoëdic), or has the potential evidence been lost to sea level rise? We need to know more about the extent and chronology of coastal change during this period, given the evidence elsewhere for the coastal focus of latest Mesolithic communities. Understanding this critical transition will also require the excavation of the right sorts of contexts, especially accumulative deposits such as those encountered in the Fir Tree Field shaft on Cranborne Chase (Green and Allen 1997). How do we expect "transitional" sites to manifest themselves, and can we confidently identify transitional lithic assemblages? We need to establish better dated chronologies to improve understanding of this crucial period in British prehistory (Research Aim 16 on the next page). High resolution analyses are needed over a 1000-year period. Specialists should also look for evidence of domestication in deposits considered to be late "Mesolithic". Detailed palaeoenvironmental analysis, excavation and dating of tufa deposits may help to further elucidate the Mesolithic–Neolithic transition (Research Aim 18b on page 283). Further information could be obtained from a study of insect evidence for browsing under woodland conditions around the transition (suggestion from Robinson 2002).

b. We need to understand better how the arrival of metalworking impacted upon later Neolithic societies. Is there evidence for change in the construction/use of monuments and are there any changes consistent across the region? What social and ideological changes accompanied the uptake of Beaker pottery and the traditions that went with it? How much was the movement of people was involved?

c. When and under what conditions did fieldsystems and traditions of roundhouse settlement begin? Did fieldsystems begin in the early 2nd millennium BC?

d. What are the processes and motivations behind the new tenurial and settlement regimes that appear in the 2nd millennium BC, and what evidence exists for variation in these across the South West?

e. There has been a lot of recent discussion about the nature of the late-Roman/post-Roman period – the "Late Antiquity" model of a modified classical world continuing or a model of systems collapse into barbarism – and the South West has the potential to provide this evidence due to the late date of Germanic influence. We need to understand better just how long "Roman" sites continued in use. There is also a need to continue to seek to identify an essentially post-Roman British material culture. The influence of Christianity on these transitions also needs to be examined. This links to chronological issues (see Research Aim 16h on page 282) and also the need for palaeoenvironmental sequences (see Research Aim 18a on page 283).

f. There is much more work to be done on the diagnostic material culture of the transition from the early to later Medieval periods, particularly pottery. The EH/MPRG strategy similarly highlights the dearth of good contextual material to help understand the transition from the Medieval to Post-Medieval tradition. At both transitional periods there are radical changes in type and technologies but we do not understand the detail of these changes, let alone what they mean.

Hidden Resources

Research Aim 11: Improve knowledge and study of under-utilised museum collections.

a. Many collections are often catalogued under very general classifications because of lack of skilled identification. Important diagnostic artefacts, such as post-Roman imports or Post-Medieval coarsewares, may lie unrecognised. Similarly many finds made on sites primarily of a different period are not recognised for their importance as part of an overall pattern of finds.

b. Opportunities should be taken to consolidate closely related assemblages when programmes of publication are initiated. Publication of evidence of Post-Medieval pottery production from North Devon at Barnstaple, Bideford and Great Torrington would not only benefit from this approach but has been identified by English Heritage and the Medieval Pottery Research Group as a high priority for action given the significance of their products to New World archaeology (Mellor 1994).

c. As well as the excavation archives in museums there are also extensive artefact collections that deserve study; recent work on quernstones (Shaffrey 2006) shows the potential for this kind of study.

Research Aim 12: Improve access to, and synthesis of, "Grey Literature".

a. The national synthesis for later prehistory based on "grey literature" that has been made by Richard Bradley (2006) should be considered for

other periods in addition to the pilot project on the Roman period that is underway.

b. HERs provide a vital index into the growing amount of archaeological information but this is biased towards information generated by the planning process. Mechanisms need to be agreed to access the growing volume of "grey" literature that is accumulated by colleges, universities, museums and others. The uneven HER coverage of Post-Medieval sites (see Research Aim 1j on page 275) implies, and reinforces, severe biasses in the "grey literature" coverage of this period, and should be addressed as a matter of urgency.

Research Aim 13: Identify and bring to publication key unpublished excavations.

a. Whilst most of the major prehistoric excavations which remained unpublished for many years have now been completed, there exists a legacy of important unpublished work, such as the Neolithic phases at Cadbury Castle, Crickley Hill and the 1980s' work at Robin Hood's Ball. Compromise should not be made in funding of analysis and publication when the national significance of the site is widely acknowledged, Gwithian being a case in point.

b. This publication record is not true of important excavations of later period sites. In the Roman period many of these were undertaken in the towns (Exeter, Dorchester, Gloucester), but there are important rural sites as well (villas such as Atworth and Wortley, non-villa settlements such as Butcombe and some of the Cornish rounds such as Grambla and Penhale). See also Research Aim 34 on page 287.

c. There are also important Medieval and Post-Medieval sites which need publication, such as Barnstaple, Roadford, Glastonbury Abbey and several sites in Bristol. The impact of PPG16-related work on Medieval towns and villages in the South West has yet to be assessed. Quantification of existing HER records has been partly covered but more detail is needed to identify the number and range of sites examined throughout the region.

Artefacts

Research Aim 14: Widen our understanding of Later Bronze Age and Iron Age material culture.

With the exceptions of pottery and Bronze Age metalwork, material culture has generally been neglected. Material studies on excavated material are too rare and work on types of materials or specific museum collections has become less popular with research students. This must not, however, obscure the importance of metalwork and metalworking; the huge quantities of Bronze Age metalwork given to the gods attest to that.

Research Aim 15: Use innovative techniques and methodologies to ask sophisticated questions of Post-Medieval to Modern artefacts and buildings.

a. There is a much work still to be done at the basic typological level. It has been demonstrated that a low level of resources continuously applied to for example pottery studies can achieve a great deal. Such an approach should not be lost among demands for resources for larger scale programmes.

b. At a higher level the value of the record and study of artefacts in context has been demonstrated but rarely applied. Locations and assemblages should be identified for specific study to address issues such as identity. Where themed issues are being addressed opportunities should be identified of applying these techniques as well as recording structures.

c. The period is characterised by a growing diversity of rural settlement and activities within that rural settlement. More systematic studies of vernacular architecture as applied to both housing and other rural buildings are required, particularly at the humbler end of the scale. Little work has been done to examine the archaeological evidence of agricultural improvement apart from a few specific examples of landscape.

15.3.2 Science

Research Aim 16: Increase the use and improve the targeting scientific dating.

