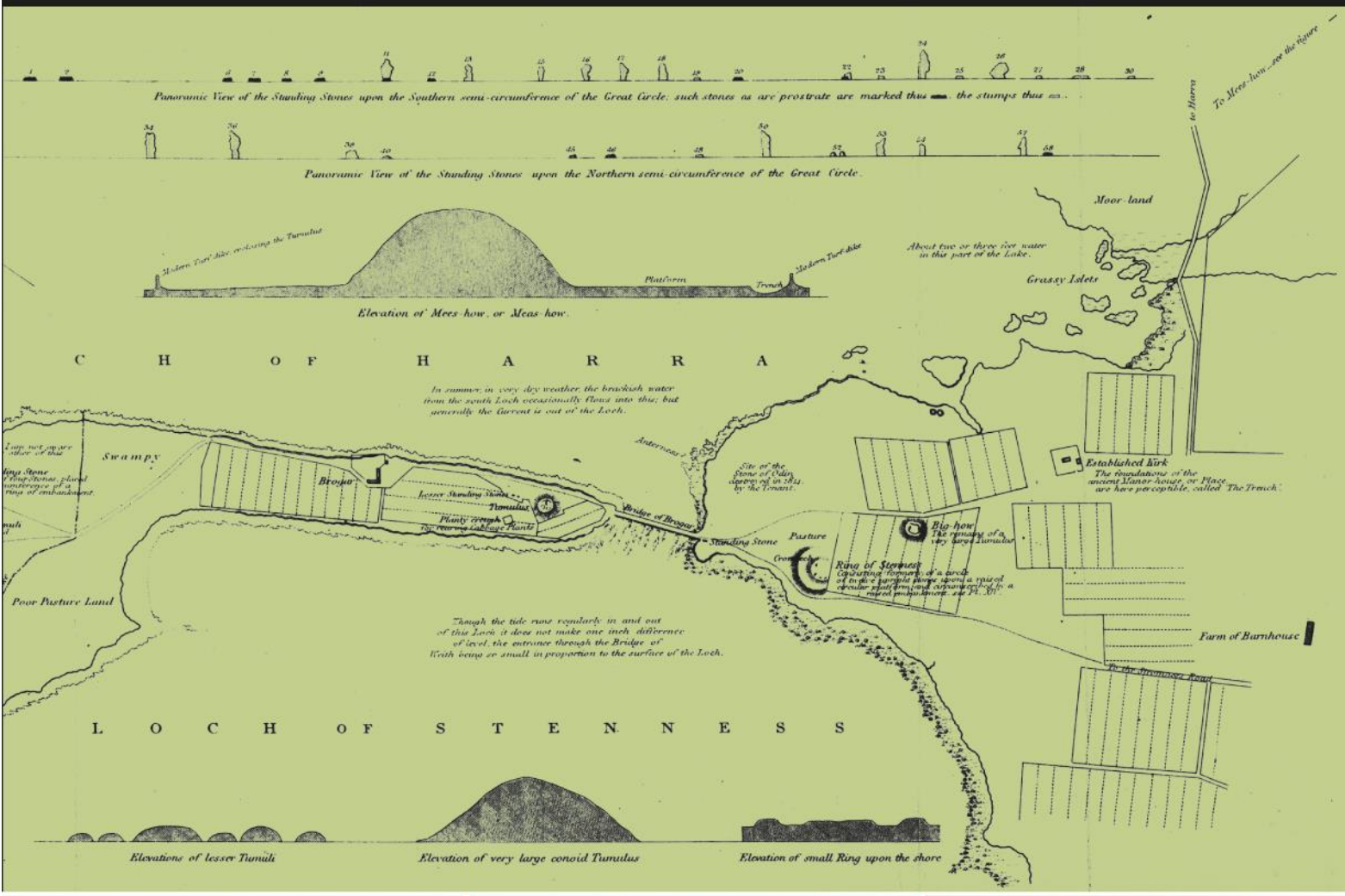
HISTORIC SCOTLAND

The Heart of Neolithic Orkney World Heritage Site Research Agenda



Edited by Jane Downes, Sally M Foster and C R Wickham-Jones with Jude Callister

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As advisers to the World Heritage Committee, ICOMOS has drawn up guidelines for the management of World Heritage Sites and for research programmes to promote and co-ordinate research in the area. In Orkney this important task has been carried out with the contribution of a number of partners. It has been a collaborative venture involving many experts who have generously given freely of their time. I know that Historic Scotland has been delighted to support the Orkney College UHI in organising and co-ordinating the production of this Research Agenda for Scotland's first archaeological World Heritage Site, The Heart of Neolithic Orkney.

We very much hope that this Research Agenda will prove a model for Site managers throughout the world, as well as others dealing with the challenges and opportunities of their local archaeological inheritance elsewhere in Scotland.

Patricia Ferguson

Minister for Tourism, Culture and Sport

Dedicated to Daphne Home Lorimer,
prime mover in the setting up of
Orkney Archaeological Trust
and Chairman of the Trust
1996-2004

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Foreword

The Orkney World Heritage Site is indeed one of the glories of prehistory, not just of Scottish or of British prehistory, but of world prehistory. There can be few places more numinous than the walkway between the Loch of Harray and the Loch of Stenness, with the Stones of Stenness on one side, with the Ring of Brodgar in prospect, and with the most perfect of Neolithic tombs, Maeshowe, only a few hundred metres away. It is always a pleasure to celebrate these remarkable monuments and their numerous counterparts elsewhere in the Orkney Islands.

This splendid volume is, however, very much more than a simple celebration. It sets out to use the impetus offered by the status of 'World Heritage Site' in a very active way. Of course it considers fully the various problems offered by the management of what we now increasingly realise to be a priceless heritage. But it does more than that. It seeks ways of understanding more fully just what that heritage is, and of promoting the wider dissemination of that understanding.

For the archaeologist, Neolithic Orkney is one of the wonders of the ancient world. It is quite exceptional anywhere, and without parallel in Europe, to be able to visit the well preserved settlement sites, like Skara Brae and the Knap of Howar, and then wonderful funerary monuments, like Midhowe or Quoyness or Isbister, and then to go on to view these in a landscape in which the great central monuments, including the Ring of Brodgar, become increasingly intelligible to us in their contemporary setting. For the pace of discovery is considerable. Today, through the revelations of the settlement at Barnhouse, we understand very much more than we did 30 years ago when I was excavating at Quanterness and investigating the Ring of Brodgar and Maeshowe.

And as this admirable Agenda so clearly indicates, our understanding of the World Heritage Site is enriched and amplified by our increased knowledge of the Orkney Islands as a whole at that period. The discovery and excavation of new settlement sites, and their thoughtful integration into a more ambitious notion of the Neolithic landscape holds the promise of a much more comprehensive and coherent view of Neolithic Orkney. There is a potential for further research here which is very well outlined in this report. It is admirably open-ended and invites both the intelligent amplification of what we already know and the acquisition of new knowledge.

The report has a second great merit. It recognises fully that although it is the great monuments of the so-called 'Neolithic' period that first attract us to the World Heritage Site, that Site and its landscape, like any land that has been lived and worked and loved for 6,000 years, is a palimpsest. That is to say it is an overlay: a record of the life and work of more than a 100 generations of Orcadians. It carries the traces of the first visitors to Orkney in the Mesolithic period. It has burials and settlements of the still (to us) rather obscure Bronze Age life of Orkney which succeeded the great floruit of the Neolithic period. With the brochs of the Iron Age and then the Pictish settlements we have a new period of abundant evidence which is soon succeeded by the Norse settlements and their Scottish successors. There are

ample indications of these phases within the World Heritage Area itself. But again it is to the Orkney Islands as a whole that one has to look to obtain a fully diachronic view, and to discern the full richness of what the great Orcadian poet George Mackay Brown described as the tapestry of the past of Orkney.

This remarkable book is more than simply a 'research agenda', generously grant-aided by Historic Scotland, the Orkney Islands Council and Orkney Heritage Society, with support from Orkney College UHI. In the first place it is an up-to-date review of the state not only of the World Heritage Site itself but of archaeology and of the historic heritage in Orkney today. To realise so comprehensively the vision that the true heritage encompasses the whole of Orkney is already an important contribution. Any management plan has to be concerned not only with the physical integrity of the great sites in guardianship but with the remarkable totality of the historic resource which Orkney offers. By considering not only the research techniques which are available in a very systematic way but also the theoretical perspectives which may be developed to inform such research, it offers an encouraging exemplar. Themes of cultural identity and of social construction are developed here in an admirably pragmatic way. For sometimes in theoretical archaeology the theory is at a rather abstract level which does not quite engage with the practicalities of day-to-day archaeological research. Here the theory has been brought to bear upon the rich available data for early Orkney with the promise of generating further relevant data, and hence new conclusions and perhaps even new theory. This is cutting-edge research. I predict that it will be used quite widely, far beyond Orkney, as a model of how such issues should be tackled. The archaeology of Orkney is a research field of quite exceptional richness, by international as well as national standards. It is well served by this refreshing appraisal.

Colin Renfrew

Patron, Orkney Archaeological Trust

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Funding and support for the Symposium was received with thanks from Historic Scotland, Orkney Islands Council and Orkney College.

Acronyms

AD	After Christ
AHRCC	Archaeological and Historical Research Co-ordination Committee
AMS	Accelerator mass spectrometry
BC	Before Christ
BP	Before present
^{14}C	(dating) radiocarbon
DNA	Deoxyribonucleic acid
EM	Electromagnetic conductivity
EMEC	European Marine Energy Centre
FOAT	Friends of Orkney Archaeological Trust
GIS	Geographical information systems
GPR	Ground penetrating radar
HLA	Historic Landuse Assessment
HS	Historic Scotland
IBZ	Inner Buffer Zone
ICOMOS	International Committee on Monuments and Sites
IFA	Institute of Field Archaeologists
OAT	Orkney Archaeological Trust
OBZ	Outer Buffer Zone
OIC	Orkney Islands Council
OSL	(dating) Optical stimulated luminescence
PIC	Property in Care
LCA	Landscape Character Assessment
NMRS	National Monuments Record of Scotland
NMS	National Museums of Scotland
RCAHMS	Royal Commission on the Ancient and Historical Monuments of Scotland
SNH	Scottish Natural Heritage
SMR	Sites and Monuments Record
TL	Thermoluminescence
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WH	World Heritage
WHA	World Heritage Area
WHS	World Heritage Site
WHAGP	World Heritage Area Geophysics Programme
WWI	World War One
WWII	World War Two
ZVI	Zones of visual influence

PART

Agenda setting

Background

Description and status of The Heart of Neolithic Orkney World Heritage Site

Jane Downes

In December 1999 The Heart of Neolithic Orkney was inscribed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) as a World Heritage Site (WHS). This inscription followed submission of a nomination in June 1998 by Historic Scotland (Historic Scotland 1998). The title Heart of Neolithic Orkney has been applied to six discrete sites in West Mainland, Orkney, all of which are in the care of the Scottish Ministers, through Historic Scotland. These sites are:

- the chambered tomb of Maeshowe (alternative spelling Maes Howe) (Fig 2)
- the stone circle and henge at Stones of Stenness (Fig 3) and nearby stone settings known as the Watch Stone (Fig 4) and the Barnhouse Stone (Fig 5)
- the stone circle, henge, adjacent standing stone and burial mounds at the Ring of Brodgar (Fig 6) (alternative spelling Brogar)
- the settlement of Skara Brae (Fig 7).

WHS are places or buildings of outstanding value – cultural and/or natural – which deserve protection for the benefit of humanity. The Heart of Neolithic Orkney is now one of the four WHS in


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2. Interior of Maeshowe

3. Stones of Stenness

4. The Watch Stone

5. Barnhouse Stone

6. The Ring of Brodgar

7. General view of Skara Brae

Scotland and one of just over 700 in the world. As such it ranks alongside some of the most famous heritage sites in the world, including Stonehenge and Avebury, the Pyramids and the Great Wall of China. It is the first archaeological site in Scotland to be honoured in this way since the other three Scottish sites are St Kilda (inscribed for its natural values), New Lanark, and the Old and New Towns of Edinburgh (inscribed for their cultural values).

The significance of the Orkney WHS was described thus in the Historic Scotland Nomination document:

i) Maes Howe, Stenness, Brogar and Skara Brae proclaim the triumphs of the human spirit away from the traditionally recognised early centres of civilisation, during the half millennium which saw the first mastabas of the archaic period of Egypt, the brick temples of Sumeria, and the first cities of the Harappa culture in India.

ii) Maes Howe is a masterpiece of Neolithic peoples. It is an exceptionally early architectural accomplishment. With its almost classical strength and simplicity it is a unique survival from 5000 years ago. It is an expression of genius within a group of people whose other tombs were claustrophobic chambers in smaller mounds. Stenness is a unique and early expression of the major ritual customs of the people who buried their dead in tombs like Maes Howe and lived in settlements like Skara Brae. They bear witness, with an extraordinary degree of richness, to a vanished culture which gave rise to the World Heritage sites at Avebury and Stonehenge in England. The Ring of Brogar is the finest known truly circular late Neolithic or early Bronze Age stone ring and a later expression of the spirit which gave rise to Maes Howe, Stenness and Skara Brae.

iii) Skara Brae has particularly rich surviving remains. It displays remarkable preservation of stone-built furniture and a fine range of ritual and domestic artefacts. Its remarkable preservation allows a level of interpretation which is unmatched on other excavated settlement sites of this period in Europe. Together, Skara Brae, Stenness and Maes Howe and the monuments associated with them demonstrate the domestic, ritual and burial practices of a now vanished 5000 year old culture with exceptional completeness. (Historic Scotland 1998, 5)

The Heart of Neolithic Orkney was therefore inscribed as a WHS based on the UNESCO criteria that the sites making up the WHS represent masterpieces of human creative genius, exhibit an important interchange of human values, bear a unique testimony to a culture which has disappeared and are an outstanding example of monuments which illustrate a significant stage in human history (von Droste *et al* 1995, Annex II). The component sites also meet the test of authenticity and integrity demanded by UNESCO, for, although all the monuments have undergone maintenance to differing degrees since the latter half of the 19th century, this work is recognisable and reversible (Historic Scotland 1998, 9). There are illustrated descriptions of the sites within the Nomination document (*ibid*).

The context and purpose of the Research Agenda

Jane Downes

ICOMOS guidelines for the management of WHS recommend that a research co-ordination committee be set up. The suggested role of this committee is to devise research programmes and promote and co-ordinate research in the area (Feilden and Jokilehto 1993). The need for research agendas in archaeology in general is seen to have become more pressing during the 1990s, since the publication of planning and policy guidelines (in *Scotland National Planning and Policy Guideline 5: Archaeology and Planning* (Scottish Office 1994a) and *Planning Advice Note 42: Archaeology - the Planning Process and Scheduled Monument Procedures* (Scottish Office 1994b)). These made developers responsible for the funding of archaeological work ahead of development. Research agendas are important in this respect both to inform curatorial decisions and to give relevance and context to archaeological work undertaken.

In 1996 Adrian Olivier produced *Frameworks for Our Past*, a survey of English Heritage research frameworks and an exploration of the definition, purpose and future of research frameworks. This document was part of an English Heritage initiative concerning the facilitation of regional research frameworks. It included a reconsideration of strategy in the light of what had been achieved since the production of their national research strategy: *Exploring our Past; Strategies for the Archaeology of England* (English Heritage 1991). This has been followed up by the production of a research agenda for the Archaeology Division of English Heritage, now published, together with an implementation plan, as *Exploring our Past* (English Heritage 2003). In 1997 Historic Scotland published *State-funded 'Rescue' Archaeology in Scotland*. As a contribution to discussions on future directions of Scottish archaeology this attempted to identify, on a period by period basis, gaps in knowledge. There have been moves towards developing a research agenda for Wales, the first stage of which was a conference held in September 2001 (Geary 2001). In England, some regional research frameworks have recently been developed or are in the process of being developed - for example for East Anglia, *East Anglia Research and Archaeology: A Framework for the Eastern Counties* (Brown and Glazebrook (eds) 2000) and for the East Midlands, *The East Midlands Archaeological Research Framework Project* (http://www.le.ac.uk/ar/east midlands research framework.htm, visited Dec 2003). Research agendas may also be used to look at specific themes in more detail. In 1999 the Prehistoric Society published a research framework for the Palaeolithic and Mesolithic of Britain (Prehistoric Society 1999) and a research agenda covering the Iron Age across Britain has been published (Haselgrove *et al* 2001).

Stonehenge and Avebury were inscribed in 1986 as a single UNESCO WHS known as the Stonehenge, Avebury and Associated Sites WHS. This is perhaps the most comparable WHS to the Orkney example, except that the designated area is much larger, comprising some 2000 ha. Avebury and Stonehenge each have their own management plans (English Heritage 1998; 2000). A research agenda has been published for Avebury by the Avebury Archaeological and Historical Research Group, publication funded by English Heritage (AAHRG 2001). English Heritage has commissioned Bournemouth University Department of Conservation Sciences to develop a research framework for Stonehenge (http://apollo5.bournemouth.ac.uk/consci/stonehenge/, visited Dec 2003).

Olivier defines a *research framework* as a piece of work which incorporates a resource assessment - defined as 'a statement of the current state of knowledge and a description of the archaeological resource', an *agenda* - defined as 'a list of the gaps in that knowledge, of work which could be done, and of the potential for the resource to answer questions' and a strategy - defined as 'a statement setting out priorities and methods' (Olivier 1996, 5).

The overall aims of the Orkney WHS Research Agenda are to lead to an improved understanding of the WHS and its setting by:

- defining the scope of research around the WHS;
- outlining the potential of the area to answer research questions;
- identifying gaps in knowledge;
- encouraging inter-disciplinary research into a broad spectrum of topics within the WHS and its wider context;
- encouraging research which will contribute to enhanced management, preservation, conservation and interpretation;
- encouraging research with wider methodological and/or theoretical applications.

In seeking to address these aims it was decided to adopt a different structure to the majority of the research documents mentioned above. In particular, the period-by-period approach to the definition of the research themes has been eschewed in

favour of a more thematic approach. This avoids the problems of repetition common to many who seek to provide a multi-period view, it makes for a clearer discussion of the main issues of archaeological research and takes account of the main trends of archaeological thought and research today. The structure of the document is set out in more detail below (p 24).

Formulating the Agenda - the Archaeological and Historical Research Co-ordination Committee

Jane Downes

In 2001 an Archaeological and Historical Research Co-ordination Committee (AHRCC) for the Orkney WHS was established by Jane Downes of Orkney College, UHI Millennium Institute (UHIMI) with encouragement and funding from Historic Scotland and from Orkney Islands Council. The Committee's membership is drawn from Orkney College, Orkney Archaeological Trust, Orkney Heritage (incorporating the museum service), Orkney Islands Council, Historic Scotland, the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) and the Universities of Sheffield, Manchester, Bradford, Cambridge, Cardiff and Stirling.

The aims of the AHRCC are to promote, stimulate and co-ordinate research into all periods and relevant aspects of the World Heritage Area (WHA - see definition below). Rather than the AHRCC *devising* research programmes (Feilden and Jokilehto 1993), its job has been to work with a wider group to draw up this Research Agenda, which takes full cognisance of national and international curatorial and research considerations and will help ensure that methods of research are sustainable and compatible with the protection of WHS values.

The principal mechanism for the formulation of the Research Agenda was a symposium which was held in April 2001. The majority of the Committee attended the symposium, as did a number of other delegates from government agencies, universities and independent specialists (see list of contributors). The symposium was seen as key to facilitating the identification of the research issues. Discussion and workshops were structured around a number of pre-set research strands into which participants were placed according to their area of expertise. These strands were: *Landscape; Artefacts, Monuments and Cultural Identity; Temporality and Period-based Study; Formation Processes and Dating; Palaeoenvironment and Economy; and Management and Interpretation.* A member of the AHRCC led each discussion group and wrote up the outcome of the discussions in consultation with the members of the discussion group. The emerging document was circulated for comment among the Committee, to those who attended the symposium and others who had expressed interest in the formulation of the Agenda.

Jane Downes (Chair AHRRC), Caroline Wickham-Jones and Sally Foster edited the texts, while Jude Callister (Assistant to Chair) circulated further drafts and co-ordinated responses. Further texts were solicited from various authors for the resource assessment, appendices of the Research Agenda and the techniques section of the strategy.

The process of producing this Research Agenda has already served to stimulate research in the WHS (eg the PhD studentship of Angie McClanahan on contemporary perceptions of the archaeology, Manchester University, funded by Historic Scotland, see below Part 5; the PhD studentship on soil analysis at Stirling University funded jointly by Stirling University and Historic Scotland, see Part 3; and large scale geophysical survey in the Brodgar and Stones of Stenness area by GSB Prospection for OAT, funded by Historic Scotland and Orkney Islands Council, Part 5). The work of the Committee will continue, both in the implementation of the strategy and in the periodic reviews of

this document so that the Agenda and strategy retain relevance and currency. In this way, information gained from research will be relayed back into future research and management strategies as well as presented to the public at every opportunity through a variety of media as appropriate.

Structure of The Heart of Neolithic Orkney Research Agenda

Jane Downes and C R Wickham-Jones

The Research Agenda presents and considers the WHS in its broader archaeological, historical and cultural context. It includes the research strategy which presents ways by which research aims might be achieved. Together these two provide a research framework, which is not intended to determine a programme of action, but rather to highlight issues and problems that could usefully be addressed.

In the process of pulling together the research strands, significant overlaps became apparent with the result that the strands were merged into just two broad themes:

- Artefacts, Monuments and Cultural Identity
- The Formation and Utilisation of the Landscape

These themes are discussed in detail below (Part 3).