See also Research Aim 54i on page 292.

a. The expanded application of recently developed and/or modified dating techniques, principally optically stimulated luminescence (OSL) and amino acid ratio (AAR), to open-landscape deposits (especially, but not exclusively, those containing, or with the potential to contain, Lower and Middle Palaeolithic archaeology). Recent research has indicated that OSL dating may be particularly effective on lower elevation (i.e. younger) river terraces deposits (e.g. valley gravels). Use of these techniques will aid contextualisation of extant archaeological collections in already known, key areas, including the Solent River (and its tributaries) and the Bristol Avon's fluvial terrace systems.

b. Widespread application of radiocarbon dating (where possible) to Mesolithic sites, especially in Cornwall and Devon, is urgently required in light of the extremely poor chronological frameworks currently available.

c. Further re-dating where possible of faunal (including human) assemblages from Upper Palaeolithic and Mesolithic cave sites, particularly in light of the recent methodological developments in the radiocarbon technique (Mellars 2006). The key importance of these new radiocarbon dates are their implications for understanding Late Glacial environmental change through fluctuations in faunal communities, reflecting re-colonisation/extinction events. The extinction of key species (particularly in Late Pleistocene cave assemblages) also needs to be better understood in order to improve the calibration of those biostratigraphical models that are currently used to date Upper Palaeolithic sites.

d. The lack of understanding of the period between 12,000–9,000 BP highlights the need to develop higher resolution frameworks with reference to the timings and geography of the Late Upper Palaeolithic (LUP) re-colonisation of Britain. While this will principally be based upon absolute dates from securely stratified sites, assessments of extant Upper Palaeolithic (and Mesolithic) lithic scatters (see also Research Aim 5a on page 278) should also evaluate the presence/absence of chronologically diagnostic artefacts from different periods. This will support testing of apparent trends (e.g. the seeming absence of Creswellian open-air sites in the Upper Palaeolithic of the South West, in contrast to the remainder of Britain), and may also permit potential integration of those scatters with absolutely dated cave-based and open landscape assemblages from the region (see also Research Aim 1b on page 274).

e. A better definition of key transitional phases (such as the beginning of the Neolithic, the introduction of metalworking and Beakers and the change from the Earlier to the Later Iron Age) is required. See also Research Aim 18a on the facing page and Research Aim 10 on page 279.

f. The Late Bronze Age is poorly defined chronologically for several reasons. Burials with accompanying grave goods are very rare, in contrast to the situation in the Early and Middle Bronze Age, perhaps because excarnation was practised increasingly frequently. Pottery styles become less distinctive, and pottery use may have been less common. There is a lack of radiocarbon dates and the lack of a systematic collation of them for this period.

g. The dating, nature, and development of prehistoric tin and copper production remain very poorly understood, to the extent that the sites which should produce samples for radiocarbon, dendrochronological, and other dating methods have largely not been identified. Analysis and dating of heavy-metal profiles in upland peats and in alluvial sequences may provide a useful route into site location, as well as providing direct information on environmental impacts.

h. In the Early Medieval period, where diagnostic material culture is hard to recognise, the centrality of scientific dating cannot be over-emphasised. In particular dates are needed from "undated but probably prehistoric" sites such as enclosed settlements and sites that appear "late Roman" on the basis of their artefacts.

i. In the Medieval and Post-Medieval periods diagnostic material culture becomes more commonplace but there is a need to link scientific dating techniques to documented and well-researched Medieval sites. The use of dendrochronology on a range of waterlogged sites such as riverside structures, urban wet sites and timber bridges can be linked to more detailed analysis of standing buildings and roof structures.

j. Take opportunities that arise to develop further the tree-ring chronologies for the South West, by carrying out sampling in association with building recording.

Past Environments

Research Aim 17: Improve the quality and quantity of environmental data and our understanding of what it represents.

a. We need to improve consistency in sampling, assessment and analysis for all types of palaeoenvironmental evidence. This requires agreement of details such as sample size, mesh size, methods of recording etc. Examples given by Serjeantson (forthcoming) of where this would help are:

- Standard recording of tooth wear should be employed to establish the age of death of pigs, sheep and cattle for inter-site comparison.
- Standardised recording should be employed to allow inter-assemblage and site and period comparisons of butchery and cooking methods. This would also facilitate the

understanding of the relative importance of hunting red and roe deer.

b. A range of context types should be sampled for plant macrofossils, especially for the Iron Age where most work has concentrated on pits. For example, sampling only obviously rich deposits misses evidence for crop processing and leads to mis-interpretation of site function and plant use.

c. We should maximise sample size by targeting areas where preservation of animal bones (including micro vertebrates) is good. However this needs to be balanced to make sure that context related variation is also understood (suggestion by Serjeantson forthcoming).

d. We should look at the environmental evidence that exists in new ways, such as by conceptualising what we would expect to find under different scenarios and then interrogating the archaeological record. This approach could particularly lend itself to a new understanding of past farming.

Research Aim 18: Target specific soil and sediment contexts for environmental information.

a. Targeted use should be made of pollen analysis to investigate particular archaeological questions or gaps in knowledge and not just carried out on long sequences "because they are there". Examples include the Late Glacial (i.e. the environment of the Late and Final Upper Palaeolithic) from catchments including archaeological sites of this period; the Mesolithic to Neolithic transition; the timing and duration of Neolithic and Bronze Age clearance and reforestation; the development of heathland and the immediate post-Roman to Saxon period (Sub-Roman and Early Medieval). High resolution dating strategies will be needed to allow detailed interpretation and not restricted to top, middle and base of sequences unless judged to be appropriate.

b. Tufa sequences hold great potential for understanding landscape change over long time periods in limestone and chalk areas where sources of data are usually poor. This is demonstrated by recent work on Mendip by Paul Davies (Davies and Lewis 2005). Pollen, molluscs and plant macrofossils are preserved and material suitable for radiocarbon dating can be recovered from these deposits.

c. There is a need to quantify peat wastage, which can be done by establishing age/depth curves which highlight where deposits survive. This has been done for part of the Somerset peat moors, but has wider applicability including in the upland areas.

d. Little is known about when, how and where soils were artificially improved in the past. Are there temporal trends in soil improvement? Micromorphological studies can begin to address these questions and carbon isotope and geochemical studies can also be used in some circumstances. Areas such as the Isles of Scilly, Gwithian and other island or coastal locations would be particularly amenable to study, but the question is relevant throughout the region.

e. Colluvial and alluvial sequences as markers for forest clearance, agricultural intensification and for metal mining and smelting need to be exploited. In order to do this both types of stratigraphy need to be investigated in more detail than present and much better dated, rather than being written off as archaeological and palaeoenvironmentally sterile. Magnetic and geochemical techniques can be used to source such deposits and suggest why deposition occurred, while OSL dating is now a reliable technique (sometimes more so than radiocarbon) for accurately dating the onset of alluviation etc.