Although this might, at first glance, appear to be minimalist, this approach has led to the identification of central research issues which cross both temporal and spatial boundaries, so that a flexible and non-prescriptive agenda can be produced. A period-by-period approach was felt to have the potential of being repetitive and confusing for discussion of research that aimed to cover the broad scope we intended. Period-based information has, however, a valid place in the resource assessment (Part 2). The resource assessment describes the history of research in the Orkney WHS, which is instructive in explaining how the monuments and interpretations were shaped by the interest of individuals and by various strategies in excavation and presentation. This is followed by a summary account of the current state of knowledge which is structured chronologically following the basis for most previous research. In this way the gaps in knowledge of the WHS can be highlighted. There are admittedly tensions between the static nature of the 'time slices' outlined in the resource assessment and the more dynamic nature of the research themes discussed in Part 3, but it is not difficult to move between the two approaches and this reflects the current trends of archaeological thought.

Each of the two general research themes is sub-divided into more specific fields from which sample research topics have been identified. These topics are by no means exhaustive. Specific research projects, extracted from the research themes, and with an indication of how these might be prioritised, have been incorporated in the strategy.

An extended bibliography has been included in the document. This comprises a substantial amount of sources in addition to those referred to in the text. Appendix 1 lists, by individual site, select investigations undertaken within the WHS. In Appendix 2 the nature and location of sources/materials pertaining to Orkney's archaeology and history are described (eg museums, databases etc). Appendix 3 comprises a list of current postgraduate student research relating to the archaeology of Orkney. Between the resource assessment, the extended bibliography and the appendices, the Research Agenda will serve as an audit and a resource in itself for would-be researchers. Appendix 4 provides an exhaustive list of archaeological fieldwork (survey, geophysical survey, excavation) undertaken in Orkney since 1945, with bibliographic references where a site is published, location of finds, etc.

Management of the WHS

It is the responsibility of the government to nominate WHS. Historic Scotland carries out this work in Scotland on behalf of the Scottish Ministers. Historic Scotland is also responsible for the preservation, conservation, management and interpretation of sites in State care, which in this case includes all components of the Orkney WHS. WHS status brings no additional controls and no additional funds. It is, however, an accolade for the whole community and the country as a whole, and it is hoped that it will reinforce the international significance of Orkney's archaeology. In doing so, the WHS status will undoubtedly also help to promote tourism. About 70% of tourists to Orkney choose to visit its archaeological monuments (Fig 8). Since tourism is the biggest source of income into Orkney, the local economy should benefit considerably from the enhanced prestige brought by World Heritage nomination, although care has to be taken to ensure that the Site does not suffer as a result of increased visitor pressure.

Boundaries of the Site and its buffer zones

Jane Downes and Sally M Foster

Any consideration of a research agenda has to take into account the boundaries of the Site and their relevance to this. The extent of the WHS is defined by the boundaries of the component monuments that are in State care (Figs 9, 10 and 11). All of these areas are protected as scheduled ancient monuments under the Ancient Monuments and Archaeological Areas Act 1979; however the boundary of the scheduled area may be larger than the property in (State) care (PIC). Additionally, buffer zones were defined around the monuments. The buffer zones were necessary for three reasons:

- Although the WHS comprises discrete sites, these are an integral part of a wider archaeological landscape of related sites (including non-WHS sites), both visible and invisible.
- The wider landscape is privately farmed and inhabited under disparate ownerships. The visual impacts of rural

8. The World Heritage Site attracts large numbers of tourists each year, as here at Skara Brae

9. Map of Orkney showing the location of the World Heritage Site property maps (Figs 10 and 11) and extent of the National Scenic Area (NSA)

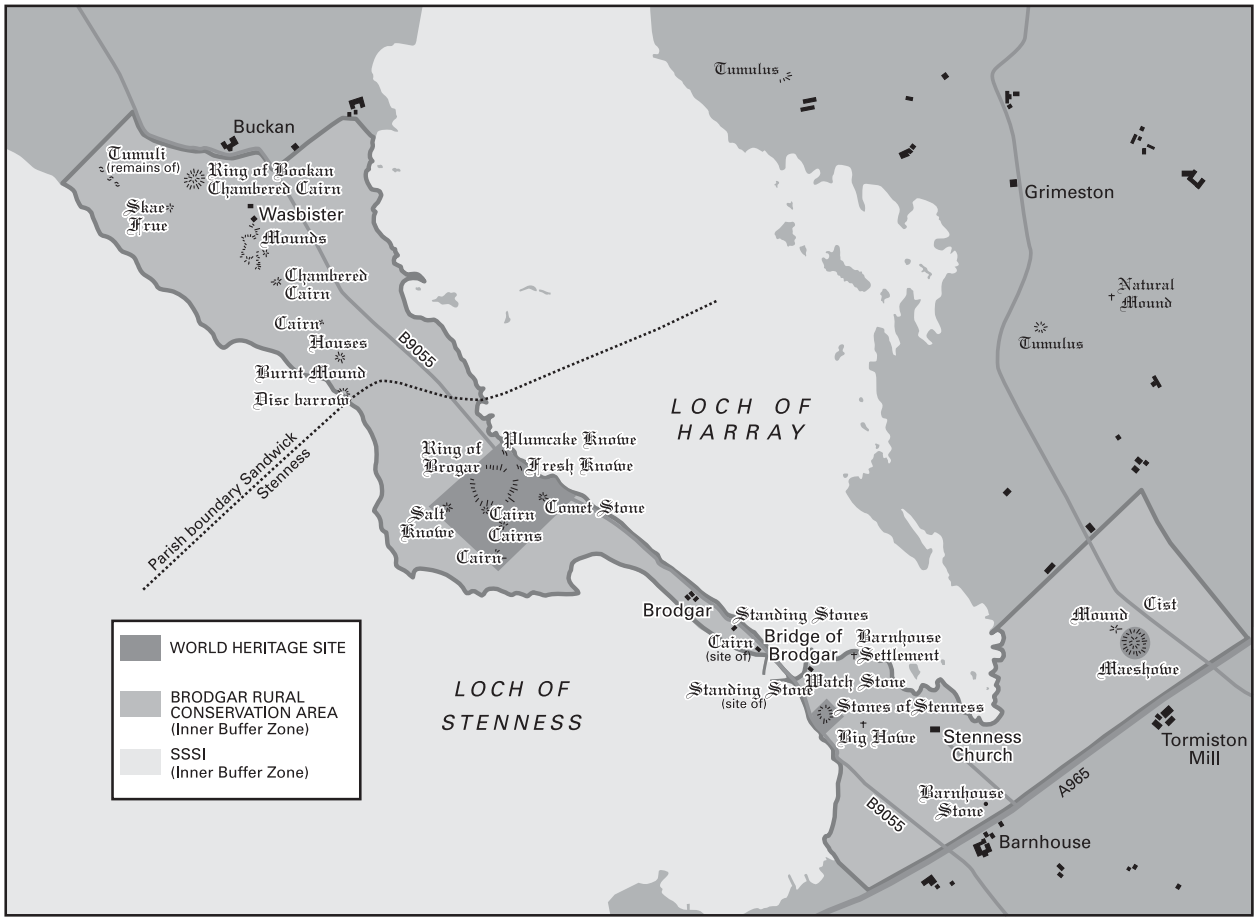
development, together with the environmental and visual impacts of tourism, could impact adversely on World Heritage values and thus need some form of management or control.

- The Orkney landscape is open and treeless with wide vistas and views to and from the monuments. Inappropriately or badly sited development within the broad area could erode the World Heritage values of the sites, particularly cumulatively and over time.

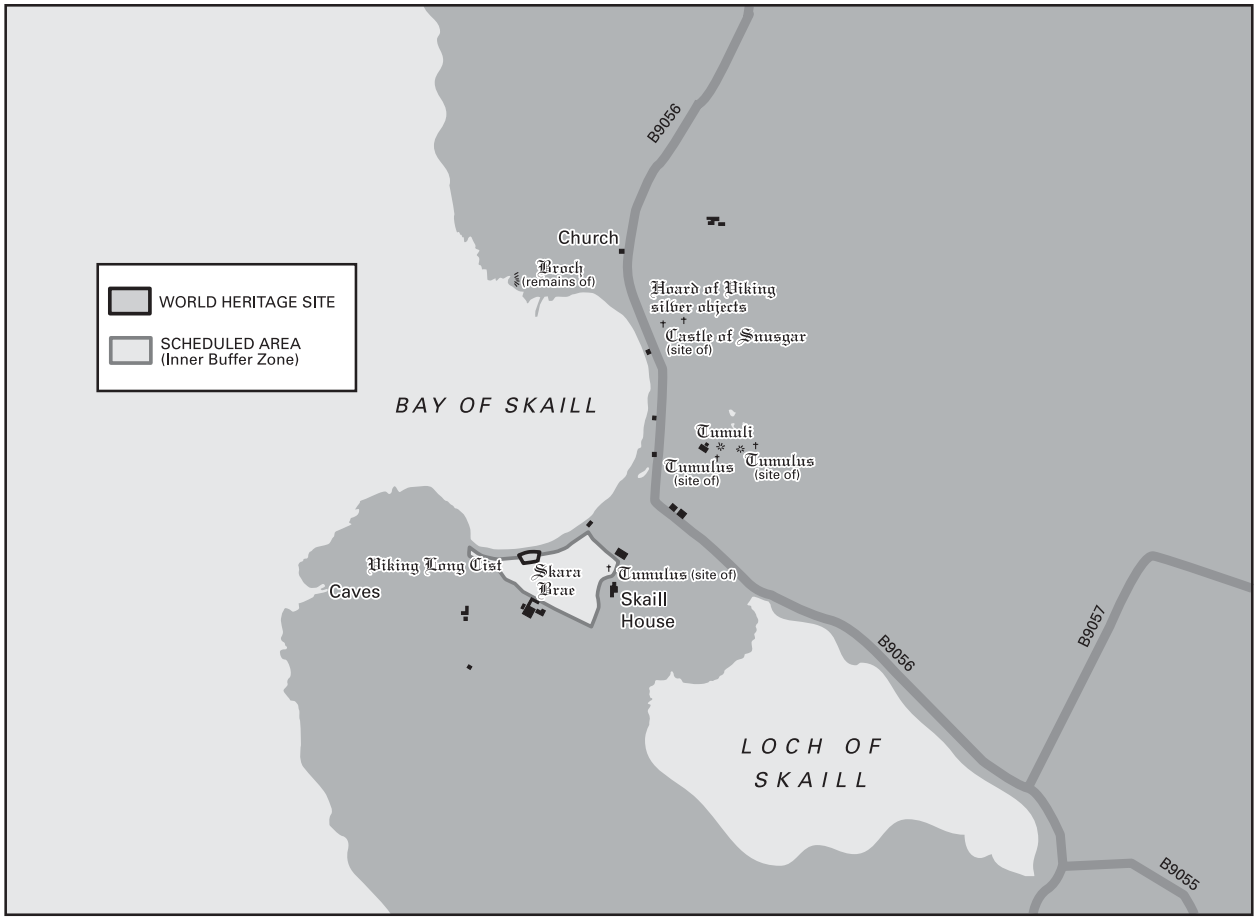
The WHS comprises two, geographically separate areas (Fig 9). Each of these areas has its own tier of two buffer zones:

- an Inner Buffer Zone (IBZ) drawn fairly tightly around the principal sites themselves;
- a larger, more general Outer Buffer Zone (OBZ).

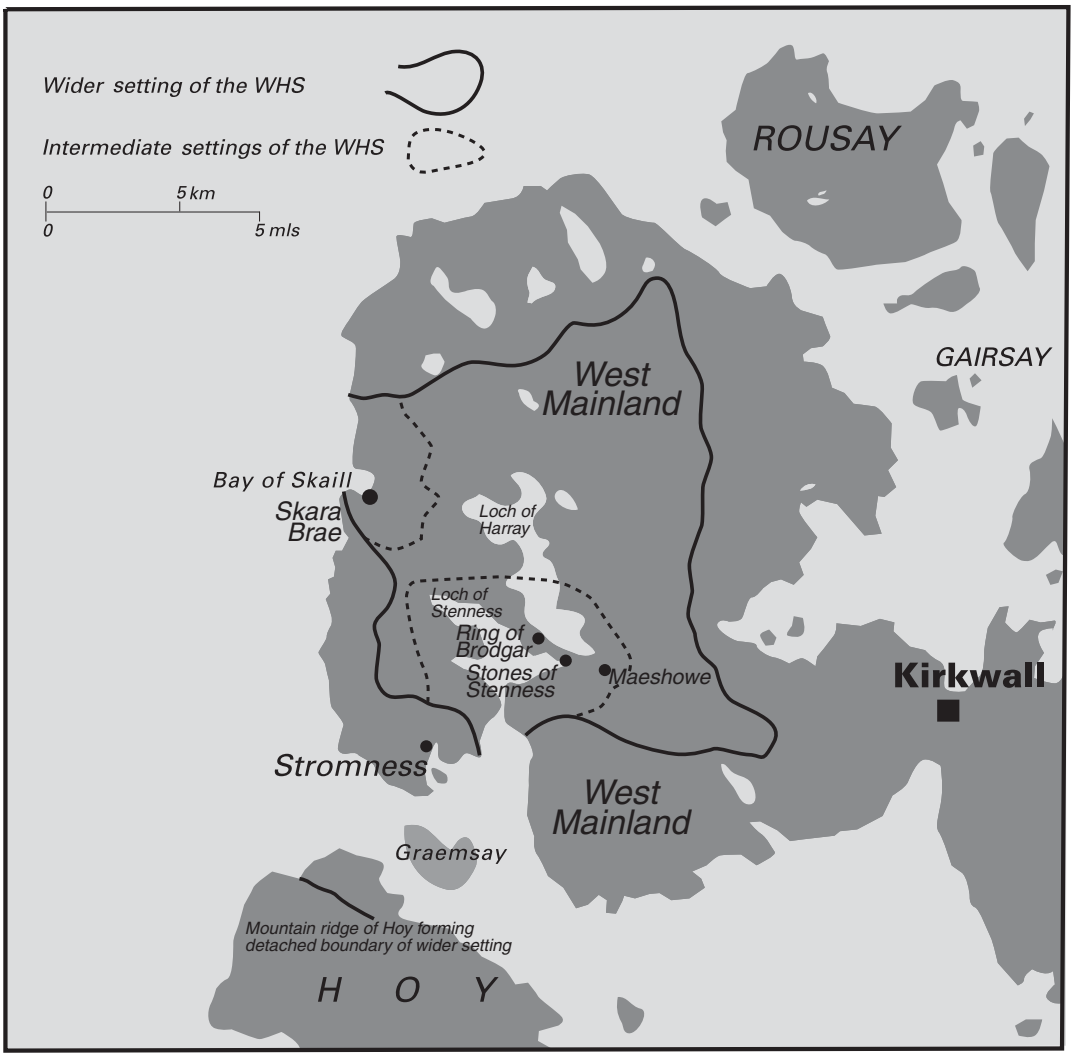
The intention of this layered approach was to protect both the immediate settings of the sites and areas of high archaeological value, as well as their wider landscape setting. Following advice from ICOMOS-UK, the boundaries of existing statutory designations were used to define the boundaries of these two levels of buffer zone. Built heritage, nature conservation



10. Map showing location of the Ring of Brodgar, Maeshowe, Stones of Stenness, Watch Stone and Barnhouse Stone components of the World Heritage Site, as well as sites in the vicinity (for wider context see Fig 9)



11. Map showing location of Skara Brae component of the World Heritage Site (for wider context see Fig 9)



12. Map defining on visual grounds the wider and intermediate settings of the World Heritage Site (redrawn from Tyldesley 2001

and landscape designations already cover all or parts of the area containing the components of the Site. The buffer zones therefore contain many other scheduled and unscheduled archaeological sites, as well as areas of ground that are protected for cultural and natural purposes (on a scale of local to international significance).

In practice, the use of such designations to define buffer zones has not been found to offer a useful framework that works to provide a uniform, coherent approach to the management and development control issues which centre on the needs of the Site. The complexity of the various statutory aims and requirements, consultation mechanisms and agencies of control has been found to bring confusion rather than clarity to the process of protecting the World Heritage values of the Site. These statutory designations would perform their required functions whether or not they formed part of the buffer zones. ICOMOS guidelines issued in 2000 now suggest alternative ways of defining buffer zones that are better tailored to meet the needs of the Site, and in due course Historic Scotland will consider whether more appropriate boundaries for the Site and its buffer zones might be desirable and practical (Foster and Linge 2002). This could take into account the visual setting of the site as well as the management of archaeological monuments and landscapes (see below). In the meantime, Historic Scotland and others effectively treat the landward part of

13. The landscape surrounding Skara Brae (on far side of the bay, on the coastline below the farm)

the IBZ as the Site, in the Brodgar area at least, in the sense that this is the focus of attention.

Setting of the WHS

Jane Downes and Sally M Foster

In 2000 Scottish Natural Heritage (SNH) and Historic Scotland became partners in a landscape capacity project that focussed on the setting of the WHS. Building on Landscape Character Assessment (LCA) and Historic Landuse Assessment (HLA), the aim of the project was to provide guidance on if, how and where new development could best be accommodated in the area (Tyldesley 2001). The study assessed both landscape and visual aspects. In doing so it also explored how the two processes of LCA (undertaken by SNH: Land Use Consultants 1998) and the HLA (undertaken by Historic Scotland and the RCAHMS: Dyson Bruce *et al* 1999) might be integrated. One significant outcome of the project, of particular relevance here, was the definition of a hierarchical tier of settings for the WHS which has a predominantly visual relevance (Fig 12). These settings were largely created on the basis of visual envelopes (everything that can be seen from specific view points, key monuments in this instance) and Zones of Visual Influence (ZVI), areas which are visually sensitive to different scales of change.

Three types of setting were identified for the WHS:

- **Immediate** - where very small changes could markedly affect the intimate experience, ambience and enjoyment of the Site. This should be regarded as a flexible and changing area;
- **Intermediate** - where visible changes about the same size as a human figure (or larger) could affect the character, and people's perception and enjoyment, of the Site;
- **Wider** - where large scale built developments in the wider setting and/or approaches could affect people's image, perception and enjoyment of the Site.

Given the distance between Skara Brae and the rest of the WHS, two sets of intermediate settings were required. Since Skara Brae lies in the relatively visually confined Bay of Skaill and the rest of the Site is in a more open landscape, different methodological approaches proved necessary. At Skara Brae the intermediate setting was relatively easily defined, given the topography of the surrounding low hills, and there was naturally a close correlation with landscape character units (Fig 13).

In the case of the Ring of Brodgar/Stones of Stenness/Maeshowe, a single intermediate setting was created by amalgamating individual ZVIs. These boundaries were then adapted by continuing outwards until strong physical boundaries were encountered, wherever possible one that represented a boundary between LCA or HLA types.

The wider setting of the WHS was defined by a combination of visual envelope and ZVI. These closely relate to the LCA character types because all rely on landform to define their extent. Skara Brae was fitted into a single wider setting for the WHS for, over the low ridges which form the intermediate setting, there are views to more distant hills. The natural basins of the Lochs of Harray and Stenness topographically contain all elements of the WHS. The edges of the wider setting are

14. Overview of the natural basin containing the Lochs of Stenness (left) and Harray (right), and the narrow isthmus of land between the two on which the Ring of Brodgar and Stones of Stenness are sited. In order to understand the World Heritage Site we have to look at its wider landscape context

therefore the lines of ridges along the moorland hills that define the outer rim of the basin, a significant part of West Mainland (Fig 14). However, there is one significant addition – the mountain skyline of north Hoy - an area which is exceptionally sensitive in terms of the winter solstice and Maeshowe (Fig 15). The wider setting therefore includes this mountain skyline but omits intervening land between it and the loch basin, as changes here would not affect the WHS.

It was concluded that the amalgamation of visual envelopes, ZVIs, HLA and LCA techniques produced integrated, rational and meaningful boundaries for the settings of the WHS.

15. The hills of Hoy provide a dramatic background to the World Heritage Site, as here at Maeshowe

The Management Plan

Jane Downes

Historic Scotland produced a Management Plan as an initial step towards the conservation of the Orkney WHS, as required by UNESCO (Historic Scotland 2001). This was prepared in liaison and consultation with a local Steering Group and Consultation Group. The Steering Group comprises Historic Scotland, Orkney Islands Council, Orkney Archaeological Trust and Scottish Natural Heritage. The Consultation Group is made up of other parties interested in the area, including the Orkney Tourist Board, RSPB, land owners, coach tour operators and others with a specific interest in the area. Project Groups have been established to take forward specific issues.

The Management Plan is intended to provide a framework for an integrated and consensual approach to the issues involved in the management of the WHS. The overall aims of the Plan are:

- *To safeguard the important cultural (and natural) heritage elements of the Site by identifying conservation and enhancement works and projects with a sustainable and beneficial approach.*
- *To inform people about the cultural and educational value of the Site.*
- *To increase their enjoyment of the Site.*
- *To identify how the economic and cultural benefits of Inscription can be used to the advantage of the Orkney community and businesses.*

(Historic Scotland 2001)

Encouraging the formation of a research committee is one of the cited objectives in the Management Plan and many of the specific aims of the Management Plan are relevant to the work of the AHRCC. The relevant aims are:

3: increase people's recognition, understanding and enjoyment of the Site and their understanding and enjoyment of Orkney and the rest of Scotland's past.

4: ensure that management of the Site is guided and informed by appropriate knowledge of development of the Site and its surroundings through time.

9: policies be directed towards positive measures for the enhancement of the Site and its Buffer Zones so that they benefit in character, appearance and setting, while continuing to support the economy of Orkney and the social well- being of those living there.

10: encourage appropriate and sympathetic land uses in the Buffer Zones in order to protect monuments from degradation and from potentially damaging works that do not require planning permission, and to protect and enhance their setting.

11: policies should recognise that cultural heritage is more than the visible upstanding structures in the Site and Buffer Zones.

12: establish an accurate picture of the condition and vulnerability of all monuments in the Site and Inner Buffer Zones.

13: all activities on the Site and all activities affecting the natural heritage in the vicinity of the Site should be based on principles of environmental sustainability.

14: every effort should be made to integrate and enhance the interests of the cultural and natural heritage, balancing the respective needs of each other.

15: policies for development on the Site and adjacent to it should reflect the international importance and the sensitivity of the Site and its setting.

16: ensure that the policies for development on the Site and adjacent to it should lead to benefits for the economy of local people and of Orkney as a whole.

17: help develop sustainable tourism by encouraging dispersal of visitors to more of the various visitor attractions in Orkney, and by evening out the concentrations of numbers at particular times and locations.

18: ensure that policies relating to visitors to the Site emphasise quality tourism and encourage longer stays and higher spending in Orkney.

19: ensure that there are good facilities for people with disabilities by including provision for their needs in all schemes for enhancement at the Site (ibid).

Management issues and threats

Sally M Foster and Interpretation and Management Group

Management of the WHS has many different facets of which the main ones can be broadly summarised as:

- **protect**ing the resource and **maintain**ing it in its optimum condition;
- effectively and sympathetically **present**ing and **interpret**ing the Site;
- facilitating visitor **access** in the most appropriate and safe manner;
- **research** to increase understanding of the resource and its management.

The first of these can equally be applied to those monuments in the wider landscape, beyond the formal boundaries of the Site, which are in private ownership and for which, unlike the Site, no formal public access exists. Here the land is used almost exclusively for agricultural purposes (although the possibility of underwater archaeology in the lochs and sea cannot be excluded). The question of how research fits into management strategies is discussed in the next section.

Protect and maintain

Put simply, protecting the Orkney WHS and maintaining it in its optimum

16. The popular Ring of Brodgar requires grounds maintenance and visitor management to address the erosion that arises due to the number of people who visit it

condition means avoiding ground disturbance or disturbance of the fabric of the monuments and attempting to postpone natural decay processes. Disturbance can be caused by humans, animals – cattle, sheep and rabbits – or the roots of inappropriate vegetation. Natural decay processes include decay of stone – a particular concern if these are carved - and coastal erosion. Any human interventions into the ground or fabric of the Site and protected monuments in the wider landscape require prior consent from the Scottish Ministers (scheduled monument consent) and can be controlled in this manner.

More difficult to prevent is the irreversible ground erosion caused by the large number of visitors (Fig 16), a problem exacerbated when conditions are wet. This is a serious problem at the Ring of Brodgar despite Historic Scotland's repeated and regular efforts to manage visitor movements in a variety of different ways. Unlike the surrounding area where erosion by animals and ploughing is causing attrition of both the visible and sub-surface archaeology, the only agricultural use of any part of the Site is limited grazing by

17. Coastal erosion at the Bay of Skaill continues to uncover archaeological sites

sheep (at the Stones of Stenness and Maeshowe). Active efforts are made to deter rabbits at each part of the Site and the situation is closely monitored because of the damage they could so easily cause. At Skara Brae coastal erosion remains the most acute threat, not least to the scheduled archaeology that survives on either side of the sea walls that protect the stone structures (Fig 17). Environmental conditions within House 7 at Skara Brae also need reviewing. At Maeshowe a pressing question is whether present levels of moisture within the tomb are having an adverse impact on its interior, most notably the Neolithic and late Norse carvings. If so, what is the source of this moisture and how can the problem be dealt with?

Yet preservation of a monument's physical integrity and unrealised archaeological potential is still only one part of the equation. Of inestimable significance is the setting of monuments. Protecting this entails far more than ensuring that sightlines between (known) monuments are kept open, but involves preserving the characteristics of the present landscape that create, nurture and reinforce our appreciation of the monuments. Insensitive modern intrusions can all too quickly detract from this. Here David Tyldesley's exploration of landscape capacity in the context of the setting of The Heart of Neolithic Orkney (Tyldesley 2001), not least its relationship to the techniques of LCA and HLA, is particularly germane (see above).

18. Information panels help visitors to understand the sites. Historic Scotland's plans for the World Heritage Site include relocation of such panels in order to minimise their impact on site setting

Much of the immediate and intermediate setting of the WHS is an archaeological landscape of high value in its own right. In the present context it is significant that Historic Scotland and others effectively treat the IBZ at the Brodgar area as the Site *in the sense* that this is the focus of attention. The WHS is best managed in a holistic sense that embraces the wider cultural and natural landscape, an approach that is more in accord with the Orcadian perception of what is significant (Foster and Linge 2002). Notably, most efforts to improve visitor access and interpretation will impact on land beyond the boundary of the Site proper. Historic Scotland's responsibilities do not stop at the boundaries of the WHS. It has a responsibility to ensure that scheduled ancient monuments in private ownership are protected and seeks to encourage and, where possible, facilitate their improved management.

Present and interpret

Interpretation is an integral part of good heritage management (Fig 18; Australia ICOMOS 1999, Articles 1.17 and 25). Knowledge and understanding of the resource is a prerequisite of intelligent and effective presentation/interpretation and requires a practical approach that is sensitive to both the setting of a place and proportionate to the needs of the site and its visitors. Too often the site managers or other well-intentioned parties could pose a threat to a monument. In accordance with Historic Scotland's mission statement and objectives for the nation's heritage as a whole ('safeguarding the nation's built heritage and promoting its understanding') we can see how important it is that this understanding is commensurate with the standards of the 21st century and invigorated by research, as appropriate.

Access

Alongside the ever-present threat of coastal erosion, facilitating visitor access in the most appropriate and safe manner is probably the most difficult of the immediate issues to be addressed at the WHS. Current issues include improving car and coach parking arrangements, improving road safety for drivers and pedestrians, and enabling better access and interpretation through the landscape for pedestrians and cyclists. Resolution involves the wider landscape, including archaeological interests around and between the different components of the WHS (Historic Scotland 2001; Parkin *et al* 2002; Historic Scotland 2002). Aside from the sub-surface archaeology which might be destroyed or compromised in the course of such works, the main consideration is if, and if so how, this can be achieved in a visually sensitive manner while still addressing the needs and demands of all interests, notably the coach operators, landowners, residents, visitors and archaeologists.

Management and research

Sally M Foster and Management and Interpretation Group

The strategies of good managers will be informed by all available knowledge and understanding of the archaeology in question. Of particular importance is the ability to assess the various types and levels of significance which accrue to the resource in question and this is likely to require research (Historic Scotland 2000, Articles 5.1-2; Australia ICOMOS 1997, Articles 26.1-2). All analyses inevitably lead to the recognition that we have significant gaps in our knowledge and it is important that these omissions are identified and acknowledged. By their very nature, these academic lacunae are not solely 'archaeological' or 'academic' in the traditional sense that more knowledge is always desirable. They relate also to the

management of the monuments and our understanding of the interplay of past and present perceptions of the landscape. Such understanding has to take on board the general theory and practice of heritage management and how and if this applies to the specifics of the resource in question. For instance:

- What is the relationship between what now survives/is visible and what was once here?
- What factors have influenced this and our ability to recover such information?
- What is the present condition and vulnerability of monuments?
- How does the modern visitor engage with what is here now and with what was happening here in the past?
- If we understand the behaviour of different categories of visitors at, and towards, the monuments, can we protect the monuments better?
- How can we discover and understand what visitors do, and do not perceive? Can this knowledge be used to inform interpretation strategies (cf Ucko 2000, 72)?

We can conclude that good site management requires ongoing, focussed research. The nub of the matter is how much destruction of the resource is acceptable to achieve this? Put another way: how much of the Site is a critical asset that should be conserved at all costs; how much is a constant asset that might be subject to change providing that the overall character of the resource, notably its appearance, is maintained; and how much is tradable, might be destroyed in return for other benefits? What is the 'environmental threshold' beyond which such an activity becomes unsustainable? (See English Heritage 1997, 3, 7-8 for helpful definitions of historic environmental capital.) Can we define and achieve a form of research that is necessary, satisfying and sustainable? Part 5 (pp 120-21) suggests some parameters. But before reaching that point we must explore further where the tensions reside.

In a highly stimulating and eminently quotable interview Bill Lipe, an American archaeologist, discusses the threat to knowledge that preservation can pose (Lipe 2001). While his topic was archaeology on state-managed land in America, his arguments have wider resonance. In summary, while excavation is destructive, judicious excavation is essential to realise a site's potential information and hence to increase its value to the public. Excavation will always be the main archaeological research tool. Through research we can make connections between 'them and us', the people of the past and present, between the practice of archaeology and the wider public. The more we know about a site, the greater its perceived value. Research, by feeding interpretation, keeps the reason for stewardship alive and provides the intellectual context for interpretation. In effect, not to allow the destructive process of excavation is to cut off archaeology's lifeline, to fail to fulfil archaeology's social rôle. We cannot always postpone the future waiting for better techniques (how else do we develop them?) and to only ever excavate threatened sites trivialises archaeology's contribution to society. If the research stagnates, so does our understanding of ourselves. Lipe argues that implementation of this is a two way process: the managing authority needs to put a higher value on knowledge; and researchers need to fit their interests within the constraints of what responsible management entails.

While Historic Scotland has never made a policy statement about research strategies at its PIC, it has indicated how it sees its Archaeology Programme funds being deployed (Barclay (ed) 1997, 27; presently being reviewed by Patrick Ashmore, responsible for Archaeology Programme). As such, it has to be recognised that funding excavations for research purposes, whatever their scale, whether on PIC or not, is for the moment an exceptional activity. However, Historic Scotland has since at least 1930 carried out research on its properties where improved understanding of the monument is essential and where there can be positive benefits for the visiting public (see for

instance Barclay 1990). In recent years these have been treated as a widely-advertised spectacle and have included a high educational component.

What does this mean for the Orkney WHS? There are a range of scenarios in which intervention may be considered appropriate:

- For its own sake, to understand better the history of a monument, its relationship to the surrounding environment and other sites.
- For its own sake, to understand better the conservation needs of a monument.
- As a consequence of conservation needs. What if, for instance, the modern roof of Maeshowe needed to be replaced?
- As a consequence of 'development', unavoidable intervention necessitated by the requirement to provide facilities for the public and/or address health and safety issues (revised access, car parks, walkways, etc).

It is essential to maximise the potential each opportunity presents for research across the inter-disciplinary spectrum of archaeology-heritage management and beyond. In addition, opportunities to involve the public are required. This has been rather neatly expressed by Tore Artelius of Göteborg University, Sweden (pers comm) as the 'four kronor principle' (for which read four pounds). In other words, using each unit of currency spent to explicitly benefit science, education, cultural resource and the public.

It should also be remembered that Historic Scotland as the state archaeological body has a vested interest in the research and development of improved tools for all aspects of site management, whether it be techniques of excavation or tools for conservation or interpretation. Model case studies can be a successful way of achieving such ends. The stated commitment of the government of looking into the possibility of providing training opportunities at UK WHS for those involved in conservation work overseas should also be noted (DCMS 2002, Article 4.41).

Defining the spatial and temporal research context of the WHS

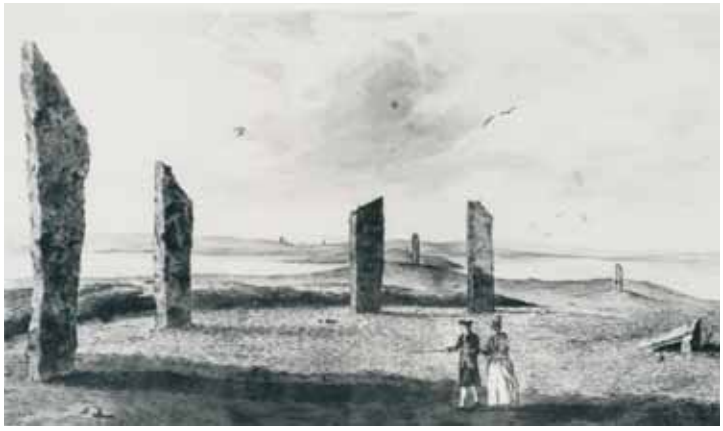
The title of the WHS - The Heart of Neolithic Orkney - is very much site and period specific and a concern of the Research Agenda (or of those producing the Research Agenda) is to set any research into a meaningful and coherent framework. This involves exploration of the temporal and spatial boundaries of the individual components of the WHS and an identification of the intellectual frameworks that could be employed.

Researching the landscape

Dave Cowley, Jane Downes, Mark Edmonds and Landscape Group

In legal terms the WHS is made of discrete monuments, but we appreciate that there are problems with defining their extent and, as archaeologists, are uncomfortable with how this cuts them off from the other elements of the wider landscape. Landscape was a research theme that was discussed in the Symposium in its own right and which was found to be a unifying theme for all discussion, hence its consideration in more detail in Part 3. However, tensions were apparent in definitions and interpretations of the concept of landscape and consequently in its use as a theoretical framework or a research method. There are many perceptions of what constitutes landscape, including physical landforms, the interaction of natural processes and human influences, artistic depictions, mosaics of landuse or vegetation, patterns of social interaction and personal and group experience (Fig 19). Although it was felt that a fairly general view of landscape would provide a framework which could articulate other strands of research, the varying uses of the term and applications are explored here.

Firstly, there is a need to define the geographical scope of research centred on the WHS, given that there was a consensus that the scope needed to extend well beyond the designated areas in order to



19. The Stones of Stenness and the Ring of Brodgar have always offered different experiences to their visitors Add.15511 f3 Frederick Herm 1772, by permission of the British Library.

place the WHS in context. This would allow, for example, consideration of local variation in settlement or landuse patterns in both space and time and inclusion of the maritime and marine margins. WHS status obviously acknowledges the international importance of the monuments and places research firmly in the international context. Furthermore, the location of Orkney on a broad Atlantic European canvas is clearly fundamental to many avenues of research. However, the archaeological and historic landscape is perhaps best studied at a more local level. A nested approach with varying scales and inputs can therefore be suggested.

Suggested geographical frameworks are listed below, in order of increasing resolution of study:

- **Orkney in the World** (Fig 1) - The size and shape of Orkney's place in the world changes through time and circumstance - it is therefore not possible to describe a single boundary to Orkney's world context.
- **Orkney** (Fig 9) - Orkney contains a diversity of landscape types and monuments appropriate to general research issues such as survival and recovery patterns, landscape development and monument distribution. Research centred on the WHS can be set in an Orcadian context and can add to knowledge of sites outside the WHS; conversely, research into areas outside of the WHS can help our understanding of the WHS.
- **Zones of Visual Impact** (see above) (Fig 12) - In these smaller areas issues such as local variation within the region (eg of settlements, artefacts) can be examined in order to build up a detailed landscape history and characterisation. In these cases a greater resource input is realistic.
- **Individual components of the WHS** (Figs 10-11) - It is appropriate to their designation that these small areas be studied in the greatest detail within the limits of what can be defined as sustainable research (see above). Much basic recording and research remains to be done, for example to establish detailed topographic and geophysical surveys of all the sites.

Secondly, methods need to be established for the identification of the *archaeological* or *historic landscape* by measuring or mapping. Throughout the process of developing the Research Agenda, the need to understand the development of the Orcadian landscape was identified as a priority. Our current understanding of the contemporary landscape is a key to this, as the patterns of earlier landscapes are articulated through the present. Unfortunately, the nature of the archaeological resource hinders deeper understanding of landscape development. Most records focus on unitary monuments and are essentially a product of 19th- and earlier 20th-century patterns of fieldwork - there is a clear need for systematic and extensive survey to redress this imbalance.

The development and character of the Orcadian archaeological or historic landscape is poorly understood, though there is now a body of data relating to the contemporary landscape (Land Use Consultants 1998; Dyson Bruce *et al* 1999). Evaluation and exploration is necessary to enhance the treatment of archaeological and historic landscapes. The establishment of a baseline of consistent data is seen as a priority for the WHS and buffer zones and, wherever possible, data should be assembled in a systematic fashion that is GIS compatible to allow the ready integration with other data. The production of maps as part of this process can be very eloquent in illustrating how the landscape has developed, for example in illustrating sea-level fluctuation or landuse change.

20. This 1862 illustration by Farrer (1862, Pl I) shows monuments now forming part of the World Heritage Site in their setting. The view has changed little today

Thirdly, landscape is not merely a passive receptor and reflector of human activities, a series of sites and traces which can be measured and mapped; it is constructed socially and historically through practice. Landscape is also experiential; from it we extract our sustenance, within it we experience the seasons and the passage of time. There we find our families, friends, rulers and vassals; within it our ancestors are buried, and we gaze upon it. It is so large that changes in its character extend beyond our vision and occur either so fast or so slowly they seem unimaginable.

As Christopher Tilley put it, 'The landscape is redolent with past actions, it plays a major rôle in constituting a sense of history and the past, it is peopled by ancestral and spiritual entities, forms part and parcel of mythological systems, is used in defining social groups and their relationship to resources' (Tilley 1994, 67). The creation of the monuments, in this instance that constitute the Orkney WHS, was undertaken in a landscape that was understood in its own day in terms of history and the past. Each subsequent generation 'inhabited, interpreted and acted upon' this landscape; each generation encountered its own archaeology (Barrett, J C 1999, 257), as we do today (Fig 20).

Landscape studies offer a rich vein of research potential which is wide in both geographic and temporal scope. Not only does research move beyond the site specific to the spaces between and far beyond the monuments, but in a consideration of movement, of experience and of occupying and inhabiting the landscape, the dimension of time is incorporated.

Period-based research and temporality

Colin Richards and Temporality and Period-based Research Group

The designation of particular sites as 'The Heart of Neolithic Orkney' instantly introduces questions of how we conceive the past as periods of discrete blocks of time and how we choose to value or privilege certain blocks over others. Within the WHS there is a contrast between the three monuments of Maeshowe/Stones of Stenness/Ring of Brodgar and the isolated Skara Brae settlement (Figs 2-7). The henge monuments provide a focal point for actions spanning thousands of years while Skara Brae was covered by sand in the Bronze Age and left buried until the mid-19th century, when a storm removed the sand and exposed the site to view. Equally, the attribution of WH status to the monuments themselves (in the case of Stenness, Ring of Brodgar and Maeshowe) could divorce them from the broader social conditions which led to their construction and use.

Clearly, we are interested in the social conditions which led to the construction of the henges and associated standing stones (which represent a truly monumental place in the Neolithic world and for ever after)

and their relationship to contemporary settlement and our attention should thus move far beyond the individual components of the WHS. Nevertheless, these monuments do deserve special attention because they were built in different ways to convey very specific meanings on a scale never seen before in Orkney. They are achievements of a very high order (and hence their selection as WHS).

On the whole, period-based research continues to define the archaeological profession in Britain today. Period-based courses remain popular in archaeology degrees in British universities and the archaeological literature is subdivided and characterised by period-based research. Indeed, the designation 'The Heart of Neolithic Orkney' for the Orcadian WHS brings such definition into sharp focus. However, there are a number of consequences inherent in such an approach and these are magnified by the different discursive strategies which have arisen within different archaeological periods. This situation gives rise to a partial breakdown of communication between researchers operating in different 'blocks' of time, eg Palaeolithic, Neolithic, Medieval, etc. Research questions and priorities differ between periods because of theoretical differences in approach. This can have the effect of creating entirely different forms of archaeology in adjacent and overlapping blocks of time (eg Iron Age/Roman periods in England, Scottish Iron Age/Later Iron Age). Furthermore, arbitrary disciplinary vogues occur where research projects into particular periods or parts of Scotland attract greater attention and more financial support than others. Some periods leave none or few upstanding remains and this has heavily biased our understanding of the past. In Orkney, examples of this are the contrast between the prominence of the Neolithic tombs and stone circles, and the Iron Age brochs, and the invisibility of Mesolithic and Bronze Age settlement.

It is clear that in the buffer zones that surround the designated monuments lie a number of sites of different construction date. On the basis of such construction dates these sites can be attributed a specific archaeological period. However, the problem arises of when was their 'real' time? Some sites and monuments represent 'construction' over enormous periods of time and right up to the present they have been used in a variety of ways. Indeed, in many cases, sites and monuments designated, for instance, as Neolithic or Bronze Age have had special meaning and significance throughout their histories (and for many continue to have such effect today, Fig 21). This realisation should provide an effective critique against ideas of purity and authenticity as applied to archaeological sites. Moreover, it produces a real and valid problem for the interpretation and presentation of archaeological sites because questions arise about what is actually being displayed and the validity of the interpretation offered.

21. The Neolithic site of Maeshowe is also world-renowned for its collection of Norse runes (carved around 3800 years after the tomb was constructed)

Another point involves a perceived paradox in the archaeological research of the WHS. The designation of such status to this part of Mainland Orkney is based entirely on the presence of four well-preserved sites or monuments (plus two related standing stones). Yet, their understanding in terms of conception and construction lies elsewhere, in the other contexts of life that provided the social conditions under which these monuments (Ring of Brodgar, Stones of Stenness and Maeshowe) could be built. The inclusion of Skara Brae in the WHS represents an additional context, as it is a settlement site,

22. Peering into House 7: Skara Brae provides a unique glimpse of domestic life 5000 years ago

whose presence in the WHS is based on its high level of preservation (Fig 22). Qualities of preservation and the 'spectacular' are of obvious importance (not least in the presentation of the past to the public) but do not necessarily form a coherent basis for research.

We suggest research into the WHS requires a shift away from a site-orientated study to one more concerned with social practices and frameworks of understanding. We have to consider how people engaged with their world and the physical experiences which provided both the conditions under which 'knowledge' has been produced and the social relationships that allowed such material expressions as Maeshowe, etc. to be built.

Preceding experiences must be taken into account - it is very unlikely that the WHS monuments were set in a virgin landscape. There must be a history of Mesolithic or earlier Neolithic inhabitation that helped to make these places what they became and we must therefore consider whether these areas in West Mainland Orkney had any special significance before the monuments were constructed. Clearly an argument could be provided for a consideration of 'place' and 'memory' in terms of the situation of the monuments at a particular point in the Neolithic world. To recognise the basis for the 'special' nature of the WHS as simply the monuments themselves, denies the likely significance attached to the area by, for example, the Mesolithic inhabitants of Orkney.

Together these points and issues highlight the problems of research strategies that focus on archaeological objects as defined by their date or period of creation. Such strategies would remain falsely fossilised at some arbitrary point in time, totally divorced from the present and we wish to avoid this. Instead we would like to re-establish social practices and 'people through the past' as a central tenet of enquiry and to suggest some research themes which may counter some of the problems discussed above.