Research Aim 19: Improve our understanding of wild and domestic animals in the past.

a. Stable isotopes and laser ablation could be used profitably to reinvestigate old collections of human remains and more work could usefully be done on material from Badger Hole and Gough's Cave and Kent's Cavern.

b. A baseline needs to be established for the distinction between dogs and wolves and there is a need for reconsideration of the size range of Neolithic dogs which could be larger than previously thought (suggestion from Serjeantson forthcoming).

c. The natural history of mammals needs to be better understood. Current gaps include exploitation of wild animals in the late and post-Roman to Early Medieval period and the origins of current breeds of domestic animals. The former may just involve a synthesis of current excavation reports, while the latter could involve DNA and metrical studies of well dated animal bone collections. Assemblages from towns may offer the best opportunities.

d. Isotopic studies are needed on animal as well as human bone assemblages to understand transhumance, pasturing practices and trade in domesticated animals. Recent isotopic work for the

Wessex Iron Age hillforts suggests that Iron Age horses were bred in different geological zones to those where their bones were found.

e. Establish when the decline in Red deer size took place and whether it is correlated with a decline in woodland.

f. Establish base-line size (or other criteria) to distinguish wild from domesticated animals.

g. Establish when cattle became smaller. This has implications for understanding husbandry, subsistence and environment.

Research Aim 20: Improve our understanding of wild and cultivated plants in the past.

a. We need to be open to the possibilities of regional and even local distinctiveness in the contribution of unusual or infrequently cultivated plants. Our understanding of plant cultivation in the past is based on a small range of species, largely because of the processes responsible for preservation in non-waterlogged conditions. Thirsk (1997) gives some indication of the possibilities for the historic period.

b. Saltmarshes presented a valuable resource for past societies. Remains of intertidal and submerged saltmarshes should be included in intertidal studies in the rest of the South West, as done for the Severn Estuary.

c. Most evidence for management of pasture and meadows comes from the east of the region in the Thames valley where the evidence from pollen, insects and plant macrofossils has been integrated. Waterlogged deposits which provide information on this important aspect of farming which is frequently overlooked should be a high priority for all periods as the information is of use both to archaeologists and to the nature conservation sector.

Research Aim 21: Improve our understanding of the environmental aspects of farming.

a. Our knowledge of plant use especially remains patchy. This extends beyond food; fibres, building materials, adhesives and drugs should also be considered. See also Research Aim 3f on page 277.

b. Better understanding is needed of how the process of agricultural intensification can be detected on archaeological sites. Better use of the evidence should be made by integrating environmental and artefactual evidence to test theory, coupled with comprehensive dating programmes. For example, better understanding of the development of field systems and increase in arable between *c.*2000 and 1500 BC remains important.

c. Later prehistory is often characterised as the domestication of the land, with the appearance of permanent settlements and fields; from wildscape to landscape. The environmental evidence for agriculture, whether charred plant remains or animal ones, remains poorly studied in comparison to structures or ceramics. In this regard archaeological science needs to be taken out of the black box and treated as mainstream.

d. Site-based studies have provided environmental evidence in the Medieval period but further work is needed to link sites to the wider landscape and better-dated contexts. This will provide opportunities for understanding what happened at documented historical events around the region. Understanding the changing patterns of land use and their environmental impact has yet to be fully realised.

e. As in other regions, the potential of environmental studies in the Post-Medieval periods remains under-exploited; there is substantial opportunity to enhance our understanding of agricultural, industrial, and urban environments and their development.

Research Aim 22: Improve our understanding of insect faunas and what they can tell us about past environments.

The following specific targets for insect studies are taken from Robinson (2002):

a. Insect faunas from areas with little waterlogged evidence, for example the chalk and limestone areas.

b. Insect faunas in the extreme south-west where conditions are most Atlantic.

c. Carbon and oxygen isotope measurements on insect faunas from sequences which suggest climate change, to give direct measurements for dating and temperature.

d. Insect assemblages that can be closely related to the elm decline.

e. Early–Middle Bronze Age insect faunas.

f. Insects from Iron Age hillforts, oppida, and coastal trading settlements in relation to aspects of the synanthropic insect fauna.

g. Insect faunas from Roman urban deposits, especially where the site has a Late Iron Age origin.

h. Post Roman to Middle Saxon insect faunas.

i. Late Saxon and Medieval rural insect faunas.

j. Insect faunas from major towns such as Bristol and Gloucester.

k. Changes in the Medieval and recent insect fauna of the major rivers.

l. Comparative studies of modern death assemblages which can be related to the surrounding habitats from which they were derived.

m. The development of improved techniques of data analysis to cover more aspects of the urban fauna.

Research Aim 23: Improve our understanding of past climate and sea level changes together with their effects on the peoples relationships with landscapes and the sea.

a. Opportunities should be taken to better understand climate change by ensuring that a range of proxy data (multidisciplinary palaeoenvironmental analyses) is obtained from well-dated wetland sequences from both the uplands and lowlands.

b. Opportunities should be taken to understand the scale and nature of sea level change throughout the region. This will involve multi disciplinary biostratigraphic analyses and high resolution dating programmes.

c. The continuation of the Palaeolithic and Mesolithic archaeology of the South West offshore highlights the need for topographic modelling, deposit and site prediction, and palaeoenvironmental reconstructions to be extended below the current tidal limits to improve understanding of the landscapes occupied by Upper Palaeolithic and Mesolithic populations. The marine archaeological resource has the potential to be particularly relevant to the issue of Upper Palaeolithic re-colonisation strategies (such as, how did modern humans reach the extreme west of the region?)

d. The submerged forests and peat bed resources surrounding the present coast are an endangered resource, with widespread evidence for their ongoing erosion. Yet these locations contain well preserved proxy data for Mesolithic and Neolithic environments that have only rarely been studied in the South West. It is important that the remaining resources are studied in detail before they are destroyed.

e. In light of the importance of Mesolithic coastal strategies (as indicated by key midden sites such as Westward Ho!, Balaam *et al.* 1987), the extant terrestrial resource should be integrated with the marine resource (such as submerged forest landscapes and artefact/ecofact material), especially in the west of the region. Particular focus should also be given to the palaeoenvironmental evidence for coastal management during the Mesolithic (such as reed beds management).