The Agenda that we have produced is an attempt to cross period-based boundaries and spread research priorities across time and space. Site specific and period specific research can be set within the broad research themes that have been identified and are detailed in Part 3.

PART 2

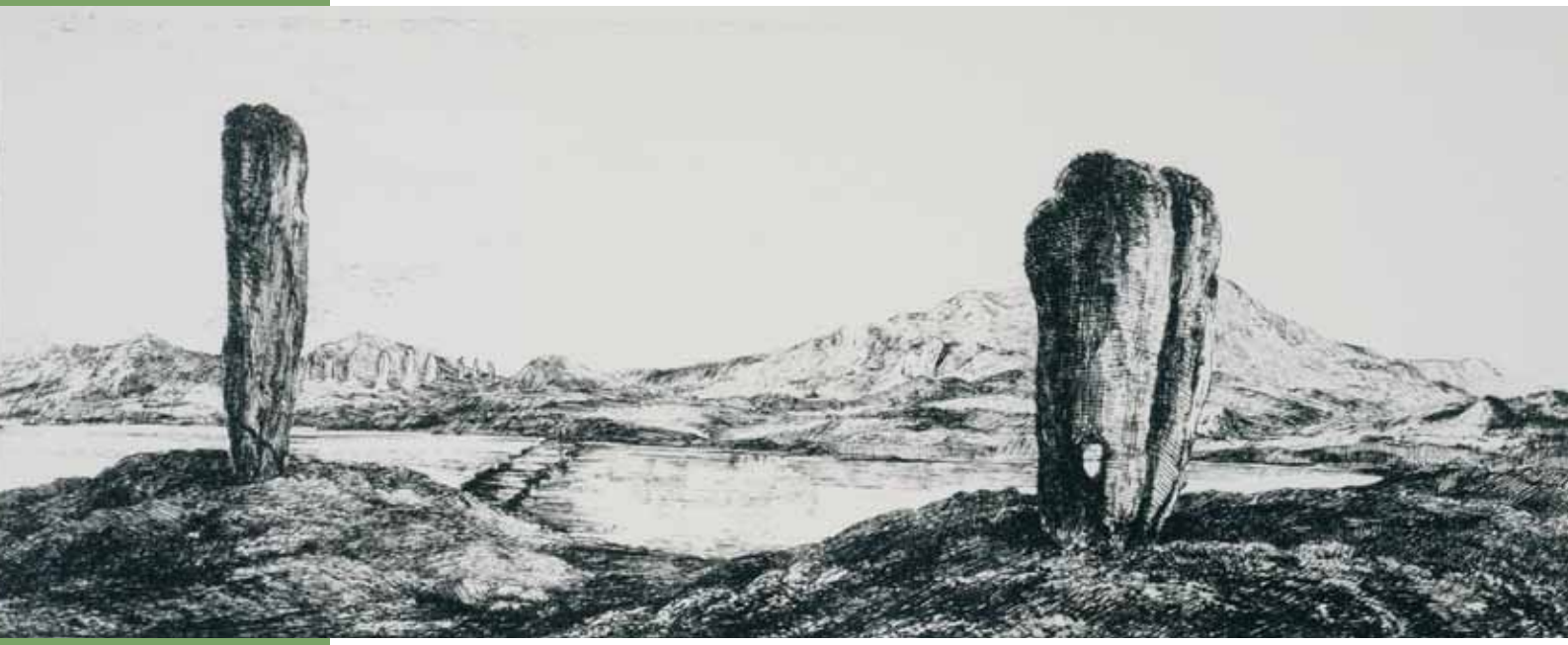
Resource assessment

History of prehistoric research

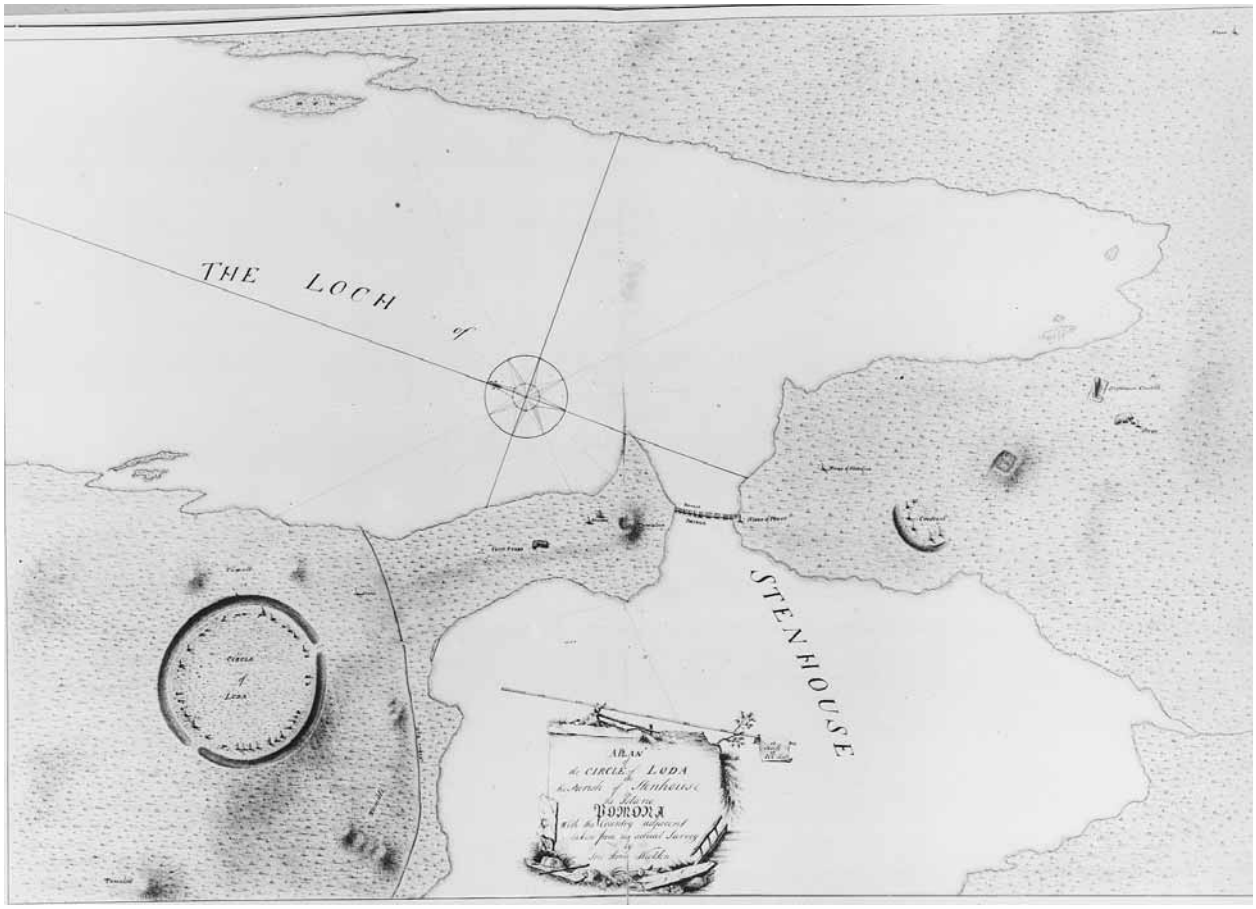
Nick Card

Ever since Jo Ben's (1529) account of some of the antiquities of Orkney and their 'excavation', the dramatic nature of the Stones of Stenness and the Ring of Brodgar, together with associated standing stones and mounds, have attracted the attention of visitors who portrayed and investigated them in various ways. Antiquarian and archaeological investigations were undertaken to varying standards, as described below (Fig 23). This work both informed and was informed by investigations that were undertaken elsewhere in Orkney. The history of research in the WHS and the wider Orkney context traces the development of thought and interpretation related to the WHS, and demonstrates the pivotal rôle that Orkney sites have played, and continue to play, in wider archaeological theory.

Until the mid-19th century most of this work amounted to little more than rather fanciful descriptions, interpretations and accounts of unscientific investigations (Wallace 1700; Pococke 1760; Low 1879; Gordon 1792; Barry 1805; Neill 1805; Hibbert 1823; Wood, W 1826). Within this period, however, two important studies should be noted. In 1772 Sir Joseph Banks, on his way to Iceland, stopped off in Orkney. Although his investigations of mounds at Skaill Bay (Lysaght 1974) were little better than the average antiquarian, his surveys of both the Skaill Bay area, and the Rings of Brodgar ('Circle of Loda') and Stenness, exhibit an eye for detail (Fig 24). This was mainly due to the work of Frederick Herm Walden, a naval architect and surveyor who accompanied Banks. Shortly after Banks in 1789, the expedition of Sir John



23. A romantic, early 19th-century view of the Watch Stone and the Odin Stone by Elizabeth, Marchioness of Stafford. Many antiquarian views of the World Heritage Site exist and they can be an important source of information about the monuments



24. A Plan of the Circle of Loda in the Parish of Stenhouse Add.15511 f.10 Clevely 1772, by permission of the British Library.

Thomas Stanley visited Orkney and surveyed and recorded many of the sites (West 1970-76). Both Banks' and Stanley's work mark a trend towards more scientific and systematic investigations in the islands.

It was not until the mid-19th century, however, that archaeology entered its 'Golden Age' of antiquarian investigations. The translation of Thomsen's 'Three Age System' by Ellesmere (1848) allowed Daniel Wilson in his *Archaeology and Prehistoric Annals of Scotland* (1851) to give a clearer chronological perspective to many of the type sites and move away from the ubiquitous category of 'Picts' houses'.

The impetus for this period of archaeological investigation in Orkney was also due to agricultural improvements following the collapse of the kelp industry in Orkney in the late 1830s (Thomson 1983). Vast new areas were brought under cultivation and, as George Petrie noted in a letter to Daniel Wilson in 1849, perhaps hundreds of sites were disappearing 'without any attention being given to preserve a record of their construction and contents' (Wilson Collection MS).

One of the important documents to arise from this era was not an excavation report but another survey. In 1852 Captain F W L Thomas, the commander of the Royal Navy survey ship *Woodlark*, produced the topographic survey of the Brodgar/ Stenness peninsulas he had undertaken in 1849 (cover and Fig 42; Thomas 1852). In his account he not only produced the most accurate and detailed map to date, including many of the 'minor' monuments in the area, but also chronologically correct, detailed descriptions. His work is even more visionary when one takes into account his proposals for preservation of the monuments and treasure trove. Thomas was also involved in the excavation of the large Bronze Age burial mound at Skae Frue and the emptying of a chambered tomb, the Holm of Papa Westray South. Unfortunately his excavation techniques were more in line with fellow antiquarians than with the standards of his other work.

The heyday of antiquarian investigations in Orkney, from the mid- to late 19th

century, is dominated by three main characters: George Petrie (1818-1875), factor of the Graemeshall Estate; James Farrer, the MP for Durham and friend of the Earl of Zetland (a major landowner in Orkney); and Sir Henry Dryden (1818-1899), the famous architectural illustrator. Between them they were responsible for opening up numerous sites, most famously Maeshowe in 1861 (Petrie 1861a). Although Farrer was the instigator of many of the excavations, his archaeological talent was limited and many of his discoveries would have disappeared without any record had it not been for the annotated sketches of Petrie (Petrie nd). Dryden was also responsible for recording many of the sites they investigated, but in most cases he based his drawings on Petrie's sketches. Petrie was also partly responsible for publishing the results of the early excavations at Skara Brae, following its exposure in a storm in 1850 (Petrie 1867). Perhaps Petrie's greatest contribution, however, was his reappraisal of various types of monument. In a quite radical article in 1863 he questioned the all-consuming 'Picts' houses' category of site, stating that they were 'simply chambered tombs which have been despoiled of their original contents at an early date' (1863a).

Despite being involved in over 30 excavations from 1847 till his death in 1875, Petrie failed to develop his excavation techniques. It was left to his contemporaries to develop excavation methods. William Traill, the owner of North Ronaldsay, not only differentiated between two clear periods of occupation in the excavations at the Broch of Burrian (Traill 1890), but also made the first inroads into palaeobotany with his records of tree remains in island peats (Traill 1868b). R S Clouston, a local landowner, showed a relatively systematic approach to his excavations at Unstan in 1884 (Clouston 1885) and rightly assigned the tomb to the Neolithic.

For almost half a century after Petrie's death the impetus created by him seems to have been lost, with few excavations being recorded. Mr Balfour Stewart, the tenant of Skaill House, briefly revisited Skara Brae in 1913 and revealed parts of House 2 (Stewart and Dawkins 1914). James Cursiter (1898b; 1923) cleared several brochs. His conclusions, that they were the work of Phoenician builders from Atlantis, were a definite step backwards. A major advance, however, was the founding of the Orkney Antiquarian Society in 1922. Under the auspices of such local luminaries as Hugh Marwick (Dickens 1966), its first secretary, and J Storer Clouston, the society flourished until the outbreak of war in 1939. The *Proceedings* of the Society provided a vital outlet for discoveries and research in Orkney.

A new period of archaeological research was stimulated by the work of the Royal Commission on Ancient Monuments in Orkney from 1928 to 1937 and the arrival of the distinguished prehistorian Professor V Gordon Childe. Soon after Skara Brae was placed under the guardianship of HM Office of Works in 1924, consolidation work was started to stabilise the structures. It soon became clear that further, undisturbed structures existed. Childe, as a representative of the Society of Antiquaries of Scotland, was invited by the Ministry of Works to oversee the clearing of these buildings by a local Kirkwall contractor, James Firth (Fig 25; Childe 1930, 1931a; 1931b). Although Childe recognised the site as being Neolithic in character, he initially assigned a 'Pictish' date to the village, partly based on the correlation in the distribution of Pictish symbol stones and stone balls (eg Childe and Paterson 1929, 277-9). This view was supported by J G Callander (1931a), the Director of the National Museum of Antiquities, but challenged by the local historian Hugh Marwick (1929c, 26), who correctly attributed the site to a 'pre-broch period', and Stuart Piggott (1936, 201), who ascribed a Neolithic date to Skara Brae on the basis of the pottery.

The presence of Childe in Orkney and the work of the Royal Commission on Rousay in 1928 provided the catalyst for Walter G Grant (1886-1947), the whisky magnate, to embark on a series of excavations on

25. Work at Skara Brae under the direction of Gordon Childe (bottom left) Thomas Kent, © Orkney Archives.

Rousay, his home island (Reynolds and Ritchie 1985). Initially this was in collaboration with J G Callander. Together they excavated ten chambered tombs and the broch of Midhowe on Rousay (Callander and Grant 1934a; 1934b; 1935; 1936; 1937). Although their techniques were still quite basic they did record the position of artefacts and human bone. After Callander's death in 1937, Walter G Grant continued his work. In general these latter excavations were never published and records for these sites relied on the drawings of Grant's draughtsman, David Wilson. The exception to this was Grant's collaboration with Childe in the supervision of the excavation of the Neolithic settlement at Rinyo in 1938 (Childe and Grant 1939). The excavation was interrupted by the war, but the discovery of Beaker pottery stratigraphically later than Grooved Ware, similar to that found by Childe at Skara Brae, helped Childe review his chronology for Skara Brae.

Childe's investigations at Skara Brae also provided the impetus for the excavation of the Knap of Howar on Papa Westray. In 1929 the landowner, William Traill of Holland, aided by his friend William Kirkness (Traill and Kirkness 1937), revealed the nature and extent of the site. Initially it was attributed to the Iron Age and it would be another 40 years before it was correctly assigned to the Neolithic (Ritchie, A 1983a).

C S T Calder, an architect with the Royal Commission, was also active during this period, excavating several chambered tombs and other sites on Eday and the Calf of Eday (Calder 1937; 1938; 1939). Calder also produced the first comprehensive account of the Dwarfie Stane on Hoy (Calder and McDonald 1936).

Many of these inter-war excavations were published and a move to a more systematic approach to excavation was being made by refined techniques and the addition of photographs, scale plans and section drawings. But the overriding objective at many sites was to provide a monument for public display; archaeological research was still of secondary interest. At the brochs of Midhowe and Gurness, their centres were still just basically cleared, although outbuildings and ditches were also investigated. At Skara Brae much of the 'mundane' material from Childe's excavations, such as undecorated pottery and animal bone (now regarded as of interest), was dumped without proper examination. Other excavations were never

published. The Brough of Birsay was prepared for public display throughout the 1930s, mainly under the supervision of Dr J S Richardson. The only surviving record of this work is the diary of the site foreman, Mr J Henderson.

Despite such shortcomings, the results of these excavations provided crucial elements of forthcoming syntheses of Scottish and European archaeology. The Orkney material was incorporated by Childe into his pioneering works, *The Prehistory of Scotland* (1935) and *Scotland before the Scots* (1946), and latterly Stuart Piggott's *Neolithic Cultures of the British Isles* (1954).

The immediate post-war years started well for archaeology with the publication of the Inventory volume for Orkney by the Royal Commission on Ancient Monuments (RCAHMS 1946), the first systematic record of Orcadian archaeology. However, apart from Childe's work at the chambered tombs of Maeshowe (1956) and Quoyness (1952), and the publication of Henshall's definitive work *The Chambered Tombs of Scotland* (1963), archaeological investigations were very limited. Childe's excavations at Maeshowe are notable as a landmark in Orcadian palaeoenvironmental studies. For the first time, samples were recovered from a site and studied for pollen and microfossil evidence. The results were used to recreate the Neolithic landscape. This work was a forerunner for future environmental studies in the islands (eg Moar 1969; Davidson *et al* 1976; Keatinge and Dickson 1979).

The present era of archaeological work in Orkney can be seen to start in the early 1970s. Initially this was intrinsically linked to the development of the 'New Archaeology'. The catalyst for the 'New Archaeology' was radiocarbon (14C) dating. In conjunction with tree-ring calibration this allowed absolute dates to be obtained for sites. Many basic assumptions that had dominated the study of prehistory, in particular diffusionist concepts, were finally laid to rest. Dating, in conjunction with a new battery of analytical and statistical techniques, allowed new questions to be asked of the material remains concerning the economy, environment and society that produced these monuments. This approach was epitomised by the work of Professor Colin Renfrew. Throughout the early 1970s Renfrew brought this new battery of techniques to bear on Orcadian archaeology with his excavations at Quanterness, Ring of Brodgar and Maeshowe (Renfrew 1979). His results paved the way for many new ideas and theories relating to Orcadian prehistory and beyond. An aspect of this project was the pioneering work on burnt mounds by John Hedges with his excavations at Liddle and Beaquoy (Hedges, J W 1975).

In 1972-3 Skara Brae was revisited by Dr D V Clarke (Clarke 1976a; 1976b). His main objectives were to obtain environmental and dating material. Samples obtained allowed an absolute date to be gained. As a result of coastal erosion, Clarke, D V (1977b) carried out further work at Skara Brae in 1977 which allowed the settlement to be placed in its landscape context. In 1978 Clarke went on to investigate the Links of Noltland on Westray, another Neolithic settlement site, originally discovered by Petrie. These excavations are as yet unpublished.

Neolithic studies were further advanced by excavations conducted by Drs Graham and Anna Ritchie in the early 1970s. Excavations at the Knap of Howar by Anna Ritchie in 1973-74 (1983a) showed that the structures were early Neolithic not Iron Age. Meanwhile Graham Ritchie's excavations in 1973-74 at the Stones of Stenness (1976) finally provided important evidence for its date and its relationship to Grooved Ware.

1978 is marked in the history of Orcadian archaeology with the appointment of the first Orkney or County Archaeologist, Dr Raymond Lamb, by the Orkney Heritage Society. His most important contribution to the study of archaeology in the islands was the creation of the Sites and Monuments Record (SMR) for Orkney.

26. Excavation of Neolithic building at Pool, Sanday

This was the first systematic update of the Royal Commission Inventory of 1946 and identified many previously unrecorded sites. His work continues to be built upon by his successor, Julie Gibson, appointed in 1996 by the newly formed Orkney Archaeological Trust.

During the late 1970s and early 1980s excavations took place at the Howe, Stromness (Ballin Smith (ed) 1994) and the Bu, Stromness (Hedges 1987) by John Hedges and the North of Scotland Archaeology Service (NoSAS). These excavations radically altered Iron Age studies of northern Scotland. Up until then Iron Age research had concentrated on the architectural typologies of brochs and associated structures. The Orkney excavations, not only provided evidence for an extended chronology, but also shifted the emphasis towards the social context of this style of architecture. The most important point to arise from these excavations was the contemporaneity of the brochs and their surrounding villages. These were previously regarded as chronologically separate.

Throughout the 1980s Bradford University was involved in a series of excavations in Sanday, Orkney. At Pool (Hunter *et al* forth) and Tofts Ness (Dockrill *et al* forth) important work was carried out, primarily in response to threats from coastal and landscape erosion (Fig 26). Evidence from both sites has provided an opportunity to study in detail all aspects of the development of an island population over several millennia. The long-debated relationship between Neolithic Unstan Ware and Grooved Ware has also been clarified by the discovery of both styles at Pool.

Since the early 1980s the contribution of Dr Colin Richards to the study of Orcadian prehistory cannot be overlooked. Richards was the first to use fieldwalking systematically as a method of identifying sites in Orkney. Following his discovery and excavation of the Neolithic settlement of Barnhouse (Richards forth), his numerous papers have attempted to provide a theoretical framework in which to place his and others' fieldwork. Richards, more than anyone else, has realised the potential of the rich, almost unequalled, quality of the archaeological record in Neolithic Orkney. More recently in the late 1990s, in conjunction with Jane Downes and Richard Jones, Richards initiated a new project in the Cuween-Wideford area of Mainland. This proposed to address some of the many issues raised by the Barnhouse excavations. A programme of fieldwalking led to the discovery and excavation of two new, but very different, Neolithic settlements at Crossiecrown and Stonehall. In 2003, as

part of the same project, a settlement at the base of Wideford Hill (HY41 SW47), hinted at by antiquarian lithic collections (Rendall 1931; 1934b), was also located. For the first time in Orkney Neolithic timber structures were found. These underlie a 'Knap of Howar-style' stone structure. The results of these excavations may yet again transform our understanding of the Neolithic. Richards is presently investigating the prehistoric quarry at Vestrafiold, one of the possible sources of the standing stones of the Brodgar area.