Research Aim 24: Improve our understanding of Pleistocene vertebrate faunas.

More work needs to be carried out on existing Pleistocene vertebrate faunas, particularly Late Pleistocene cave assemblages. In particular, extinction of key species needs to be better understood in order to improve calibration for the biostratigraphic models that are currently used to date Upper Palaeolithic sites.

Research Aim 25: Improve our understanding of Palaeolithic and Mesolithic landscapes.

a. It is notable in the South West that such Late Upper Palaeolithic (LUP) material that is present is typically represented by single finds. This situation is extremely different to the river basins of northern France and there is a need to assess and explain the differences (particularly since the two landscapes were connected during the Upper Palaeolithic, albeit by a landscape with a major fluvial system (the Channel River). With respect to the identification of LUP sites, the issue of river valley burial and tin streaming (especially on the uplands) needs to be acknowledged.

b. The South West also provides an opportunity to study the Mesolithic/Neolithic transition, for example in the Land's End area or the uplands (such as Dartmoor or Bodmin Moor) where there may be relevant stratified material preserved under peat deposits. Jacobi (pers. comm.) has also highlighted tufa deposits as a potential source of well-preserved evidence for this transition period and for the Mesolithic more generally (Research Aim 18b on page 283).

Research Aim 26: Investigate the changes in landscape and population at the end of the Roman period.

In the Early Medieval period environmental studies have the potential to provide an independent witness to activities which are currently obscured by the lack of site-based evidence. Studies such as the use of pollen to assess woodland regeneration can provide broad indicators of population densities – but they must be dated independently rather than by links to supposed historical events as has sometimes happened in the past.

Research Aim 27: Investigate the origins of free-threshing wheat.

Despite this being a priority for archaeobotany for many years, when, where and how the change from cultivation of hulled to free-threshing wheats took place is still not understood. This major change which will have affected husbandry and crop-processing practices occurred sometime in the centuries covering the late/post-Roman–Early Medieval periods. Efforts must be made to target suitable assemblages.

15.3.3 Settlement

Rural

Research Aim 28: Improve our understanding of Neolithic settlements and landscapes.

a. A greater focus needs to be placed on the landscape surrounding Neolithic sites. Although such an approach has been applied to some areas of Wessex (such as Cranborne Chase, Stonehenge, Durrington Walls etc) there are many areas where sites are studied in isolation.

b. The potential of "small-scale" evidence such as pits and stake-holes needs to be realised. While individually not seemingly significant, will cumulative patterns emerge?

c. We still require a better knowledge of "domestic" architecture, in both ephemeral and more permanent forms.

d. More attention should be paid to tree-throws and other "natural" features within which occupation debris occurs.

Research Aim 29: Improve our understanding of non-villa Roman rural settlement.

a. Whilst work in the past has concentrated on villa buildings, developer funded work has made considerable advances in the study of non-villa rural settlement in certain parts of the region, such as the M4/M5 corridors, the Upper Thames valley and the outskirts of the Bristol conurbation. Elsewhere the record is very patchy and there has been little study of the environmental/economic data such as bones and seeds which ought to provide information on the agricultural base in different parts of the region.

b. Some areas, such as West Dorset and North and West Devon, currently have very little evidence for settlement in the Roman period. This needs to be assessed by extensive field survey (such as the National Mapping Programme) and targeted excavation to test whether this is a reflection of a real absence or only a lack of archaeological work.

c. Apart from in these areas, the visibility of Roman sites should allow more geographical approaches to their study, such as the identification of differing settlement densities and types across the region (and perhaps beyond). This would provide a useful counterbalance to earlier studies of villa distributions and provide a greater understanding of the nature of the Roman countryside. Developer-funded work associated with linear schemes such as roads and pipelines provides raw data which requires further synthesis before it can be used to address such questions.

Research Aim 30: Develop and test methodologies to identify Early Medieval rural settlement.

The lack of visibility of smaller rural sites has led to a reliance on more visible elite settlements. The known sites (of all types) are so few in number that it is impossible to assess how "typical" a site such as Trethurgy or Cadbury Castle is. This needs to be addressed by wider landscape studies and careful targeting of fieldwork.

Research Aim 31: Address the long-running debates about Early Medieval landscapes and territories.

a. New questions, such as the location and role of "assembly places" or execution sites need to be considered in landscape terms along with older, but still unanswered questions, such as the continuity of Roman estate boundaries.

b. We need to confirm the dates of the various linear earthworks that have been produced much debate about their function as boundaries at various dates. See also Research Aim 62b on page 294.

c. The origins of the parish, the manor or township, the hundred, the monastic estate and the shire occur in the transition period between Early Medieval times and the end of the 11th century and are a key area for further research.

Research Aim 32: Investigate and identify the locations of Early Medieval religious buildings, monuments and landscapes.

a. Recent discussions on the origins and typological usefulness of circular churchyards (Petts 2002) and rectangular minster enclosures (Hall 2000) need to be addressed by fieldwork – in particular for dating evidence.

b. The location of churches in relation to landscape and territories needs to be studied as does the location of the inscribed stones.

c. There is a particular need to identify and explore the early development of monastic sites.

d. Inscribed stones that appear to be in their original locations should be considered for detailed fieldwork.

e. Similar questions need to be asked of churches in urban topography.

Research Aim 33: Widen our understanding of the origins of villages.

The transition from the Early Medieval period into the pre-Conquest period is one of the main research areas for rural settlement studies in the region. The origin of villages and their field systems in some areas (notably in the east of the region), is thought to date from the 10th century in this area but further detailed investigation, analysis and dating is urgently needed. Further work needs to be addressed by wider landscape studies and the careful targeting of fieldwork/excavation. There is a particular need to explore the origins and development of landscapes characterised by dispersed settlement patterns in the west of the region.

Urban

Research Aim 34: Improve our understanding of early Roman urban settlement.

a. The wealth of towns in the late-Roman South West has led to a focus on their later histories. We know very little of the sequence and form of the crucial late 1st–early 2nd century development of the *civitas* capitals and *colonia*. Non-publication of excavations in, for example, Gloucester has led to competing theories which are difficult to evaluate in the absence of detailed publication of key sites.

b. The seemingly very different early development trajectories of towns such as Cirencester, Dorchester and Exeter also needs to be explained. The old dichotomy between urban and rural needs to be re-evaluated in the light of new theoretical models from other places and periods.