Since the extensive investigations of burial mounds and 'tumuli' in the 19th century, the study of Orcadian prehistory has concentrated on the Neolithic and Iron Age and tended to ignore both the preceding period and the intervening Bronze Age. This was partly due to an apparent lack of evidence. This imbalance was partly addressed, for the Bronze Age, by the work of John and Melia Hedges in the 1970s, with their investigations of the burnt mounds at Liddle and Buckquoy (Hedges, J W 1975) and the barrow cemetery at Quoyscottie (Hedges, M E 1977), and Bradford University's work at Tofts Ness, Sanday (Dockrill *et al* forth). In the 1990s Bronze Age burial mounds again entered the research agenda. Jane Downes' 'Orkney Barrows Project' surveyed all known burial mounds and excavated a sample of them (Downes 1995; 1997a; 1997c; 1999; forth). This project has not only led to a better understanding of the Bronze Age funerary landscape, but also the requirements for the management and preservation of these monuments. This project is ongoing with the detailed survey and excavation of the Knowes of Trotty in Harray.

Despite the huge legacy of known archaeological sites, Orkney continues to surprise both academic and lay people with the plethora of new sites still being discovered in the islands. In 1998 the first undisturbed chambered tomb to be discovered in Orkney for many years came to light at Crantit (Ballin Smith 1998; 1999), while the ongoing excavations of the Iron Age 'ritual complex' at Mine Howe (Card *et al* 2000), and the mortuary structure and cemetery at the Knowe of Skea, Westray (Moore and Wilson 2003), have added other dimensions to life in the Iron Age. Furthermore, geophysical survey is proving immensely valuable in adding to the number of new sites and providing further information about known sites. This is best evidenced in the recent and ongoing geophysical survey of the Orkney WHS and surrounds (GSB 2002; 2003a and b).

27. Fieldwalking provides much useful archaeological evidence

Assessment of the prehistoric periods

Nick Card

Pre-Neolithic Orkney

Orkney, like the rest of Scotland, has presented no clear evidence to suggest human occupation before the end of the last glaciation, *c*10,000 BP. A single bifacial flaked implement from Upperborough, Harray (Anon 1914) does have certain typological affinities with Lower Palaeolithic handaxes. However, this is thought to be more likely of Neolithic/Bronze Age date (Saville 1997).

Mesolithic-type, flaked stone artefacts have been recovered from several locations in Orkney, mainly as a result of surface collection (Fig 27; Saville 2000; Wickham-Jones and Firth 2000). Many post-war studies of these microlithic forms, mostly informed by the work of Lacaille (eg 1935), viewed them as 'the survival of a

lingering, degenerate, Upper Palaeolithic tradition...' (Livens 1956, 443). This was contrary to Lacaille who saw no reason not to attribute these forms to Mesolithic activity in Orkney (1954, 169-70). Livens' view however is still current amongst some authors. Anna Ritchie stating, most recently, that '… flintwork that looks Mesolithic can turn up on Neolithic sites … where it is more likely to indicate the survival of old-fashioned ideas in toolkits than pre-Neolithic activity' (Ritchie, A 1995, 20). Renfrew (2000, 5), although not denying the possibility of sporadic Mesolithic visits to Orkney, contests the idea of permanent Mesolithic settlement in Orkney.

Recent reviews of the material by Saville (1996; 2000), '… leaves no doubt of the existence of a fully Mesolithic presence on Orkney' (1996, 220). This view is shared by Wickham-Jones, on the basis of the lithic artefactual evidence (1994, 74) and fieldwork (Wickham-Jones and Firth 2000). Despite the lack of wholly diagnostic implements, the flint assemblage from below the chambered tomb at the Point of Cott, Westray has also recently been assigned to the Mesolithic (Findlay 1997), as have new finds from Long Howe, near Mine Howe.

Environmental evidence for Mesolithic activity is also scant. Bunting (1996a, 23) has interpreted an interruption of woodland in a pollen column from the West Mainland, as evidence for possible Mesolithic activity, *c*6,500 BC. On Hoy (Blackford *et al* 1996) a similar decline in woodland was also detected around 6,400 BC. As with the Mainland evidence this was associated with concentrations of charcoal, which have been interpreted as possible evidence for people in Orkney in the Mesolithic.

The pre-Neolithic World Heritage Site and Inner Buffer Zones

Although no Mesolithic sites have been detected within the IBZ, many of the flints cited by Saville (1996; 2000) as 'typical microliths', have been attributed to the Stenness and Sandwick areas. Saville's (2000, 95) re-examination of the lithics from the 1970s excavations at Skara Brae (Clarke, D V 1976a; 1976b) also identified two pieces of 'Mesolithic character'. Saville considers that these may represent residual Mesolithic pieces and may 'hint of a pre-existing Mesolithic site being disturbed by the Neolithic village' (Saville 2000, 95).

Neolithic Orkney

Present ^{14}C dating suggests that the Neolithic in Orkney spans about 1500 years from the mid-4th millennium to *c*2000 BC. This is usually divided into two general phases, an early and a late, each characterised by differing styles of decorated pottery and architecture. There is overlap between the two phases and the transition period is generally considered to have occurred around 3000 BC (Renfrew 1979, 199-212; Davidson and Henshall 1989, 85-98; Hunter 2000; Hunter and MacSween 1991; and see Ashmore 2000a). The earlier phase seems characterised by Unstan Ware, the later phase by Grooved Ware. This phasing is also generally reflected in the architecture of chambered tombs. In simplistic terms, Orkney-Cromarty cairns (both tripartite and stalled cairns) are assigned to the early phase, while Maeshowe-type tombs are later (Davidson and Henshall 1989, 19-51). Statistical analysis by David Fraser (1983) appeared to support a possible typological division between the Orkney-Cromarty cairns and the Maeshowe group. This simplistic scheme is, however, complicated by some tombs exhibiting features from both styles of architecture. Further doubts have been cast on this simple typological sequence by Ashmore (2000a) and the important results of excavations at the Point of Cott (Barber 1997).

The architectural division is also mirrored in the domestic sphere. The organisation of space within the early Neolithic houses of the Knap of Howar (Fig 28; Ritchie, A 1983a), Howe (Ballin Smith (ed) 1994, 10-13) and Stonehall is mirrored in

28. Neolithic settlement at Knap of Howar, Papa Westray

Orkney-Cromarty tombs, with chambers being subdivided by upright slabs, while the layout of Maeshowe-type tombs finds parallels in Grooved Ware settlements such as Skara Brae (Richards 1991a).

Development within the later Neolithic period is evidenced by subtle changes in house design (Richards 1996a, 199), applied rather than incised decoration on Grooved Ware (Hunter and MacSween 1991) and the construction of large ceremonial sites, such as the Ring of Brodgar, Structure 8 at Barnhouse (Richards forth), Maeshowe and perhaps Structure 8 at Pool (Hunter 2000, 121-2).

For many years chambered tombs dominated the study of the Neolithic in Orkney. In many ways this is understandable since until the 1970s only three settlement sites (Skara Brae, Rinyo and the Knap of Howar) were known, compared to the plethora of chambered tombs. As early as the late 19th century chambered tombs were correctly assigned to the Neolithic (eg Clouston 1885), whereas, the recognition that Skara Brae was Neolithic only occurred almost 90 years after its discovery. Not until Bronze Age Beaker Pottery was found stratigraphically later than Grooved Ware, at Rinyo in 1938, did Childe accept that Skara Brae was Neolithic. The Iron Age date attributed to the Knap of Howar by early investigations (Traill and Kirkness 1937) was finally dispelled by the excavations of the 1970s (Ritchie, A 1983a) which revealed its early Neolithic date. This imbalance between settlement and ritual evidence resulted in early studies failing to investigate or even consider the relationship between the two. Since the 1970s, however, this imbalance has been addressed with the excavation of the Neolithic settlement sites at Links of Noltland (Clarke, D V 1981), Howe (Ballin Smith (ed) 1994, 11-13), Barnhouse (Richards forth), Pool (Hunter *et al* forth), Tofts Ness (Dockrill *et al* forth), Crossiecrown (Richards *et al* forth), Stonehall (*ibid*) and, most recently, Wideford Hill (Richards *et al* forth). Numerous other potential settlement sites have also been identified by survey work, eg at Stove, Sanday (Bond, J M *et al* 1995; Morrison 1995).

In the past the evidence from these settlements has been seen as representing a straightforward development from single dispersed farmsteads in the early Neolithic towards nucleated villages in the late Neolithic. A reappraisal of past excavations and the results from Pool, Stonehall and Crossiecrown (eg Richards 1999) would suggest, however, that a wide variety of settlement forms characterised the entire Neolithic period in Orkney. The recent excavations at Wideford Hill (HY41 SW47) (Richards *et al* forth) have added another dimension to the repertoire of Neolithic settlement forms. Timber posthole structures, both linear and circular in plan, underlay a stone-built early Neolithic structure, similar in size and architecture to the Knap of Howar. Although awaiting the confirmation of an absolute date, these timber structures are potentially the earliest habitation site yet found in Orkney.

The study of chambered tombs has been augmented by Davidson and Henshall's revised survey (1989) and by modern excavations at Quanterness (Renfrew 1979), Pierowall Quarry (Sharples 1984), Howe (Ballin Smith (ed) 1994), Point of Cott (Barber 1997), Crantit (Ballin Smith

29. Example of Orcadian megalithic art: Neolithic incised stone found at Brodgar Farm
Thomas Kent, © Orkney Archive.

1998; 1999) and Bookan (Card forth). Results from these excavations have not only shed light on possible funerary practices, be that excarnation (Renfrew 1979; Hedges, J W 1983b) or inhumation (Barber 1997), but also on contemporary social organisation.

Cist burials are so characteristic of the Bronze Age in Orkney that in the past they have been automatically assigned to this period. The results of the excavation of the large, rock-cut chamber and cist at Sand Fiold (Dalland 1999) implies that this tradition in Orkney perhaps had its origins in the Neolithic.

Until recently, megalithic 'art' was recognised at only a handful of sites in Orkney (Fig 29). Apart from some incised motifs noted by Childe at Skara Brae (Childe 1931a, 150-52; Shepherd 2000), these appeared to be limited to mainly pecked motifs in a few chambered tombs (Davidson and Henshall 1989, 81-3). The finest example of this is the magnificent, spirally decorated, carved stone discovered during quarrying work at Pierowall, Westray in 1981 (Sharples 1984). Recent work has shown the wider use of megalithic art both in domestic and funerary contexts. Pecked motifs have now been noted at the settlement sites of Pool (Hunter 2000, 121) and Crossiecrown (Richards pers comm), while incised motifs have been found at both the settlement site of Barnhouse and several chambered tombs (Ashmore 1986; Bradley *et al* 2001; Ballin Smith pers comm). Pick dressing of stone has also been recently noted at several sites in Orkney (Phillips and Bradley 2000). The recognition that many aspects of Orcadian megalithic art are paralleled in the Boyne Valley in Ireland would seem to emphasise the possibility of direct contact between the two regions in the Neolithic.

The integration of all of this new material has revolutionised the study of the Neolithic (see Ritchie, A (ed) 2000). Many basic questions regarding the Neolithic of Orkney have been addressed and partially answered. For instance, stratigraphical evidence from Pool has suggested the relationship between Grooved Ware and Unstan Ware to be mainly chronological, rather than cultural (Hunter and MacSween 1991).

Environmental and economic evidence has also been greatly enhanced. A detailed picture of the Neolithic environment is being created and the impact of farming realised. The conventional picture of a landscape devoid of trees during the Neolithic and later prehistory (eg Tipping 1994, 24) is also being questioned (eg Limbrey, in Buteux 1997, 10-11). The diversity of the Neolithic economy is now clearer. In the past the Neolithic economy in Orkney was seen as being based on pastoralism. Modern excavations have emphasised the range of environments exploited in the Neolithic (Clarke, D V and Sharples 1985, 72-8). Recent excavations at the Links of Noltland, Skara Brae, Tofts Ness, Pool and Knap of Howar have provided evidence for cereal production including wheat and barley. Evidence from Pool (Hunter 2000, 122-3) also hints at intensification in agricultural production in the later Neolithic. This may be related to evidence from Tofts Ness (Simpson and Dockrill 1996; Simpson *et al* forth) where, from the late Neolithic, manure and turf were added to the soils to maintain crop yield and minimise erosion. The exceptional quality and quantities of the bone assemblages from settlement sites in Orkney have not only demonstrated the wide diversity of both domestic and wild animals being exploited, but also the importance of this resource for the

30. The Bookan skyline from near the Ring of Brodgar (some of the mounds relate to quarrying)

production of artefacts. The only comparable assemblages in size come from southern England, but almost exclusively from ritual sites like Durrington Walls and Mount Pleasant (Harcourt, in Wainwright 1979). The importance of the Orcadian bone assemblages has recently been addressed by Sharples (2000).

Despite the range and quality of evidence from Neolithic sites in Orkney, there has generally been reluctance by the 'Wessex school' of archaeological theory to address the Orkney material in its wider context (Renfrew 2000, 2; but see Sharples 1992 and Barclay, G J 2000). Meanwhile new theoretical frameworks and landscape studies have been developed by those working in Orkney. Colin Richards' work at Barnhouse (Richards forth) has been followed up by his landscape studies around the Finstown basin, the Cuween-Wideford Project and a series of wide-ranging papers concerning his findings. He has attempted to address issues such as the cosmological and ideological perceptions of Neolithic people. His excavations at Barnhouse also provided material for Dr Andrew Jones's far reaching analysis of the pottery and its implications for the elucidation of social identity in the Neolithic (Jones, A 2000; 2002). As Gordon Barclay, however, points out (2000), the regionality of the Orkney material should be recognised.

The Neolithic World Heritage Site and Inner Buffer Zones

There are at present no absolutely dated early Neolithic sites known in the IBZ. Recent excavations at Maeshowe, however, suggest that an earlier structure underlies the clay platform on which the tomb was built. This has tentatively been identified as part of an early Neolithic house (Richards 1996a, 195; forth).

It has been suggested that the Ring of Bookan and the chambered tomb of Bookan form a sub-group of monuments within the larger Neolithic complex (Fig 30), as perhaps do the Ring of Brodgar and its surrounding large mounds, and Maeshowe and the Stones of Stenness (Historic Scotland 1998, 34). As the chambered tomb of Bookan has been assigned to the early Neolithic on typological grounds (Fig 31), the Bookan 'grouping' has been thought of as early Neolithic (*ibid*). However, the description of the pottery found by Petrie at Bookan tomb, with its 'rudely formed raised moulding in a waved form', implies Grooved Ware (Henshall 1985, 108; Davidson and Henshall 1989, 77-8) and perhaps suggests that the tomb at Bookan is late Neolithic. A possible example of an early Neolithic tomb is the elongated mound of Fresh Knowe (HY21 SE12), partially excavated in 1853 (Petrie 1857, 58; see below).

The rich variety of sites in the area relate to many aspects of the late Neolithic. Settlement is represented at Skara Brae, the initial phases of Barnhouse and probably the new complex on the Ness of Brodgar (see below); burial at Maeshowe and the chambered tomb of Bookan; and ritual at the henge complexes of the Ring of Brodgar and Stenness, and the later phases of Barnhouse. Each aspect is dealt with separately below but, as shown especially by excavations at Barnhouse, all sites are interrelated and share aspects of architecture, orientation, layout and material culture.

Since its discovery in 1850 (Fig 32), excavations at the Grooved Ware village of

31. Bookan chambered cairn under excavation in 2002

32. An early painting of House 1 at Skara Brae (by John Cairns, Petrie 1867, pl xxix)

33. Plan of Skara Brae

Skara Brae (HY21 NW12) have revealed a complex history of settlement throughout which general continuity was maintained by the process of demolition, construction and reconstruction. Recent excavations (Clarke, D V 1976a) have suggested that the remains here fall into two broad phases, though their precise interpretations need clarification (Fig 33). The first phase, starting *c*3000 BC, was characterised by free-standing structures with 'beds' recessed into the walls. The later buildings, though retaining the basic layout of the earlier structures (a central hearth, beds on both sides and a dresser opposite the entrance), were larger with the beds not recessed into the walls. These later structures were not free-standing but set into midden deposits. Two of the structures stand apart from the rest, Houses 7 and 8. Due to abundant debitage from stone working, its separation from the rest of the houses and its lack of beds, House 8 (Fig 8) has often been interpreted as a workshop (Childe 1931a, 49; Clarke, D V and Sharples 1985, 67), though this has been questioned by Richards (1990b, 37-40). House 7 (Fig 34), although resembling the layout of other houses, also seems detached. This, in conjunction with several other idiosyncrasies, such as two female burials under the floor, suggests that this structure may have had a special, non-domestic function (Richards 1990b, 35-7).

34. House 7 at Skara Brae, from wallhead looking to entrance

The discovery in 1984 of the settlement of Barnhouse (HY31 SW61), in a landscape that was often viewed as purely ritual, was surprising. Excavations between 1986 and 1991 (Richards (ed) forth) revealed a highly organised settlement with its origin *c*3000 BC. The houses were free-standing and similar in plan to those in the early phase of Skara Brae, with beds recessed into the walls, a dresser opposite the entrance and a central hearth. As at Skara Brae and Rinyo, all the hearths were orientated on a south-east/north-west axis. An exception to this general plan was House 2. This was a double-sized structure, with six 'bed' recesses and built to a higher standard than the rest. Unlike other houses in the village that were replaced as often as five times, House 2 remained in use throughout the history of the settlement. Like House 7 at Skara Brae, this structure was probably not domestic in nature. Despite the replacement of many of the houses, the basic plan of the village remained the same, with the houses arranged around a central open area. This area was divided into specific places for the manufacture of pottery and the working of bone, hides and flint.

The settlement at Barnhouse appears to have had a shorter life than that at Skara Brae and the evidence suggests that it was abandoned *c*2600 BC. When habitation of the site ceased, however, a single monumental building was constructed to the south-west, partially overlying some earlier houses (Fig 35). This structure will be discussed below.

The existence of other settlements within the IBZ is implied by the recovery in the past of numerous, characteristically late Neolithic artefacts (eg HY21 SE44 and 52). Many of these are provenanced to the area around Bookan at the northern end of the IBZ. The collection comprises of many flint tools, including over 40 scrapers, arrowheads, maceheads, stone axes, hammers and a piece of haematite (Callander 1931a).

35. Aerial view of Barnhouse under excavation

The incised stone (HY31 SW25) found near Brodgar Farm in 1925, with its affiliations to similar stones from Skara Brae and Barnhouse, was considered to be perhaps indicative of another late Neolithic settlement. This appears to have been confirmed by the partial uncovering in the spring of 2003 of a structure very similar to Barnhouse's Structure 2 (Ballin Smith 2003). The ongoing geophysics programme being conducted by the Orkney Archaeology Trust within the WHA (WHAGP) (GSB 2002; 2003a and b; Mackintosh and Damianoff 2003) has shown that this structure appears to be part of an extensive complex of structures covering the Ness of Brodgar to the south of Brodgar Farm. The importance of this discovery, due to its location within the WHA and its proximity to the Barnhouse Neolithic settlement, cannot be over-stressed.

Maeshowe (HY31 SW1) (Davidson and Henshall 1989, 142-6) is perhaps the finest piece of Neolithic architecture in western Europe. The tomb sits on a clay platform surrounded by a broad circular ditch (Fig 18). The bank outside of the ditch appears to be mainly a later addition, though in places excavation has shown it overlies a substantial prehistoric wall (Richards (ed), forth). Both Childe (1956) and Renfrew (1979) excavated trenches across the ditch (Fig 36). Renfrew's results suggest that sometime before *c*2500 BC (though as noted by Barber (1997, 7) there was no demonstrated relationship between the ditch and the burial mound) a natural knoll was partially levelled for construction. The tomb, however, was not the primary structure to be built. Recent excavations revealed the remnants of an earlier structure underlying the clay platform on which the tomb was built. A socket for a standing stone was also discovered on the platform at the rear of the tomb (Richards (ed) forth). This may have been part of a stone circle situated on the mound, prior to construction of the tomb (Richards 1996a, 197). The mound that contains the tomb consists of a stone core covered with clay and stones with stabilising, internal walls (Childe 1956). The central chamber is accessed through an entrance passage, presently over 15m long, and aligned with the midwinter sunset. Four large slabs, one on each side, form the main length of the passage. It has been suggested that these may have come from a stone circle built on the site prior to the tomb (Richards 1996a, 197). An alcove in the passage houses a blocking stone, which when in place does not fully fill the passage. A small horizontal slit is left which, like the 'light-box' at Newgrange, Ireland, would allow light to penetrate the inner chamber at midwinter. The large, central chamber measures *c*4.7m square and its corbelled roof was originally *c*4.5m high. At each corner is a buttress flanked by a large standing stone. Three side cells are present in the sidewalls. When excavated in 1861 only a single fragment of human bone was found.

36. 1970s excavation of the ditch at Maeshowe by Professor Renfrew

The only definite chambered tomb in the IBZ is the chambered tomb of Bookan (HY21 SE10) (Davidson and Henshall 1989, 103-4). This site was excavated by Petrie in 1861 (Petrie 1861a). Petrie discovered a rectangular central chamber surrounded by probably five smaller chambers. Orthostats were used to subdivide the interior. Human skeletal material was found in three of the side chambers, along with some pottery and a flint 'lance-head'. This site was used by

Henshall (1963) as the type site for one of her categories of chambered tomb. As noted above, this site is often quoted as being early in date (eg Ritchie, A 1995, 73), although the description of the pottery found by Petrie would seem more reminiscent of Grooved Ware than Unstan Ware. The site also shows similarities in layout and architecture with Structure 2 at the late Neolithic settlement of Barnhouse. Today the site survives as a dilapidated oval mound, *c*16m in diameter, within which some of the orthostatic chamber divisions are still visible. Excavation at Bookan in 2002 (Fig 31) showed that the tomb excavated by Farrer and Petrie was only the primary phase in the history of the site. After the tomb had fallen into disrepair or been deliberately slighted, the original cairn, *c*7m in diameter, was incorporated in a larger cairn, *c*16m in diameter and bounded by three concentric revetments (Card forth). The 2002 excavations also emphasised the apparent idiosyncrasies of this site. The size and aspects of the architecture would seem to be noticeably different from other chambered cairns.

The Ring of Bookan (HY21 SE7) has in the past been categorised as a chambered tomb (Henshall 1963). This suggestion has latterly lost favour and it was omitted from Henshall's revised work (Davidson and Henshall 1989, 4). This was due to a reconsideration of the site by Graham Ritchie (1985, J N G, 126) who thought that the site had more in common with the Stones of Stenness than the Maeshowe-type tombs. This was based on the scale of the encircling ditch (*c*13m wide by at least 2m deep) and the size of the enclosed area (45m by 38m). This is closer in size to the area enclosed at the Stones of Stenness (44m in diameter) than that of Maeshowe (76m by 60m). Local tradition (W Firth, Bockan Cottage, pers comm), however, recalls a 'chamber' still being accessible in the early 19th century. Clearly excavation is required to clarify the status of this site.

Although the remains of a cist can still be seen in the top of Salt Knowe (HY21 SE14), to the west of the Ring of Brodgar, the scale of this mound (40m by 33m by 6m high) suggests that it may be a chambered tomb.

A cist burial (HY31 SW26), discovered in 1915 at Tormiston Farm close to Maeshowe, exhibits similarities to the large cist excavated at Sand Fiold, Sandwick (Dalland 1999). Both were rock-cut and their construction allowed access to be maintained. Radiocarbon dates and 'megalithic' architectural features suggest the Sand Fiold cist may have been built and used initially in the Neolithic. A similar date has tentatively been suggested for the Tormiston Farm cist (Dalland 1999, 408).

It is also worth noting the substantial mound opposite the Standing Stones Hotel (HY31 SW24), which is situated just outside the IBZ. Until recently this was considered natural, but a reference from the late 19th century (Cochrane 1899, 88), supported by results from a geophysical survey (Challands 2001), would imply that this is a chambered tomb.

Until the mid-19th century the Stones of Stenness (HY31 SW2) were considered to be part of a semi-circular structure. The crescent form of the surviving stones was probably the basis for the site being called the 'Temple of the Moon'. Thomas (1852) was the first to realise that they had perhaps originally formed part of a complete circle of an estimated 12 stones, although the semi-circular myth was still prevalent in the 1950s (Marwick, H 1952b, 20). Final confirmation of the circular form of the monument awaited the investigations of the 1970s by Graham Ritchie (Ritchie, J N G 1976). Ritchie's investigations showed clearly that the four surviving stones had been part of a circle of 11 or 12 stones (there is some doubt about the 12th stone, though it is possible that the socket for this stone remained undetected). Round the ring of stones was a ditch, 6m wide by *c*2.3m deep, with a single causeway, 8m wide, on the north side of the ring. Outside the ditch traces of a bank were revealed. Within the circle a large square hearth was found at the

centre, which overlay the setting for a timber post. Between the hearth and causeway across the ditch, various features were uncovered including the settings for some upright stones and a timber structure. Bones of cattle and sheep recovered from the ditch and charcoal from the central 'hearth' provided ^{14}C dates of around 3000 BC for the initial use of the site. These dates are in agreement with the incised Grooved Ware found there. A date of *c*2150 BC from the bedding trench of the timber structure implies continued use of the site throughout most of the 3rd millennium. Several new dates from the basal ditch fill have recently become available (Ashmore 2000b, 125; Ashmore 2001, 125).

At the Ring of Brodgar (HY21 SE1) 60 stones were originally erected to form a near perfect circle, *c*104m in diameter (Fig 37). The stones were encircled by a ditch crossed by two opposing causeways on the north-west and south-east sides. Recorded excavation of the site is limited to the three trenches excavated by Renfrew (1979) in the early 1970s, two across the ditch and one outside the ditch. Although geophysical survey (Bartlett and Clark 1973b) located several anomalies within the central area of the circle none have been investigated. Renfrew's excavations revealed that the ditch was originally some 10m wide and up to 3.4m deep. Unlike the Stones of Stenness, excavation revealed no evidence of an external bank, however, traces of a possible bank are visible in one area outside of the ditch. No samples suitable for dating were obtained. Estimates for the date of its construction vary from first half of the 3rd millennium (Ritchie, A 1995, 79) to the latter half of that millennium (Historic Scotland 1998, 22).

Several standing stones are located, or recorded in the area. The Barnhouse Stone (HY31 SW12) lies on a direct line with the passage of Maeshowe, some 800m south-west of the tomb.

It has been argued that the Watch Stone (HY31 SW11), along with the pair of standing stones at Lochview (Fig 38, HY31 SW10), the Stone of Odin (removed in 1814, Marwick, E W 1976) and the Comet Stone (HY21 SE13), formed part of an avenue between the Ring of Brodgar and the Stones of

38. The standing stones at Lochview

37. Aerial view of the Ring of Brodgar

Stenness (eg Ritchie, A 1995, 82). Alternatively, the discovery of sockets for twin stones at the Watch Stone (discovered during roadworks in 1929) and the Stone of Odin (Richards (ed) forth), suggests that the pairing of stones might indicate a series of portals or 'symbolic doorways' linking the two henges (Richards 1996a, 199). This apparent physical link between the two stone circles, paralleled at Stonehenge and Avebury, may help to explain the functioning of the Brodgar ceremonial complex (Parker Pearson 2000, 212-13).

As noted above, when habitation ceased at Barnhouse, a single large structure, Structure 8, was built (Fig 35; Richards (ed) forth). Although reflecting some features of late Neolithic houses, like a central hearth and a dresser opposite the door, the scale of the structure was monumental. The internal floor area measured *c*7m by 8m. It was surrounded by a clay platform bounded by an outer wall, elements paralleled at Maeshowe, while the elaborate entrance arrangement, including a passage some 3m long and flanked by upright stones with a hearth at its threshold, mirrors aspects of the Stones of Stenness. The interconnection between these monumental sites is further emphasised by the alignment of the two entrances to the Barnhouse 'hall'. The outer entrance, through the surrounding outer wall, faces Maeshowe. The inner doorway was aligned on the midsummer sunset, the opposite to that of Maeshowe, which points towards the midwinter sunset.

Bronze Age Orkney

The Bronze Age in Orkney has been characterised as an impoverished period sandwiched between the apparent splendour of the Neolithic and Iron Ages. Despite the plethora of burial evidence in cists and round barrows, the lack of settlement evidence and 'exotic' items has led to the view that this was 'a dull time' (Ritchie, A 1995, 95) in the prehistory of Orkney. The apparent demise of Orkney has been linked to climatic deterioration, overuse of soils in the late Neolithic and an inability to compete in a changing society where access to resources was paramount, all leading to a growing isolation. Alternatively Clarke, D V *et al* (1985, 92) have suggested that the existing power base in late Neolithic Orkney prevented the adoption of new ideas, such as Beakers and metalwork, in order to maintain their authority. This led to a growing atrophy in Orcadian society. Recent research is addressing this imbalance and leading to a greater understanding of Orkney in the Bronze Age.

The early Bronze Age is traditionally linked to the introduction of Beaker pottery. Although sherds of Beakers have been found at the settlement sites of Rinyo (Childe and Grant, W G 1939; 1947) and Links of Noltland (Clarke, D V and Sharples 1985), and inside the chambers of Calf of Eday Long (Calder 1937) and Knowe of Yarso (Callander and Grant, W G 1935), these limited discoveries were viewed as epitomizing the growing isolation of Orkney in the early Bronze Age. (There is some doubt over the Beaker from a cist in Birsay (HY22 NE1) (Clarke, D V *et al* 1985, 92).) Recent discoveries, however, have produced Beaker pottery from around the tombs at Howe (Ballin Smith (ed) 1994, 24), Holm of Papa Westray North (Ritchie, A forth), at the settlement site of Crossiecrown and possibly Tofts Ness (Dockrill *et al* forth). Traditional views of the transition from late Neolithic to Early Bronze Age may also need to be reappraised once the evidence from Crossiecrown (Downes and Richards 2000, 165-7) and Links of Noltland (Clarke and Sharples 1985) is fully evaluated.

Burnt mounds, defined here as those frequently crescentic-shaped deposits of burnt stone and fuel ash, are found commonly throughout Orkney. A rapidly disappearing feature of the Orkney landscape, they have (following Hedges, J W 1975) been widely accepted as 'middens associated with dwelling and cooking facilities' (Hedges, J W 1975, 82) and dated to the middle and late Bronze

Age and early Iron Age. Due to a lack of other settlement types, burnt mounds have often been viewed as filling the gap in the settlement record (eg Cowie and Shepherd 1997, 159). However, the lack of conventional occupation material and their location in areas of wet ground hint at specialised functions that have yet to be established (eg Buckley (ed) 1990; Moore and Wilson 1999b). Recent research by Iona Anthony in Orkney (Robertson *et al* 2000) has highlighted the possible extended date range of many burnt mounds, from the late Neolithic to the medieval period.

Recent excavations at Tofts Ness (Dockrill *et al* forth), Spurdagrove (Hedges, J W 1980), Skaill (Buteux 1997) and St Boniface (Lowe 1998) have provided insight into the (as yet limited) evidence relating to settlement and economy from the Bronze Age in Orkney (Figs 39 and 40). Survey has also augmented this list with numerous potentially Bronze Age settlement sites being identified by Raymond Lamb (RCAHMS 1980; 1982; 1983; 1984; 1987; 1989). On Hoy the complex of structures along the Whaness Burn (RCAHMS 1989, 8), including two enclosed settlements and sub-peat dykes, seem likely to be Bronze Age in date.

39. House structure within the Bronze Age complex at Tofts Ness, Sanday

40. Recovery of animal bone at Tofts Ness, Orkney

As in the rest of Scotland, there would appear to be a movement towards the enclosure of land during the Bronze Age in Orkney. Survey work (eg Nayling 1983) has discovered sub-peat dykes in many locations and field systems were found in association with the settlement of Spurdagrove (Hedges, J W 1980). On a larger scale, the massive linear earthworks known as 'treb dykes' (Lamb, R G 1983; RCAHMS 1980, 9) may also date to this period.

As with the Neolithic, the traditional view of the Bronze Age economy being dominated by pastoralism is no longer tenable. A mixed subsistence economy appears to have been the norm. Evidence for cultivation in Bronze Age Orkney comes in the form of ard marks (eg Tofts Ness, (Fig 67); Dockrill *et al* forth; Simpson *et al* 1998a), pollen (eg Liddle, Hedges, R E M 1975) and the wooden yoke from White Moss, Shapinsay (Hedges, J W *et al* 1993). The importance of cultivation in Bronze Age Orkney is also implied by the common occurrence of ard points both in domestic and funerary contexts (Downes pers comm).

Funerary evidence has tended to dominate the study of the Bronze Age since burial mounds are the most numerous prehistoric monument in Orkney. In a survey of all Bronze Age burial sites listed in the Orkney Records undertaken by Jane Downes in 1993-4 (Downes 1997a), 229 burial mound sites were found to survive. That is a total of 550 burial mounds spread amongst sites which range from single mounds to cemeteries of several mounds. This total does not include flat cemeteries or unmarked graves. Although many Bronze Age burials were excavated in the 19th century, there is a growing body of evidence from more recent work that allows a better understanding of these monuments (eg Hedges, M E 1977;

41. Varme Dale, Rendall. The Orkney Barrows Project is looking at Bronze Age burial in Orkney through a combination of excavation and survey
© J Downes.

Hedges, J W 1981; Neil 1981b; Downes 1994; 1995; 1997c; 1999; forth; Barber *et al* 1996; Dalland 1999). Recent studies, especially Jane Downes' 'Orkney Barrows Project', have emphasised the variety and complexity of burial rites (Fig 41). Cremation and inhumation were both employed throughout the period, with burials being placed in cists, pits and even clefts in rocks. Excavations have also highlighted the amount of information that can be retrieved from sites that have already been 'investigated' or that have suffered from recent farming practices. Excavation at the barrow cemetery of Linga Fiold (Downes 1995) revealed that primary burials often survive previous investigations. Area excavation between the mounds also exposed secondary burials, pyre sites and a mortuary structure where there were no surface traces.

The 'Barrows Project' is ongoing with investigations at the Knowes of Trotty, Harray, a large linear cemetery. In 1858 amber and gold artefacts were recovered from a cist in the largest mound (Petrie 1860). These grave goods are unusual for Orkney but they find parallels in the rich Wessex graves of the early Bronze Age. It may be argued that these items were heirlooms and cannot be used to date the cemetery. However, the location and layout of the cemetery would imply an early Bronze Age date (Downes pers comm). The exceptional quality of these finds in a Scottish context implies that Orkney in the Bronze Age was not as isolated as previously thought.

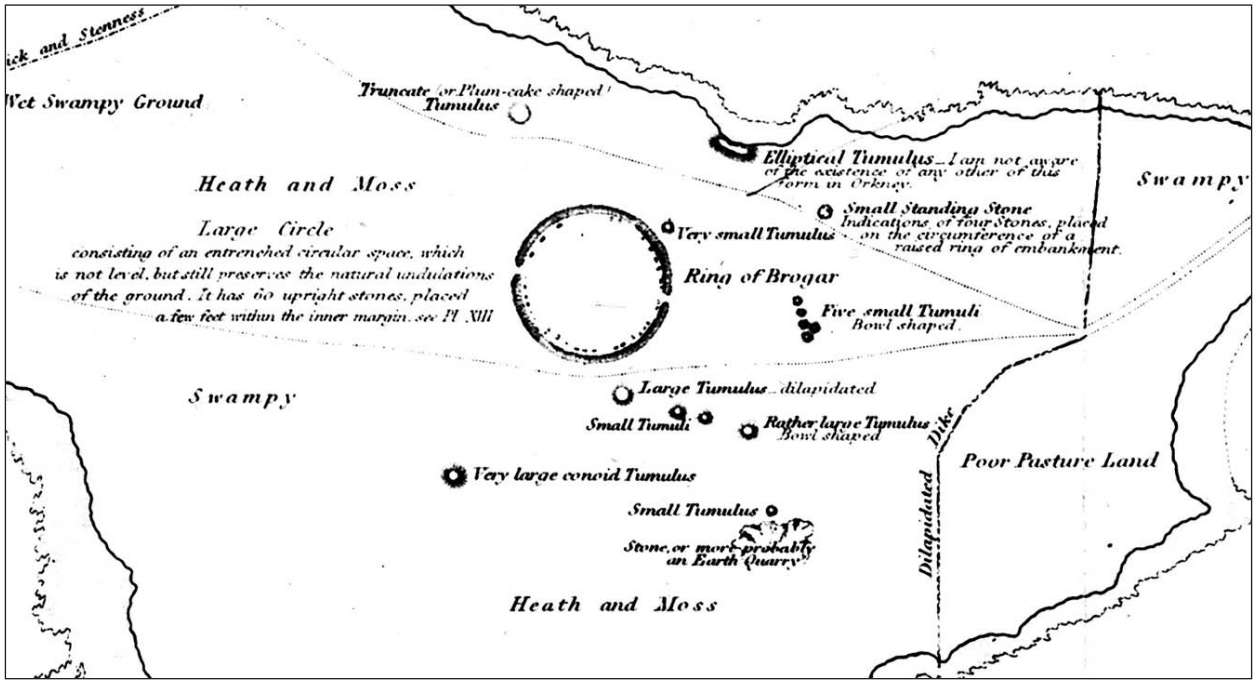
The Bronze Age World Heritage Site and Inner Buffer Zones

The Bronze Age archaeology of this area is dominated by funerary evidence. The late Neolithic ceremonial sites of the Ring of Brodgar, the Stones of Stenness, Maeshowe and the Ring of Bookan appear to have acted as a focus for Bronze Age burial, whilst respecting the earlier monuments. The importance of this area is emphasised not only by the number of satellite burial mounds, but also by the range of different types of mound, and the scale of some of the mounds. This variety of Bronze Age burial mound is best paralleled in Wessex at Stonehenge and Avebury.

When the Royal Commission surveyed Maeshowe in 1934, nine mounds were recorded in the 'immediate vicinity' of Maeshowe (HY31 SW21). Today only one visible mound survives, the others having been removed by ploughing or destroyed by the construction of a military camp to the north of Maeshowe during the Second World War (WWII).

Thomas's (1852) survey of the Brodgar area noted two mounds close to the Stones of Stenness, on the shore of the Loch of Harray (HY31 SW35) (cover). A copy of a presumed earlier map of the area, showing the sixpenny land of Stenness (Orkney Archives D23/10), shows six mounds in this vicinity and refers to them as 'Clovy Knowes'. Since Thomas's survey the land has been taken into cultivation and today no surface traces of these mounds survive.

The splendour and continued importance of the Ring of Brodgar is emphasised by the number and scale of the burial mounds erected in its vicinity (Fig 42). Salt Knowe (HY21 SE14) (Fig 43), to the west of the henge, is only paralleled in scale (*c*40m in diameter by 6m high) by Maeshowe and the largest mound at the Knowes of Trotty. Whether Salt Knowe was built to contain a Bronze Age burial or a chambered tomb awaits investigation. According to Thomas (1852, 110), this mound was investigated prior to 1700 and



42. Detail of Brodgar area in 1849 (see also cover; Thomas 1852)

43. Salt Knowe

nine silver fibulae were found. S Grieg (1940) speculates that this was Viking ring-money. It seems possible that these 'fibulae' came from the cist-like structure still visible on the top of the mound.

The two large mounds to the east of the circle, Fresh Knowe (38m by 26m by 5.7m high) and Plumcake Knowe (22m in diameter by 3m high), were both investigated by Farrer and Petrie (Petrie 1857). Two short cists were found in Plumcake Knowe, one containing a steatite urn 'one-third part filled with pieces of calcined bones', the other 'an urn of baked clay … five inches in diameter and five inches deep' (Petrie 1857, 60). The excavations at Fresh Knowe by Farrer and Petrie concentrated on the north end of this 'elliptical' mound. Despite 'a very considerable cut or trench made across it … it did not lead to any discovery' (Petrie 1857, 58). Petrie notes only that it was carefully constructed. The unusual elongated form of this mound suggests that it covers a chambered tomb rather than a Bronze Age burial.

The hollow centre of the South Mound (18m in diameter by 1.8m high) (HY21 SE15), close to the southern lip of the ditch at the Ring of Brodgar, bears witness to investigations in the past. No records of these excavations survive. To the south of the henge at least nine smaller barrows survive (HY21 SE16), ranging from 4.5m to 12.8m in diameter and up to 1.1m high. Some have obviously been investigated but no finds have been reported. The recent geophysical survey (GSB 2002) of the area has clarified the extent of these mounds and located a series of associated features.

To the north of the Ring of Brodgar, close to the present shore of the Loch of Stenness, is the best preserved of only four recorded disc-barrows in Orkney (HY21 SE3). Although the outer bank on the south-west side has been cut through by a cart track in the past, the central barrow (15m in diameter by 0.8m high) and its encircling ditch and bank (overall diameter *c*30m) are still well defined. There are no records of any excavations at this site. Recent geophysical survey (GSB 2003b) of this site suggests that the central mound is revetted. Two hundred metres to the north of the disc-barrow lies a small

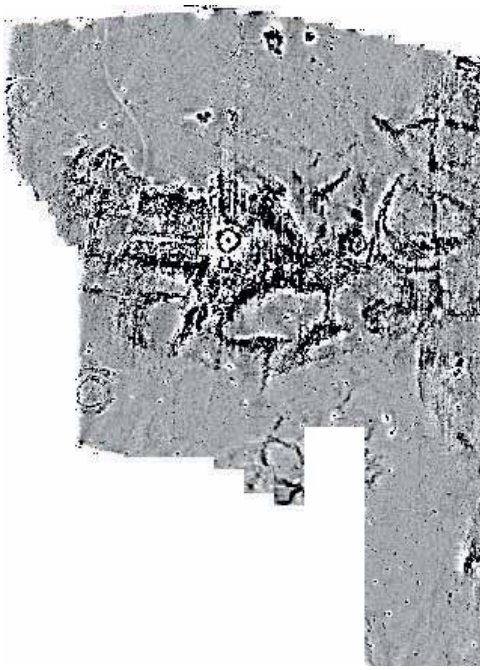
44. Skae Frue from Bookan

mound (HY21 SE19). When recorded by the Royal Commission (RCAHMS 1946, 264) it was 'outlined at the base by a setting of stones'. Today there is no evidence of this setting and the mound survives only as a low mound, *c*8m in diameter by 0.3m high.

The remaining burial mounds in the Brodgar area may be seen to cluster around the Ring of Bookan. There are presently three mounds (HY21 SE9) appearing to form a grouping at the top of the hill at Wasbister, south of the Ring of Bookan. The mound closest to the quarry is probably the result of quarrying activity. Both of the other mounds exhibit evidence of being investigated in the past. No reports survive of these excavations.
Skae Frue (HY21 SE8) is a large mound (24m in diameter by 2.4m high) that lies *c*100m downslope to the south-west of the Ring of Bookan (Fig 44). Excavations in the mid-19th century (Thomas 1852, 22-5) revealed three cists 'placed at the cardinal points of the compass', containing the inhumations of two adults and a child. Until 30 years ago a group of seven barrows (HY21 SE4) existed about 250m to the west of the Ring of Bookan. The mounds varied from 4m to 10m in diameter. A cremation in a cist was recorded from one of them (Callander 1936). Since the Ordnance Survey visit in 1966 ploughing has levelled the mounds.