Research Aim 35: Develop our understanding of Early Medieval urban settlement.

a. We need to understand better the end of Roman urbanism where a mixed picture is emerging across the country but where little evidence has been published from the South West.

b. We need to investigate the origins of Late Saxon urbanism. Landscape studies may help in assessing the context in which burhs are located and further work is needed to assess John Blair's theories on the minster origins of towns. Much basic data has been collected by the Extensive Urban Survey projects (Section 1.2.4 on page 11) but these need to be completed across the whole region and also studied synthetically.

Research Aim 36: Improve our understanding of Medieval and later urbanism.

a. The origins of towns in the South West are linked with the development of settlement patterns and the apparent expansion of the population at the end of the 10th century. This is an area requiring further detailed analysis and dating, similar to the research questions for rural settlements. Much basic data has been collected by the Extensive Urban Survey projects but these need to be completed across the whole region and also synthesised.

b. There is a clear overlap between Late Saxon urbanism and the development of towns after the Norman Conquest. The Domesday Book helps by providing a range of information but making a link between the documentary record and the reality of the archaeological evidence is still a challenge.

c. The growth and development of towns throughout the middle ages provides a substantial archaeological resource but work is needed to understand the form, function and specialisation that towns offered.

d. The transition from Medieval towns to their Post-Medieval and industrial phases needs to be documented and researched. Archaeological research in the major urban areas such as Exeter, Plymouth, Bristol, Gloucester and Bath has been going on for many decades but a synthetic volume has yet to appear for the "Urban Archaeology of South West England".

e. Understanding the nature of change that towns have undergone in the past five hundred years has been a recurrent theme of past research agendas but it is the areas peripheral to urban centres that are being subjected to intensive redevelopment at the moment. These are the areas of early Post-Medieval urban expansion which later "declined" into areas of intense but incredibly diverse economic and social activity. The opportunity must be found to identify locations which would benefit from full excavation and post-excavation analysis.

f. Techniques of recording and analysis which have been well tried and tested in the New World and in Commonwealth nations should be adopted and applied (see, for instance, examples in Egan

and Michael 1999). The unrivalled opportunities for recording and understanding interrelated archaeological assemblages offered by urban excavation should be recognised as significant in trying to answer some of the research issues raised about the chronology and nature of change of material culture.

15.3.4 Production and Trade

Maritime

Research Aim 37: Increase our knowledge of maritime archaeological sites.

Indirect evidence indicates that the seas around the region were busy with shipping in the past and this must have led to a large number of wrecks. However, many of these are likely to have been lost in waters that are not frequented by sport divers because of low visibility or high energy currents. How can we access this resource?

See also Research Aim 46 on page 290.

Extractive Industries

Research Aim 38: Widen our understanding of the extraction, processing and transportation of minerals, stone and aggregates.

a. Given the importance of exploitation of metal ores in the South West in both prehistoric and historic times, alluvial and peat sequences can be used to provide a chronology for and to assess the impact of mining activity (see, for example, Thorndycraft *et al.* 2004). A combination of geochemistry and OSL dating can be used.

b. Mining remains themselves have the potential for well-dated and stratified deposits which may also exhibit technological change with wider implications.

c. More work is required on the exploitation of flint, chert and other stone sources, and the transportation of these materials in prehistory.

d. The scale and organisation of metalworking during the earlier Bronze Age remain poorly defined as are the reasons why metal objects are comparatively rare in those areas which have ores when compared to those that don't.

e. The apparent lack of evidence for Bronze Age mining (now clearly demonstrated in Ireland, Wales, and Cheshire) is very surprising in view of the region's rich and well-exposed mineral resources. While tin extraction may have been entirely by streaming, this should not be uncritically assumed, and copper ores do not accumulate in stream deposits. The main site indicator in other regions has proved to be the hammerstones (though these do not in themselves prove a prehistoric date); their apparent absence from the South West may possibly indicate a different mining technology in which hammerstones were not used, in which case other site indicators will need to be identified. Prehistoric streaming sites would also be of considerable importance. A genuine absence of Bronze Age mining, for tin and/or copper, would itself be of considerable interest if the "negative" results of substantial well-designed research allowed this to be argued with any confidence.

f. Our knowledge of early metal extraction, production and distribution remains thin. When, for example, were tin and Mendip lead sources first exploited, and on what scale?

g. The iron industry of the Forest of Dean was of major national importance from at least the Roman period until the 18th century, with some important 19th-century sites. Iron mining "scowles" are now starting to receive good archaeological attention, but there is a surprising lack of modern work on Roman and Medieval bloomeries and other smelting sites. For the Post-Medieval charcoal iron industry, blast furnaces are relatively well-known, but there is a lack of survey, excavation and archaeo-metallurgy on forge sites (in Dean as elsewhere); the recent comprehensive historically-based gazetteers of Peter King offer a new starting-point for field-based research. Although Dean ceased to be major iron-producing area with the switch to coke smelting, its very peripheral-ness at this stage has aided the survival of some important coke blast furnaces and experimental steelworks.

h. Work on the iron industry over the last couple of decades, in other areas such as the Blackdown Hills, Exmoor and South Gloucestershire, has started to show the real potential which has long since been suspected. More work is needed, especially concerning the chronology and organisation of the industries and their associated settlements.

i. Primary evidence for lead extraction in the Late Iron Age and Roman periods has been obtained from Charterhouse, and may have been a major focus for early Roman activity in the region, but the character of the mining area and its associated settlement is still poorly understood, particularly after the 1st century AD. The Medieval mining and smelting industry on Mendip was of considerable importance and remains virtually unstudied archaeologically; the four main "minery" (centralised ore dressing and smelting) sites

are of huge scale, and appear to be nationally unique. A 16th-century horizon of innovation in the Mendip lead industry (currently known entirely from historical evidence) was also of importance for the industry nationally, with important developments in ore dressing and smelting.

j. Although the massive Medieval and Post-Medieval rise of the tin and copper industries in Devon and Cornwall is relatively well-known archaeologically, its sheer scale, importance, and variety means that there is still much important work to be done.

k. The South West also played an important part in the development of the reverberatory furnace, both for smelting and for other metallurgical and pyro-chemical processes, in the late 17th century; this development cross-cuts several industries, with early uses in calamine (zinc ore) roasting on Mendip, arsenic "burning" and tin smelting in Devon and Cornwall, and copper and lead smelting in the Bristol area.

l. As well as the "major metals" of tin, copper and lead, the Devon and Cornwall orefield is also notable for its range of other extracted metals and minerals, ranging from antimony and arsenic to wolfram (tungsten ore) and uranium. While production varied from the substantial (arsenic and wolfram) to the economically-insignificant, these industries form an important part of the national range of ore-dressing, smelting, and chemical industries, and most are confined to the region. Many have received little or no archaeological attention.

m. Although the coalfields of the South West (the Bristol, North Somerset, and Forest of Dean coalfields) are relatively minor in terms if national production figures, Monuments Protection Programme coverage showed that they they punch above their weight in terms of archaeological importance, since site preservation is remarkably good by national standards. Good-quality archaeological recording and research on collieries, coke ovens and other coal industry features must therefore remain a priority.

n. Quarrying has been a further major extractive industry of the region, ranging from the Medieval and later freestone quarries of the Jurassic belt in the east to the granite quarries of Dartmooor and Cornwall, and also including underground "stone mines" such as Chilmark and Combe Down. These quarries, and their associated infrastructure in their wider cultural and economic setting, remain under-studied.

o. Roman salt production is another area where there is good evidence from the South West (Somerset and Dorset) and the potential for wider (technological, social, trade etc) studies. However later saltmaking has been little studied, even the range of technologies employed in the region, and their chronology and distribution, being poorly understood.

p. The broader industrial and social development of the Bristol region in the 17th and 18th centuries, fuelled at a technical level by its coal and other mineral reserves, and at an economic and social level by trade (including important and uncomfortable links to the slave trade and exploitation of convict and indentured labour) and colonialism, forms a major element in British industrialisation more generally. This broader field archaeology, and the ramificatications that underlie it, have now started to receive good archaeological research; this should be continued and developed.

Food Production

Research Aim 39: Understand better the relationships of Neolithic and Bronze Age people to plants and animals.

a. Further work is needed on the use of woodland resources and woodland management.

b. The changing role of marine and freshwater resources requires more adequate investigation.

c. Isotopic studies need to be carried out on animal as well as human bone assemblages to understand transhumance, pasturing practices and trade in domesticated animals. See also Research Aim 1 on page 274

d. Better understanding is needed of the status of arable in the Neolithic and Early Bronze Age as the debate on the importance of arable versus collection of wild plant resources continues (but see also Research Aim 21f on page 277). More assemblages are needed from a range of contexts, particularly associated with domestic rather than ritual activity. All Neolithic and Early Bronze Age samples are important, but any waterlogged deposits are particularly so as they may preserve material not susceptible to charring.

Research Aim 40: Improve our understanding of agricultural intensification and diversification in later prehistory.

There is a need to better understand the chronology and regionality of crop diversification and intensification of production, which appears to take place from around the Middle Bronze Age onwards. Well-dated

assemblages from a range of settlement contexts are required to examine introductions of new crops and associated wild species.

Research Aim 41: Assess the impact of the Roman empire on farming.

We still do not fully understand the effects of "Romanisation" on plant and animal use and cultivation methods or whether regional differences can be attributed to this or other factors.

Research Aim 42: Improve our understanding of Medieval farming.

a. There is very little direct environmental evidence for the use of grassland/pasture/meadows in the South West. The pastoral side of the landscape was the major land use for many areas, and vital for producing winter food for stock. However the types and management of meadowland and pasture is still very poorly understood except in parts of the Thames valley. The integration of plant macrofossil and insect evidence and in some cases pollen as well, is the key to success here. See also Research Aim 20a on page 284.

b. Better use should be made of documentary evidence to help interpret plant and animal assemblages. Plant and animal assemblages could also be used to challenge or confirm the accuracy of the documentary record. Monastic accounts relating to demesne land, for example, give insights into the control of the Abbeys, on the farming of large parts of the Medieval landscape. Better understanding of how farming was managed could lead to more innovative and useful interpretation.

Research Aim 43: Address the lack of knowledge of Post-Medieval to Modern food production.

a. The uneven nature of work here has been noted – more is needed on small food processing establishments of the earlier periods and the larger concerns of the late 19th and 20th centuries that eventually replaced them. For example, the recent closures of breweries within the region indicate the urgency for study and recording.

b. The question of how food production changed through the period might be profitably addressed by selecting locations for a more holistic approach relating buildings, landscape, land use and artefacts.

c. Research is needed into the introduction of new crops and farming methods in the 18th century in particular. The impact of innovative plant and animal breeding and the use of mechanisation is almost totally unstudied by archaeologists. However, this evidence is vulnerable to loss through development and modern farming practice. The innovations will affect the composition of assemblages and our interpretation of them.

Technology

Research Aim 44: Develop an understanding and identification of Early Medieval technologies.

a. The hints of continuing pottery production and use in some parts of the region need to be examined as a potential key to non-elite material culture and other classes of artefact identified and considered in the same way.

b. Classes of site such as mills (wind, river, tide and animal) and fishtraps need to be sought out.

Research Aim 45: Broaden our understanding of Post-Medieval to Modern technology and production.

a. For the period 1550–1750 the following areas of research need further work:

- the regulation, products and structures of textile manufacture
- the mining, processing and manufacture of metals (Research Aim 38 on page 288).
- the quarrying, processing and transportation of stone and aggregate (Research Aim 38n on the previous page)
- regional and temporal variations in the production and use of fuel
- the early development of the glass industry
- the development of the pottery industry
- alum, copperas and saltpetre
- estate industries.

b. The period after 1750 is seemingly well-covered by industrial archaeologists but coverage has, in fact, been uneven with the neglect of many of the minor industries represented in the region. In particular, the industries of the "second industrial revolution" of the late 20th and early 20th centuries have been largely ignored. The study of industrial estates (pre- and post-war) is required.

Trade, Transport and Communications

Research Aim 46: Assess the information for Roman ports.

Ports are poorly known in Britain, yet the South West has many potential sites both on the Channel coast (Hamworthy, Seaton, Topsham, Plymouth) and on the

banks of the Bristol Channel (Oldbury-on-Severn, Sea Mills, Clevedon, Crandon Bridge, Combwich and Padstow). Despite the obvious importance of the sea in the region, very few of these sites have been studied. Work on sea level change may also be of value in understanding the Roman coastline. There has been some work on this topic in Poole harbour but little elsewhere.