Within the IBZ around Skara Brae a tumulus (HY21 NW16) was documented on the 2nd edition Ordnance Survey map of 1903, about 100m in front of Skaill House. The Royal Commission in 1928 recorded this as being a mound 23ft in diameter, dug into on the west side for a considerable depth (RCAHMS 1946, 268, no. 719). Today this possible burial mound only survives as a slight mound on top of a probable natural knoll close to the Skara Brae Visitor Centre. This mound is possibly an outlier of the extensive barrow cemetery surveyed by Low, Banks and Walden in the late 18th century in the Links of Skaill (HY21 NW15) (Lysaght 1972).

Apart from the upstanding barrows, numerous unmarked cists and burials have been recovered from the IBZ. Unfortunately only a few have been recorded. Of most note was the presumed Bronze Age cist cemetery discovered close to Brodgar Farm in 1925 (Marwick, H 1925b). Six cists were uncovered in association with a slab bearing eight bands of incised decoration (Fig 29). Three of the cists held uncremated bone. This site, however, may need to be reassessed in light of the recent discovery of a presumed Neolithic complex in the vicinity. During recent building work at the house of Lochview a deposit of undisturbed cremated bone was found adjacent to a sherd of Bronze Age pottery (HY31 SW72). There were no surface features to indicate the presence of a grave (Card 1998a, 71). Local knowledge would also seem to indicate the past presence of numerous flat cist burials around the Bookan area. While breaking in the land for cultivation in the late 1960s and early



45. The results of geophysical survey at Wasbister (the circular house in the centre is about 19m in diameter)

1970s the farmer at Bockan Farm is reputed to have ploughed up 'several' cists (Harrold pers comm).

Until recently other possible evidence for Bronze Age activity in the area was limited to two possible burnt mounds at Kokna-Cumming (HY31 SW28) and Wasbister (HY21 SE20). No evidence for the existence of Kokna-Cumming now remains, but it was reported as standing close to the pair of standing stones of Lochview (HY31 SW10), by the shore of the Loch of Harray (RCAHMS 1946, 319, No. 899). A low, grass-covered mound at Wasbister, *c*6m in diameter by 0.3m high, next to the seasonal lochan north of the Ring of Brodgar, is now indicated by geophysical survey not to be a burnt mound, as had previously been thought (GSB 2003b).

As early as 1928 the Royal Commission (1946, 263) briefly considered the two 'contiguous' cairns at Wasbister (HY21 SE18) to be hut-circles. Due to their size, however, this idea was shelved and until recently the site was described as a pair of denuded cairns. Comparisons with some recently excavated sites in Shetland (Downes and Lamb, R G 2000) and the Western Isles indicate that this site is probably a Bronze Age double house. The larger northern house is 19m in overall diameter, the smaller southern structure 11.5m in diameter. In the autumn of 2003 the geophysical programme in the WHA revealed that this structure lay in the middle of a 'major settlement site of around four hectares in extent' (Fig 45, GSB 2003b).

In comparing the Wasbister house to the various Bronze Age houses of Shetland, it is interesting to note the apparent similarities between some of these structures and House 8 at Skara Brae. The differences between House 8 and most of the rest of the houses at Skara Brae are usually interpreted in terms of function, with House 8 being seen as a workshop. However, as Richards (1990b, 40) notes, there is no evidence to suggest this structure was not a dwelling.

The Dyke of Sean (HY21 SE68) that crosses the Brodgar peninsula, although marking the medieval parish boundary, may have its origins in this period.

Iron Age Orkney

The Iron Age in the north of Scotland has its origins in the first half of the 1st millennium BC. Despite possible Roman influence or contact (Fitzpatrick 1989) and the presence of Roman imports, the lack of Roman occupation means that the Iron Age continues uninterrupted through into the latter half of the 1st millennium AD. In northern Scotland the Iron Age is generally subdivided into early (up to *c*200 BC), middle (*c*200 BC- AD *c*300) and late (AD *c*300-*c*800) (Foster 1990; Barrett and Foster 1991). The later Iron Age is often also referred to, here and elsewhere in Scotland, as early historic, early medieval, Dark Age or Pictish. The term Pictish is most usually applied in Orkney to material dating from around AD 600. Christianity was introduced to Orkney during the Late Iron Age. Although the study of this later period still relies primarily on the archaeological record, historical references also start in this period.

The study of the northern Iron Age has until recently been dominated by 'That tower of Scottish prehistory - the broch'

46. Part of the Iron Age complex at Pool, Sanday

47. 1920s excavations at Dale earth house, Harray, as photographed by Thomas Kent

(Hedges, J W and Bell 1980). Early studies of brochs were concentrated on typological and evolutionary classifications and the analysis of attributes of broch towers by simple statistics. This approach was determined by the lack of stratigraphic excavation and reliable dating evidence and gave rise to many theories explaining their origins by migration or invasion (Childe 1935; Mackie 1965; 1983), and their function in terms of comparisons with medieval castles (Curle, A O 1927). However, excavations at Bu (Hedges, J W 1987), Howe (Ballin Smith (ed) 1994), Pierowall (Sharples 1984), Quanterness (Renfrew 1979) and Tofts Ness (Dockrill *et al*, forth) have provided a 'native pedigree for the northern brochs' (Hingley 1992, 13) and dispelled the need for brochs being introduced by outsiders. The emphasis has shifted towards understanding the social context of Iron Age architecture (eg Barrett and Foster 1991; Parker Pearson *et al* 1996; Sharples and Parker Pearson 1997; Armit 2003).

A distinctive feature of the Orcadian and Caithness Iron Age is the occurrence of contemporary villages around brochs. This has been seen as suggesting a more centralised hierarchical or politically sophisticated culture than other areas of Atlantic Europe. However, it seems more likely that it reflects densities of population and the inherent fertility of the land forcing people into more compact settlement patterns (Sharples pers comm).

Recent excavations and surveys have also emphasised the possible range of non-broch-type settlement in the Orcadian Iron Age. The results from Pool, Sanday (Hunter *et al* forth) have not only provided one of the most important site sequences for the region (Fig 46) but have also

helped to bridge the gap between earlier roundhouse type structures and late Iron Age cellular structures, as found for instance at Buckquoy, Birsay (Ritchie, A 1977), while shedding new light on other previously excavated non-broch structures like Howmae, North Ronaldsay (Traill 1890). Evidence from Pool is also suggesting a revised chronology for the 'farm-mounds' (Davidson *et al* 1983; 1984; 1986) of Sanday and North Ronaldsay. Traditionally dated to later than AD *c*800 it now seems likely that many may have their origins in the Iron Age (Hunter 1990, 191-2).

The ubiquitous earth-houses or souterrains (assumed to be Iron Age although none are scientifically dated) are no longer seen as isolated features in the Iron Age landscape (Fig 47). Excavations at Howe (Ballin Smith (ed) 1994, 33) and Grain (Haigh 1983) have proved their association with ground-level structures. Their interpretation as storage for grain (Foster 1989a, 35) seems unlikely in an Orcadian context (Ballin Smith (ed) 1994, 273). The contents of some of these structures (eg at Rennibister (HY31 SE3) where many human remains were found), and the growing evidence for the importance of underground structures in the Iron Age (eg Mine Howe, Card and Downes 2003), suggests that interpretation of their use as ritual structures is worthy of further consideration.

Since Raymond Lamb's survey of promontory sites in the northern isles (Lamb, R G 1980b) little consideration has been given to these sites in the context of Iron Age settlement in Orkney. The dating of the promontory fort at Crosskirk, Caithness (Fairhurst 1984) to the pre-broch period may have important implications for similar sites in Orkney.

Crannogs are an aspect of settlement absent from the record in Orkney (eg Ritchie, A 1995) but they are present in the landscape. At present only two are listed in the NMRS database. Recent studies of aerial photographs imply that this is a much-underestimated resource in Orkney (J Gibson pers comm). Underwater survey by Bobby Forbes in the Stenness Loch area has recently led to the discovery of two small islands with causeways. Excavations at Brettaness, Rousay (HY33 SE12; Marwick, J 1984, 20) have shown that some date to the late Iron Age period in Orkney. A wider date range is evident from elsewhere in Scotland.

Recent excavations have also provided new insights into the environment and economy, and the inter-relationships between the two. By 1300 BC the climate, soil types and vegetation were very much like the present day (Davidson and Jones 1985, 35). Childe, as early as 1946, suggested an expansion of agriculture in the Iron Age (Childe 1946). Recent research in the Northern Isles strongly suggests that the Iron Age was a period of agricultural development and intensification with an expansion in arable cultivation and, particularly in the later Iron Age, the introduction of new crop species (Simpson *et al* 1998b; Ballin Smith (ed)1994; Bond, J M 1998; 2002; 2003). A change from the use of domestic midden material as fertiliser to the use of animal manure occurs as part of the expansion in arable agricultural (Simpson *et al* 1998b). The use of animal manure as fertilisers would require that the animals be stabled or corralled, with a concomitant intensification of stock keeping at this time. At the same time, a greater emphasis was placed on domesticated animals with a decline in the reliance on wild fauna, specifically red deer (Ballin Smith (ed) 1994; Gilmour and Cook 1998). This development of agriculture may be related to the apparent centralisation of settlement in the middle Iron Age, the development of broch-type structures and the emergence of an Iron Age elite basing its power on the redistribution of agricultural surpluses (Dockrill 2002). However the apparent focus of most of this intensification appears to relate to the post-broch settlements (Bond J M 2002) which may necessitate a rethink of present site hierarchy models.

The Iron Age, before the introduction of

Christianity, has often been viewed as a period within which society was more concerned with the 'mundane' aspects of life. This is largely due to a lack of evidence across Scotland for burial in the earlier Iron Age, or other structures to which a ritual purpose can be attributed. This imbalance in the evidence has partly been redressed by research showing that belief systems can manifest themselves in a variety of ways, for instance in the orientation of buildings, the use of architectural spaces and structured deposits within pits (eg Hill 1995). The discovery and ongoing excavation of the 'ritual' complex at Mine Howe (Card and Downes 2003) has shown that overtly ritual sites do exist. The similarity of the well-like structure at Mine Howe to so-called wells often found within brochs in Orkney and Caithness emphasises the potential of the 'religious' as part of many domestic structures. Anna Ritchie (2003) has also suggested a ritual function for several small alcove structures previously thought of as domestic.

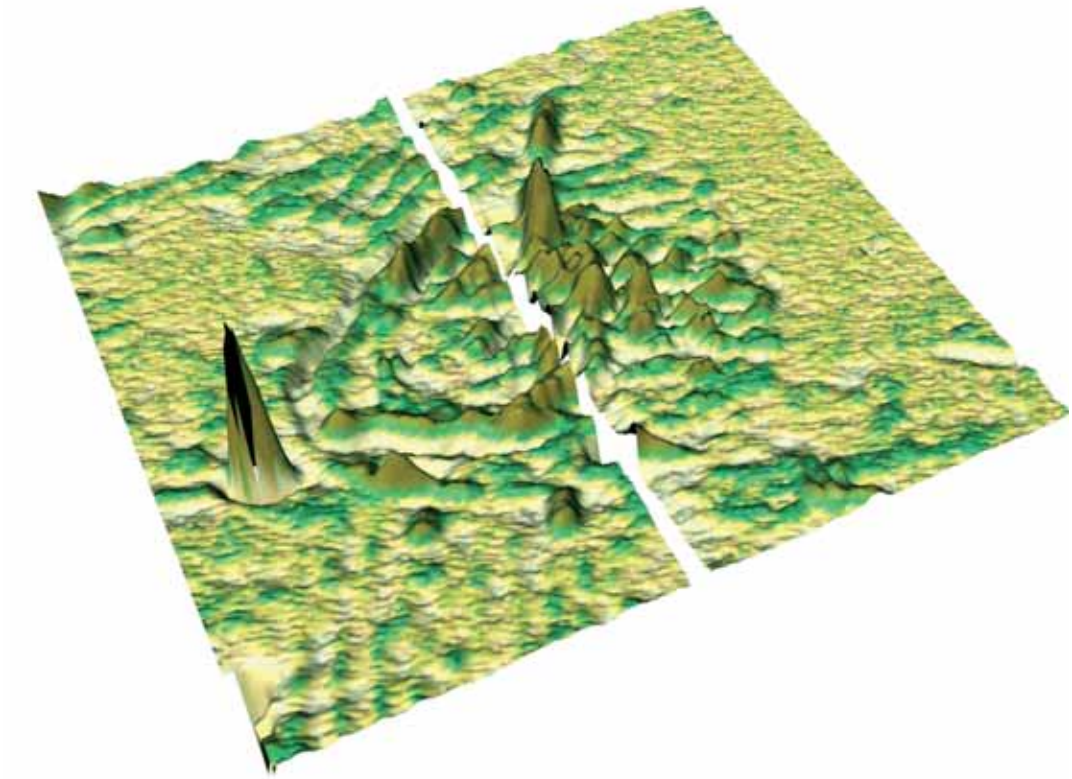
A total of 12 Pictish symbol stones have been found in Orkney (RCAHMS 1999). Until recently few of the Orcadian stones were securely provenanced. The discovery of the symbol stone at Pool (Hunter 1990, 185-7; Hunter *at al* forth) in a secure stratigraphical context has not only allowed confirmation for the stylistic dating of some stones, but also shed new light on their possible function and meaning. Ogham script has been found on various objects in Orkney. Difficulties in both reading and interpreting ogham have recently been addressed by Forsyth (1995; 1997).

Evidence for burial in the Iron Age of northern Scotland as a whole has been lacking (Hingley 1992, 16). Where found, the disposal of bodies seems almost casual and *ad hoc* as at Howe, Stromness (Ballin Smith (ed) 1994, 281). The introduction of extended inhumation in long cists was thought only to arrive with the adoption of Christianity (Close-Brooks 1984, 96). Until recently there was a dearth of formal burials attributable to the earlier Iron Age. However, ongoing excavations at the Knowe of Skea, Westray may be addressing this imbalance with the remains of over 60 individuals being recovered, some dating to the early 1st millennium AD and providing exciting new evidence for Iron Age burial practices (Wilson pers comm). Formal burials attributable to the later Iron Age are more widely recognised (Ashmore 2003). Excavations at Hermisgarth on Sanday (Downes 1997b) have shown that inhumation in cists and cremation were both practised in the late Iron Age and that burial in long cists does not necessarily imply the adoption of Christianity. The burials of this period can occur in low, kerbed cairns (eg Morris, C D 1996, 50-53) or flat cist cemeteries (Kaland 1993, 312-14). The cemetery of long-cist burials from Moaness, Rousay are dated to the Pictish period (*ibid*). These were part of the same cemetery in which several pagan Viking burials were discovered. Because none of the Pictish burials were conspicuously marked and they had not been disturbed by the burials of the Viking period, it has been interpreted as evidence for the continuity of the Pictish population into the Viking period.

The introduction of Christianity to Orkney, probably sometime between the late 6th century (Ritchie, A 1995, 117-18) and the early 8th century (Thomson 2001, 13-22), is perhaps the most influential event in the Pictish period. The strength of Christian organisation and its integration within secular power structures in Orkney at an early stage has been argued for on the basis of the evidence for a 'Peterkirk system' (Lamb, R G 1995, 22; but see Thomson 2001, 19-20) with the postulated presence of a resident bishop, perhaps on Papa Westray, sometime in the 8th century.

The Iron Age World Heritage Site and Inner Buffer Zones

The evidence for Iron Age activity within the IBZ is limited. Perhaps the most important site is the remains of a probable broch, Big Howe (HY31 SW31). This was partially leveled around 1900 when 'it was found to be a broch' (Cursiter 1923, 52). When Thomas (1852) surveyed the site he



48. Geophysical survey results showing banks and ditches at Big Howe (survey covers area of 100m^2)

described it as being 'very large' and 'requiring considerable excavations to make out its detail'. Although the site appears to survive as only a low but extensive mound, just south of the Stones of Stenness, the recent geophysical survey of the area (GSB 2002) has shown that considerable detail of the site still survives (Fig 48). What appears to be an outer 'light bulb – shaped' enclosure surrounds an inner circular enclosure *c*40m in diameter which is thought to contain the broch structure. The magnetic responses from the intervening area between the two enclosures, are 'consistent with midden heaps, hearths and structures'.

Another possible contender for broch status is the large mound at the north end of the Bridge of Brodgar (HY31 SW20). This has been interpreted as a possible Neolithic/Bronze Age burial mound and a Neolithic carved stone ball has been provenanced to the site (Anon 1885, 139, no. 18). However, other finds from the site include a 'grooved stone, possibly a sinker, with figures of fishes, a seal etc. scratched upon it' (Noble 1888) which may suggest a late Iron Age date. The results of the recent geophysical survey around this mound (GSB 2002) would appear to support its interpretation as a broch.

During the excavations at the Stones of Stenness (HY31 SW2) (Ritchie, J N G 1976) sherds of Iron Age pottery were recovered from two pits near the centre of the henge. A third pit provided wood charcoal dated to AD *c*560. Fifty-one Iron Age sherds were also recovered during the re-erection of Stone 5, in 1906 (MacKie 1976b). Hingley (1996; 1999) has recently discussed the significance of the reuse of Neolithic monuments in the Iron Age.

The Ring of Bookan (HY21 SE7) has always been dated to the Neolithic (see above). However, recent excavations of the ritual complex at Mine Howe have shown that such earthworks can also date to the Iron Age. Investigation at the Ring of Bookan is required to clarify the nature of this monument.

A long-cist burial below a stone cairn (HY31 NW30.02) was excavated due to coastal erosion at the Bay of Skaill. This has been ^{14}C-dated from AD 540 to AD 710 (James H F 1999, 771-5). Continuing erosion exposes additional stonework at stratigraphically the same layer. At Skara Brae, the 'intrusive burials south of Hut 7' Childe (1931b, 58-60) excavated may also be of Iron Age date.

Assessment of the historic period

Sarah Jane Grieve with Julie Gibson

Orkney Viking period (*c*800-1065)

The Viking period in Orkney is generally accepted to have begun at the close of the 8th century when records show that the Vikings turned their attention to the British Isles; those who raided the north of Scotland came mainly from the west of Norway. In time these Norse men settled the coastal fringes of the north and west of Scotland. By 900 the earls of Møre in western Norway had established an earldom, based in Orkney, which later included Shetland and Caithness and at times areas within mainland Scotland, the Hebrides and Ireland (Taylor 1938, 138-9, 189). The death of Earl Thorfinn the Mighty in 1065 is generally regarded as signifying the end of the Viking period in Orkney (Crawford 1987, 219).

49. Remains of a Viking building with central hearth at Pool, Sanday

One of the main debates surrounding the Viking period concerns the relationship between the incoming Vikings and the native Picts. There are two opposing views which illustrate the wide range of current opinion. There is no doubt that (with the exception of modern ones) place-names in Orkney stem almost completely from the Norse. An argument based on this proposes that the Vikings exterminated all the Picts. At the opposite extreme an alternative view suggests that Vikings and Picts integrated with little violence (based mainly on archaeological evidence from the site of Buckquoy) (see Smith, B 2001, 7-32 and Bäcklund 2001, 33-48 for details of the opposing views). The truth may be somewhere in between.

The Orkney Viking period is considered proto-historic as there are some documentary sources pertaining to the period but none of any detail and none from Orkney itself. Most of our knowledge of the Viking period in Orkney comes from: archaeological investigations; later documentary sources, namely the *Orkneyinga Saga*, written in Iceland *c*1200 and detailing the history of the earls of Orkney; and place-name evidence. This period in Orkney has been studied in detail and a general picture can be formed of Viking period Orkney from these studies.

The main Viking period settlements excavated in Orkney are: in the Birsay Bay area; the Brough of Birsay (HY22 NW1; Morris, C D 1989), Buckquoy (HY22 NW11; Ritchie, A 1977), Brough Road (HY22 NW14; Morris, C D 1989) and Saevar Howe (HY22 NW5; Hedges, J W 1983a); Skaill in Deerness (HY50 NE19; Buteux 1997) and Pool in Sanday (HY63 NW17; Hunter *et al* forth). Excavations show that the Viking settlers frequently built their homesteads on or near to Pictish settlement sites (as seen at Skaill, Pool and Brough of Birsay). These dwellings were longhouses in which accommodation for people and a byre for the animals were

integrated under one roof (Fig 49). The early houses were built in the main of stone and turf, roughly rectangular with the longer walls bowed. The living accommodation surrounded a long central hearth with the byre at the lower end of the building. At each of the sites there were also other smaller buildings associated with the dwelling house. It is likely that the house would have accommodated a single-family unit. The earliest Viking houses have been dated to the 9th century. The majority of Viking settlements have been recognised on sites close to the shore and as a result many sites, such as those in the Bay at Birsay, have been subject to coastal erosion and are thus incomplete. These coastal farmsteads were ideally situated to exploit the maximum number of resources while not encroaching on the best farmland, and are often to be found near good bays allowing ease of access and communication.

Birsay Bay is the main area of Viking settlement investigated in Orkney (Morris, C D 1989; 1996). It is probably not a coincidence that a large amount of archaeological material has been discovered in this area for it was the largest earldom estate and the seat of the first Norse bishopric in Orkney. The bay at Birsay was a Pictish settlement focus prior to the arrival of the Vikings (Ritchie, A 1977, 192; 1988, 5) and it was located on the route from Norway to the Irish Sea. The first documented reference to Birsay is in the *Orkneyinga Saga* where it states that Thorfinn 'lived usually in Birsay, and had Christ's Kirk built there' (Taylor 1938, 189). At the end of the Viking period the earldom of Orkney was a well-established power (Crawford 1987, 63). The achievements of Thorfinn the Mighty reveal the developments which had taken place within Orkney society in the 250 years since the first Vikings settled. His tour of Scandinavia, Germany and Rome and the papal approval of a bishop for Orkney, provide indications of the wealth and power he had created. That he 'turned his mind to the government of his land and people, and to the making of laws' (Taylor 1938, 189), further suggests he was attempting to develop governmental structures and, if correct, places him 'well in the forefront of 11th-century political development' (Crawford 1987, 80).