Research Aim 47: Assess the archaeological potential for studying Medieval economy, trade, technology and production.

a. Trade and interaction in the South West expanded considerably during the Medieval period with the growth of market towns, ports and an improved communication network. By the Medieval period pottery production developed at several centres and the study of markets and trade within the region is a key research item.

b. Classes of sites such as mills and fish weirs, building-stone quarries, iron production sites (such as the Blackdown Hills) were all expanded to satisfy the economic needs of the estates within the region. The Forest of Dean iron industry is perhaps in a different category, as a major national industry of strategic importance. Similarly, the tin industries of Dartmoor and Cornwall, and the lead industry of Mendip, were of supra-regional importance. The Crown-controlled lead-silver industries of Bere Alston and Combe Martin, although of more limited geographical extent, were also of strategic value, and their archaeological survivals are potentially of great importance in conjunction with the good historical documentation of their advanced technology.

c. The importance of ports, harbours, coast and maritime archaeology develops in this period and much needs to be done to link this with more traditional rural studies and the Medieval market patterns of the South West.

Research Aim 48: Widen our understanding of Post-Medieval and Modern transport and communications.

a. Minor, less glamorous but essential features of early road, rail, inland and coastal transport have been neglected in the literature and need to be studied along with the viaducts, stations, etc. Of particular importance are the survivals of motor transport systems such as bus depots, petrol stations and small garages.

b. Recent telecommunications systems are subject to rapid change and need to be studied, recorded and artefacts conserved, as a priority.

c. The region played a pivotal role in Britain's interface with the rest of the world. Increasingly the archaeological concerns of these periods have to be addressed in a much wider context. International collaboration is already bearing much fruit and further opportunities should be pursued.

15.3.5 Social Relations

Identities and Interactions

Research Aim 49: Improve our knowledge of Neolithic and Early Bronze Age social life.

a. We need to understand whether the "catchments" of communities involved in the building of large communal monuments can be determined?

b. We need to use the rich Early Bronze Age grave assemblages from the region to study bodily ornamentation and display. Equally, how does the presence of non-rich or multiple/token burials inform our understanding of individual identities.

Research Aim 50: Improve understanding of the effects of the Roman army on the local population.

The effects of the sudden presence (and then withdrawal) of the large 1st-century garrison in the south-west peninsula on the indigenous economy and settlement pattern is poorly understood. There is very little evidence for *canabae* and *vici* and what there is is poorly understood (for instance the relationship between the apparent late Iron Age settlement and subsequent fortress at Kingsholm).

Research Aim 51: Utilise the high-quality evidence from the region to investigate Early Medieval ethnicities and identities.

a. Most of the studies of "pagan Anglo-Saxon" cemeteries have been carried out in the east of England but study of such sites in the South West has the potential to provide evidence (artefactual and scientific, such as stable isotopes) for the nature of Anglicisation in the region.

b. Sub-regional identities need to be examined.

Research Aim 52: Use archaeological evidence to better understand identities, such as Cornish, through time.

The archaeology of identity is an important factor within the region, spanning the Early Medieval to Industrial periods. The most obvious intra-regional identity is that of Cornwall; there is a need for good cross-Tamar research to investigate how the very-separate Cornish cultural identity does, or does not,

manifest itself in the various forms of material culture that make up the archaeological record. However the region also includes a segment of the Anglo-Welsh border; research agenda for this national identity should be drawn up in conjunction with Welsh archaeologists, and with the West Midlands and North West England regions. Other intra-regional and cross-regional identities would also benefit from research; examples include cross-Channel contacts, elements of "Celtic" and "Atlantic Province" identity, the material-culture manifestations of the various Post-Medieval religious identities within the region, and occupational communities such as mining and fishing settlements.

Research Aim 53: Increase our knowledge of the effects of colonialism on the region and the wider world

An important aspect of modern Post-Medieval and Historical Archaeology worldwide is the archaeology of colonialism, and the South West has important contributions to make to this. The archaeology of Bristol and its connections to the slave trade are the most obvious element of this, but other ports also had strong connections to the colonisation of the New World, the industries of the region were strengthened by supply to, and investment from, both of these aspects of colonialism, and the reverse influences of colonial and non-white cultures within the region probably remain under-recognised. The 19th-century "Cornish diaspora" of miners and mining technology can also be seen to an extent as within a colonial context.

Religion

Research Aim 54: Widen our understanding of monumentality in the Neolithic and Early Bronze Age.

a. Certain kinds of monumental construction within the region (such as the diminutive Exmoor stone settings) remain very poorly understood.

b. All areas of the region contain monuments that challenge "conventional" categories and sequences. Rather than being relegated to the status of "oddities", we should acknowledge and seek to better understand non-conventional monument forms.

c. Likewise, there is a need to better interpret differences in scale, complexity and histories of use in what are seemingly single "categories" of monument.

d. How can the emergence of ceremonial centres (clusters of monuments) be understood?

e. So-called rotundas, associated with Cotswold-Severn long barrows, are still poorly comprehended. In general, a better understanding of the structure and sequence of long mounds is needed.

f. There is a need to establish whether some of the suspected Tor enclosures are in fact similar in character and chronology to Carn Brea and Helman Tor. This will enable a better understanding of whether these are regional or local centres, or if they are the consequence of a "topographical determinism" (i.e. monuments deriving from a particular response to spectacular landforms).

g. What evidence is there for Late Neolithic and Early Bronze Age enclosure in the south-west peninsula where henges are rare? Are there equivalents elsewhere for sites such as Bartinney with a non-defensive enclosure around ceremonial monuments?

h. How common and widespread are Neolithic round barrows?

i. More work is required on the chronology (see also Research Aim 16 on page 281) and function of linear monuments in the south-west peninsula – stone rows, bank cairns, possible cursus sites, and so forth.

j. Approaches to Bronze Age round barrow cemeteries as "communal monuments" potentially have much to offer.

Research Aim 55: Improve our understanding of later Roman religion.

The South West has some of the best evidence for later Roman paganism in the country but the relationship of this to Christianity in the region is poorly understood. The evidence for the presence and strength of Christianity in the region needs to be reassessed, particularly in the light of the need for knowledge of the Christian basis of the Early Medieval period.

Research Aim 56: Utilise surviving buildings and records to understand liturgical and social change in Post-Medieval to Modern places of worship and cemeteries.

a. A systematic record of surviving early liturgical arrangements is required as well as of places of worship in their context of the period post 1850.

b. Local analysis of burial memorials should be encouraged as a relatively low-cost high-yield field of study.

c. Although holy wells form a substantial element of the field archaeology of parts of the region (notably Cornwall), they have been omitted from

most mainstream archaeological research. While any comprehensive research should include critical analysis of traditional research assumptions such as continuity from pre-Christian religion, and early Christian origins, it should also include analysis in terms of a broader Christian "religious landscape", and of the Post-Medieval survival, use, and even instigation of holy wells as manifestations of local and other identities. Holy wells could also be looked at as expressions of domination and resistance in terms of dialogue and opposition between the institutional archaeology of the church and the vernacular archaeology of the holy well.

Mortuary Practice

Research Aim 57: Widen our understanding of Neolithic and Early Bronze Age mortuary practice.

See also Research Aim 2c on page 276.

a. The simplified, traditionally understood sequence of earlier Neolithic collective burial, replaced by single burial (cremation or inhumation) by the earlier Bronze Age, clearly masks a reality of considerable diversity in mortuary treatment. The full complexity of treatment in time and space needs addressing, and within single monument contexts (such as Cotswold-Severn and earthen long barrows), in part through synthesis of existing information.

b. We need to address the problem of later Neolithic mortuary practices in view of the extreme rarity of human remains from the period.

c. More dates are needed on cremated bone, with and without direct material associations, so that this aspect of mortuary behaviour can be fitted into established chronologies . See also Research Priority 16 on page 281.

d. Greater attention needs to be paid to the occurrence of isolated human bone finds within a range of contexts, both for the information they might provide of mortuary and ancestor rites, and, via direct scientific analysis, as a source of information on diet, health and mobility.

e. Does the presence of human bone in barrow sites and other monuments always equate with funerary activity or ancestral rites *per se*, or in some cases was human bone just another form of symbolic resource?

Research Aim 58: Widen our understanding of Roman burial traditions.

Inhumation burial occurs in a number of areas of the South West in the Late Iron Age and early Roman period (areas such as Dorset and the Cotswold/Severn valley) and study of these may throw light on changes in belief brought about by the conquest. Similarly large later Roman urban cemeteries occur (as at Dorchester, Gloucester and Cirencester) as do rural ones which frequently span into the post-Roman period (Cannington, Henley Wood, Bradley Hill etc.) which provide a similar resource at the end of the period. Museum collections also represent a considerable resource to which new scientific techniques can be applied such to provide information on geographic origins and family associations. The very poor burial record in Devon and Cornwall needs to be remedied.

Research Aim 59: Utilise the potential for good evidence from Early Medieval burials to address research questions.

a. The distribution of discovered burials needs to be assessed in relation to bone survival across the region and efforts made to locate dated burials from 7th – 11th centuries; the key period for the start of 1000 years of churchyard burial. Re-examination of the sites of antiquarian reports of undated burials may help here. See also Research Aim 60.

b. Modern excavation of furnished burials will provide a useful contrast to the evidence from eastern England.

c. The existence of isolated "final phase" cemeteries, such as at Camerton, needs to be explained.

Research Aim 60: Use the excavation of Medieval and Post-Medieval burials to study wider population and social issues.

The development of the Medieval churchyard provides an important resource for understanding human populations, family groups, disease and genetic mapping through developments in scientific studies of skeletal remains. The transition to Post-Medieval burial traditions also important. See also Research Aim 59 a.

Conflict

Research Aim 61: Address the lack of knowledge of Neolithic and Early Bronze Age conflict.

The nature, scales, and contexts of conflict throughout the period remain undefined.

Research Aim 62: Examine the evidence for Early Medieval defence and conflict sites across the region.

a. Battlefields are commonplace in the historical record but are unlikely to be easily located by archaeology in this period. Their locations may be better explained in terms of landscape but we need a better appreciation of how Early Medieval conflict operated.

b. Linear earthworks and defended sites may provide some of the answers and their date and distribution (in relation to landscape and potential territories) needs to be assessed – were hillforts only reoccupied in Somerset? See also Research Aim 31b on page 286.

Research Aim 63: Deepen our understanding of Medieval and later defence and conflict sites.

a. Future archaeological understanding of these issues will benefit immeasurably if Medieval sites associated with defence and warfare are not interpreted narrowly as features of "military heritage", but examined as integral components within their contemporary environments, whether urban or rural.

b. A priority for future studies of the region's castles a clear priority must be the baileys of these sites. We still have remarkably little idea of the activities undertaken in castle baileys and archaeological investigation of these zones holds particular potential to illuminate interrelationships between lordship sites and their settings.

c. Another priority area concerns the region's Medieval urban fortifications. In several cases important urban castles have been subjected to both large- and small-scale excavation and detailed archaeological surveys, although highly significant findings remain to be fully published and contextualised. This point can also be extended to several of the region's Medieval town walls, which have similarly seen multiple developer-funded archaeological interventions. Excavation is only one tool, however, and the complementary roles of other non-intrusive methodologies are vital; in particular geophysical survey has under-used potential for the study of Medieval fortifications, while a number of significant sites with upstanding masonry remains have yet to benefit from detailed standing building surveys.

d. The origins and diversity of the coastal artillery defences that are so characteristic of the region's coastline deserve greater scrutiny.

e. Battlefield archaeology is a growing field of study for all periods up to the Glorious Revolution. A more rigorous and structured approach to their study is needed of the maximum information is to be obtained.

Research Aim 64: Improve our understanding of the less-researched areas of Post-Medieval to Modern defence and warfare.

These aims need to be read in addition to the national aims expressed in Schofield (2004).

a. Opportunities should be identified to better understand the nature of fixed defences, particularly the less monumental structures. This would include study of earthen defences and siege works of the Civil War which need to be integrated with the historical work of Mark Stoyle (Stoyle 1995; 1998; 2003) and others. Also the lesser works of the 18th and 19th centuries, earthwork batteries, barracks, depots and training grounds need to be identified and placed in their social and military contexts.

b. There is massive scope in the later period, one in which the ratio of civilian and support activity to the front-line has developed to meet rapid technological change and "total" war in the later twentieth century. Particular areas in urgent need of study are logistics (depots, dumps, repair and transport facilities), command and control resources, personnel services (training, medical care, recreation, security for service people) and "civilian" aspects, such as railways in war, temporary housing and fire/rescue services.

Authors

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The index principally covers placenames and specific site-types as broader themes, such as "defence" can be easily found in the appropriate section of the text. The counties given after placenames are historical ones with the exception of those in the former county of Avon where the new unitary is used.

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