Skaill Bay in Sandwick, the location of part of the WHS, was evidently a focus of Viking activity and settlement. The place-name 'Skaill' comes from the Norse name *skali* which refers to a feasting hall for a military retinue (Thomson 2001). Furthermore, reference to the subdivision of Svein Asleifarson's great drinking hall by his sons in *Orkneyinga Saga*, chapter 108, is made by the 13th-century writers to symbolise the end of the period of Vikings in Orkney (Pálsson and Edwards 1981, 15). The name is thus likely to be a signifier of Viking activity. The original skali settlement in the bay at Skaill has not been identified, but there are other indications of a Viking presence here. One ubiquitous aspect of Viking society is the hoarding of precious metals in the ground, sometimes beneath settlements or perhaps related to prominent landscape features. There have been six hoards found in Orkney and three single finds. The hoards may have been deliberately placed in the ground to be recovered later and they could indicate a period of unrest or warfare when it was thought safer to hide portable wealth. From Skaill came a hoard (HY21 NW14) that is the largest Viking hoard yet to be discovered in Scotland. It was found in the 19th century in a rabbit burrow at the Castle of Snusgar (HY21 NW21), a large mound at the north end of the Bay of Skaill. It has been suggested that this hoard may represent 'the capital of the local chieftain who lived in this prime settlement location, buried by him … before setting out to increase his wealth on an expedition from which he never returned' (Graham-Campbell and Batey 1998, 246). Ongoing work by David Griffith of Oxford University at the Castle of Snusgar may shed light on this (Griffith 2003).

In recent years the increase in environmental analysis has allowed many new discoveries to be made concerning the

economy and environment of the Scandinavian people living in Orkney. From samples taken from the Birsay (Morris, C D 1989; 1996) and Pool (Hunter *et al* forth) excavations it has been possible to gain a better understanding of the resources exploited by these first Scandinavian settlers. It appears that these settlers had a mixed economy combining pastoral and arable farming, while also exploiting the seasonal wild resources of a variety of fish, shellfish and birds (Morris, C D 1989, 271). The livestock remains from the sites in Birsay reveal that cattle were predominant but there were also sheep, goat, pig, horse, fowl and domestic dog and cat present (Morris, C D 1989, 10). The animals were being slaughtered on site and at a young age that suggests that the majority of the animals were used for meat rather than for dairying or as a wool resource. At Saevar Howe and Pool cereals have also been found, the most predominant being six-row barley and cultivated oats. The discovery of small querns suggests that there was flour production on site while the Viking Age horizontal mill at the Earls Bu, Orphir suggests larger scale milling (Graham-Campbell and Batey 1998, 192-4). The introduction of flax in this period at most of the sites suggests that it was a crop brought in by the Scandinavians (Bond and Hunter 1987). Fish and marine resources were important in this period and the evidence from Birsay shows that gadids were the predominant fish species and limpets the most common shellfish (Morris, C D 1989, 8-9). Many varying species of wild bird were also being exploited.

Orkney has the largest number of pagan graves from any region within Scandinavian Scotland. There are a variety of forms of burial, including boat burials, such as Scar (HY64 NE7; Owen and Dalland 1999), large numbers of inhumations within cemeteries, eg Westness (HY32 NE7; Kaland 1993) and, more unusually, cremations. The most common form of pagan burial in Orkney was inhumation. Analysis of the many varied grave-goods found associated with the burials has provided an estimated date range from the middle of the 9th to the middle of the 10th century, with most burials centring around late 9th to early 10th (Graham-Campbell and Batey 1998, 154). The largest group of Viking graves yet discovered in Britain lay behind Pierowall, in Westray (HY44 NW13 and HY45 SW5). Raymond Lamb argues that their presence, read together with the *Orkneyinga Saga* designation of Pierowall as 'thorp', suggests the presence of a mercantile settlement (Lamb, R G 1993a, 82).

There is some archaeological evidence for two small chapels in use in Orkney by the mid-10th century, at Newark in Deerness (HY50 SE3) and at the Brough of Deerness (HY50 NE14; Barrett *et al* 2000b, 13-14). In addition to the archaeological evidence there is one documentary source which, if believed, is evidence for a Christian community within Orkney in the mid-9th century. The source is the *Vita Findani*, which describes St Findan being captured by Vikings in Ireland, escaping his captors in Orkney and being taken to a bishop who spoke his language (Thomson 1986, 279-80). This reference has been thought to relate to a monastic establishment in Papa Westray but the identification is by no means conclusive (Lowe 1998, 8-9). The most explicit piece of documentary evidence for Christianity in Orkney in this period comes again from the *Orkneyinga Saga*. In 995 Olaf Tryggvesson met with Earl Sigurd and said 'It is my will that thou have thyself baptized and all those under thee, else thou shalt die on the spot and I shall bear fire and flame through all the Isles' (Taylor 1938, 149). This date is taken to be the official conversion of the Norse in Orkney to Christianity and, along with the evidence outlined above, it seems likely that by the close of the 10th century there were several Christian foundations within the Islands.

It is important to realise the position of Orkney as a real power within the north of Scotland in the Viking Age and to be aware of the profound effect the Norse

settlement had on the Islands. This power can be illustrated in the far-reaching international connections between Orkney, Scandinavia and western Europe. This power would fade by the 13th century but the legacy of the Vikings continues even today.

The Viking period World Heritage Site and Inner Buffer Zones

There are at present no known Viking settlement sites in the IBZs, yet evidence is there for Viking period activity, represented by three burials and one deposit of silver rings. The silver rings were found 'in one of these hillocks near the circle of high stones' (Wallace 1700, 58) at some time earlier than 1700 (Graham-Campbell 1995, 95-6). Thomas (1852, 110) suggests they may have been found in Salt Knowe (HY21 SE14). The find consisted of nine silver plain penannular arm-rings, of the ring-money type, which have been dated within the 9th and 10th centuries (Graham-Campbell 1995, 95-6). Two burials discovered in 1930 during excavations at Skara Brae (HY21 NW12) were proposed by Childe (1931a, 58-9) as pre-Christian, possibly Viking, although they could equally be Iron Age in date (p 65). From the mound eroding to the west of Skara Brae, a 19th-century discovery of a burial (HY21 NW13) accompanied by a bone comb, comb case and other goods, has been dated typologically to the 9th century or later (Morris, C D *et al* 1985).

50. The Round Church, Orphir, part of a lordly estate complex

Orkney late Norse Period (1065-1231)

This period sees the further growth of the earldom as a power in the north. This power was at its peak during the rule of Earl Rognvald Kolsson, when the development of the medieval institutions of urbanisation and centralisation began to take place. The 12th century has been regarded as Orkney's Renaissance period and this is reflected in the quality of the buildings erected, as best exemplified by St Magnus Cathedral (HY41 SW10) in Kirkwall (Crawford (ed) 1988, 11). However, the period also saw the decline of the earldom and the end of the line of Norse earls. By 1240 the earldom had been much reduced and had lost its position of power in the north. The last earl of Orkney was murdered, his son drowned, and many of his relatives (consisting of many of the powerful chiefs in Orkney) drowned in a boat accident (Thomson 2001, 132-3). These events left a convenient blank in the power-base of Orkney and as a result the kings of Scotland and Norway were able to assert more influence upon the islands.

The *Orkneyinga Saga* portrays a hierarchical society in Orkney with the earl in control but reliant on a group of good-men for support. These men were often given earldom estates and in return supported the earl and possibly performed administrative functions within the earldom. There is no mention in the *Orkneyinga Saga* of farmers or tenants and only in 1492, the date of the earliest extant rental for Orkney, is it possible to get a clear understanding of the layout of the land in Orkney.

Archaeological evidence has much improved knowledge of the types of settlement within Orkney in the Late Norse period. The excavations at Skaill in Deerness (HY50 NE19; Buteux 1997) and at Tuquoy in Westray (HY44 SE5; Owen 1993) have both revealed relatively high status sites with large dwellings, most likely of a hall-house type construction, dating to the 12th century. Owen (*ibid*) suggests

that Tuquoy may also be compared with the more grandiose 12th-century Bishops' Palace in Kirkwall (HY41 SW12) and possibly the Wirk, Rousay (HY33 SE17). Tuquoy, Westray and Skaill, Deerness, both provide evidence of rich farm estates with large houses, outbuildings and associated churches, as does the Earls Bu in Orphir (Fig 50). The combination of residence, farm and church can also be seen in Wyre, in an agglomeration of fortified residence - Cobbie Roo's Castle, farm and church (HY42 NW4, 5). The excavations of a late Norse settlement at Westness in Rousay (HY32 NE17) revealed a pair of rectangular stone buildings which were built close together, gable end on to the sea and linked by a paved area or kloss. It seems that the one building was a dwelling and the second divided into two byres (Kaland 1993, 308-12). Nearby, and apparently of a similar date, was a naust (HY32 NE32) consisting of a large stone boathouse with a cleared landing area running ashore from a sheltered bay. This settlement may have been the predecessor to the Wirk, mentioned above. The farm mound situated at Beach View in Birsay (HY22 NW19) revealed a late Norse structure which had been modified and in-filled with midden, along with a possible separate byre and a building with a corn drying kiln dating to the 12th or 13th century. This is extremely important in that it is the earliest corn kiln in Orkney (Graham-Campbell and Batey 1998, 190-91). The buildings outlined above exemplify the increasing wealth of the local chiefs and the range of functions performed at their homesteads.

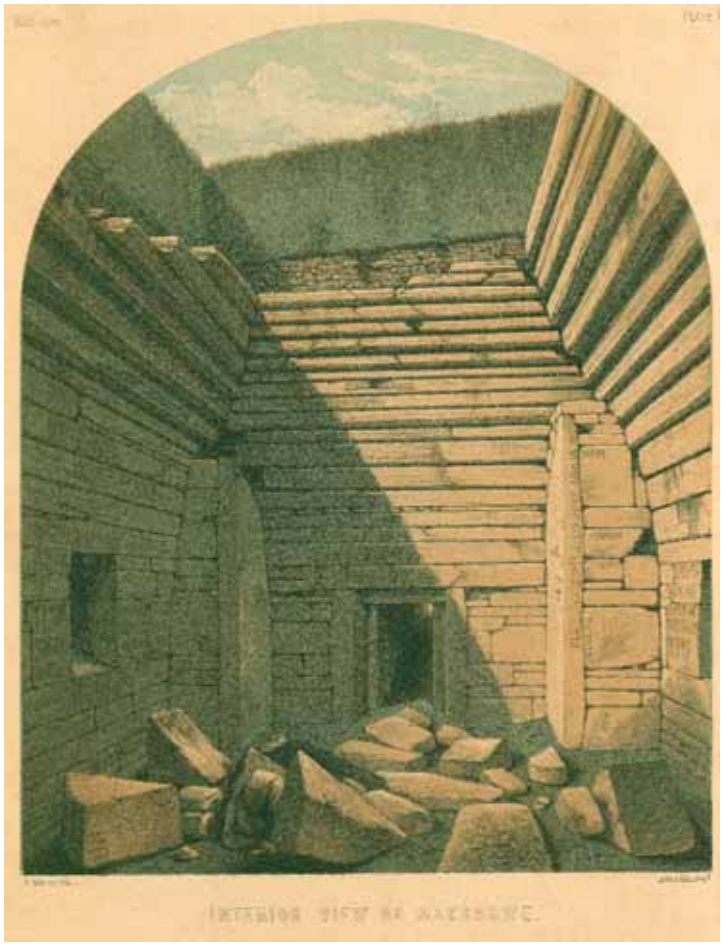
The growth and development of the town of Kirkwall is also evident during this period. Kirkwall held one of the earls' residences as early as 1046 (Taylor 1938, 183). In *c*1136 St Magnus's relics were translated from Birsay to the market town of Kirkwall (Taylor 1938, 221), followed in 1137 by the foundation of St Magnus Cathedral. Consequently the bishop's seat moved from the rural centre of Birsay to the developing town. The deliberate move to Kirkwall by Earl Rognvald established the town as the secular and ecclesiastical centre of Orkney, and it is from this period onwards that Kirkwall becomes the focus of activity. Both the earls and the bishops (Lamb, R G 1993a, 46) would have encouraged the development of the market. The refinement and collection of taxes based on the land may also have been started soon after the move to Kirkwall (Thomson 2001, 219), in conjunction with the re-organisation of the church. Saint Magnus and the cathedral indicate the status of Orkney in the 12th century and suggest a sentiment of national identity. The fact that the earl and the bishop both went on crusade in *c*1150 also indicates the power of both secular and ecclesiastical government (Taylor 1938, 281).

The position and the influence of the church changed significantly within this period. In 1065 the first bishop's seat was erected in Birsay and the 'magnificent church' (Taylor, 1938, 189) was either located on the Brough of Birsay or under the present parish church in Birsay (HY22 NW8). There were already small private chapels in use in the islands and throughout the 11th and 12th centuries these chapels appear to have increased greatly in number. It is possible that there was some form of pre-parochial system in place, although there has been little research into this area (Lamb, R G 1997, 16). It is probable that, after the cathedral had been consecrated, the church was reorganised and centralised and the parochial system put in place. The church lands increased greatly in this period, through endowments and also probably through the establishment of tithe payments (Thomson 2001, 252).

Defining the exact location and status and date of churches and of the very many chapels is not easy and will rely largely on archaeological evidence. For instance, recent accidental discovery of a medieval cemetery at and below parts of Skaill House, Sandwick, with burials ^{14}C-dated to between the 11th and 14th centuries (HY21 NW40; James 1999), reinforces Clouston's suggestion (Clouston 1918a) of

a chapel at this location. This may indicate an earlier focus of settlement at this end of the bay, the opposite end of the bay from the present day church of St Peter (HY21 NW26).

The economy in this period was similar to that of the Viking period, with samples again showing evidence of a mixed pastoral and arable economy and a continued exploitation of wild resources. However, a new development in the Late Norse period was the intensification of fish processing. Excavations at St Boniface in Papa Westray (HY45 SE26; Lowe 1998, 152-5), and Quoygrew in Westray (HY45 SW7), provide evidence of this intensification of fish production, but the increase is not matched by an apparent increased intake of fish in the diet of the locals thus suggesting that these fish were being exported (Barrett *et al* 2000b, 17, 19). These fish processing sites are related to a particular type of Iron Age/medieval settlement focus known as a farm mound. This type of site is also found in Scandinavia and is formed of an accumulation of organic settlement material (Lowe 1998, 9-10). Evidence for the import of wood was discovered in a waterlogged deposit at Tuquoy that contained pine, maple, larch and spruce. There is also evidence for the import of antler combs from Norway as found at Brough of Birsay, Beachview and Orphir (Graham-Campbell and Batey 1998, 223).



51. Early view of the interior of Maeshowe showing the Norse runes (Farrer 1862, Pl II) Crown Copyright: RCAHMS.

The late Norse period World Heritage Site and Inner Buffer Zones

The Late Norse period in the IBZs is represented entirely by runic inscriptions, which include four inscribed stones in addition to the magnificent collection in the Neolithic chambered tomb of Maeshowe (HY31 SW1) (Fig 51). This is the greatest collection of runic inscriptions outside Scandinavia: approximately 33 inscriptions and eight carvings which date from the 12th century (1125-75). For a detailed analysis and bibliography of these runes see Barnes 1994. The Brodgar rune stone (HY31 SW3) was found in a field-dyke on the farm and is now held by the National Museums of Scotland (RCAHMS 1946, 319). A stone found on the south side of the Stenness Loch with two twig runes inscribed is also now held in the National Museums of Scotland (RCAHMS 1946, 319). A twig rune and a small incised cross were discovered on an extant stump of one of the stones in the Ring of Brodgar (HY21 SE1) during restoration work (Ritchie, A 1996, 136-7). However, Barnes and Page (forth) have expressed some doubt as to the authenticity of these. The final runic inscribed stone was found at Skara Brae in 1982 and had been used face down as a paving slab for 19 years (HY21 NW12.01). This stone now resides in the Orkney Museum. It is thought that the stone weathered out of the site in 1963. It bears three twig runes and three poorly formed futhark (Ashmore and Johnsen 1984).

Late medieval Orkney (1231-1615)

There is a wealth of source material for this period and the Stewart earls especially have been well researched. The increase in

evidence from historical documentation is matched by a reduction in that from archaeological investigation. For this reason the majority of the evidence presented in this section comes from historical sources.

The political scene at the start of this period is confused and poorly documented due to the problems of various parties competing for the earldom of Orkney. After a period of disruption, the Angus earls were given the earldom, followed by the Strathearns and the Sinclairs. Several of the Sinclair family moved to Orkney and granted land to their kin, thus there was a modest influx of Scottish gentry. This was the first major stage of Scottish movement into Orkney after the end of the Norse line of earls. In 1468 the islands of Orkney were passed to the Scottish crown as a mortgage for the dowry of Margaret of Denmark. This was not an unexpected occurrence, since changes in the internal politics of Scandinavia meant that Orkney was politically and economically closer to Scotland. The transfer of ownership probably had little effect on those residing in Orkney as Scottish influence was already growing and few changes were made initially to the way in which the islands were governed. In 1470 the King of Scotland bought the earldom of Orkney from William Sinclair and annexed it to the crown, leasing it as tacks (short-term leases) until it was granted to Robert Stewart in 1565.

The Sinclairs remained in Orkney after 1468 and, although they no longer held the title of earl, they retained a large amount of land. There were several branches of the Sinclair family in the north of Scotland and much internal feuding occurred. This feuding culminated in the Battle of Summerdale (HY31 SW14), in 1529, when the Orkney Sinclair family met Earl Sinclair of Caithness at Summerdale in Stenness and where the Orkney branch was victorious (Thomson 2001, 233-46). After the battle there was continued unrest which led to James V travelling to Orkney in 1540. His return to Scotland was followed by an act of Parliament uniting Orkney permanently to the Crown and installing a new tacksman. The Sinclairs remained a powerful family in Orkney until the Reformation.

Robert Stewart was granted the earldom, the castle of Kirkwall and the position of Sheriff by the King in 1565. The Stewart rule has been widely documented and is generally regarded as corrupt and aggressive in the extreme (Anderson 1982; 1992). Robert ensured his position by obtaining the bishopric lands of Orkney from Bishop Adam Bothwell and by the ruthless taking of all common land and all newly settled land. When Patrick, Robert's son, became earl he immediately demonstrated his violent and aggressive character (Thomson 2001, 277-8). His extravagant lifestyle was paid for by the rents collected from the islands but this could not meet the cost of his lavish building programme. In 1606 James VI restored the episcopate in Scotland and as a result Bishop Law was appointed to Orkney and given the bishopric lands. Patrick did not want to share power within the islands and eventually this led to his downfall when, in 1615, he was beheaded and his son Robert was hanged for treason.

From the 13th century Scotland had had an increasing influence on the Orkney bishopric and, despite Norwegian attempts to counteract Scottish infiltration in the 1300s, by the 15th century all the clergy in Orkney were Scottish and the Scottish calendar was in use (Thomson 2001, 153-4). In 1472, as a result of the impignoration (pledging of Orkney to Scotland), the bishopric of Orkney was placed under the jurisdiction of St Andrews (*ibid*, 220). The main change in the church, however, took place as a result of the Reformation. Unlike many parts of Scotland, the transition within Orkney was quite smooth, mainly due to the actions of Bishop Adam Bothwell (*ibid*, 247). A most important change for Orkney resulting from the Reformation was not religious; rather it was a change in land ownership. Bothwell created large feudal estates out of the bishopric lands and feued them to his

family, which was the first instance of large-scale feuing in Orkney. This resulted in the introduction of alien gentry who overshadowed the local gentry in terms of estate size and, as a result, the power base changed dramatically. In the years 1614 and 1615 Bishop Law created a further fourteen feus from the bishopric lands and these were also given to Lowland Scottish gentry (*ibid*, 304). It was Bishop Law who helped to bring about the downfall of Patrick Stewart, and a part of this action resulted in the abolition of Norse law in Orkney. Bishop Law also reorganised the earldom and bishopric land in Orkney, reassigning and consolidating hitherto interspersed strips of earldom and bishopric land into more coherent blocks within the parish system. One parish that was changed to hold only bishopric land and udal land was Sandwick (*ibid*, 298). This made the collection of taxes much easier for the king and for the bishop.

There was a Europe-wide deterioration in climatic conditions after 1300, resulting in a decline in farming and a decrease in population (Thomson 2001, 169). The situation in Orkney was worsened by plague in 1349. In the 1492 Rental much of Orkney's land was tenantless and uncultivated, reflecting the seriousness of the decline. After the low point of the 1460s the economy slowly began to recover, although any profits from the land were exacted in taxes. The trading connections with the north had been depleted considerably, due to the growth of power of the Hanseatic League in Norway and the movement of the Crown to Denmark (*ibid*, 190-91). However, grain was still exported and timber imported. The Stewart earls, in their turn, placed severe restriction on trade and ferry traffic (Anderson 1982, 142), ensuring any dues or fines went to the earldom, including the right to shipwrecked cargo.

This period saw the reduction in political power of the earldom of Orkney from that of a semi-independent and highly influential part of the Scandinavian kingdom to that of the administration of a peripheral and poverty-stricken Scottish island group. While a degree of island identity was maintained, as can be seen with the Sinclairs' swift adoption into Orkney society, the increasing political and trade connections with Scotland eventually affected all aspects of Orkney life. The change of language from Norn - a form of Scandinavian language spoken in Orkney at the start of this period - to the stable and complete adoption of Scots by end of the 18th century (see Barnes 1998) marks the progress of Scottification which had started with the Sinclairs. The economic deterioration was in part due to misrule but also to climatic deterioration and changing external political circumstances. The population was able to continue to pay their rents and skat (land tax) even through the rule of the Stewart earls, but even this was to change in the following decade.

The late medieval World Heritage Site and Inner Buffer Zones

Three sites which may belong to this period are to be found within the Stenness IBZ: an earthwork which may be a parish boundary marker; the church; and a high status dwelling.

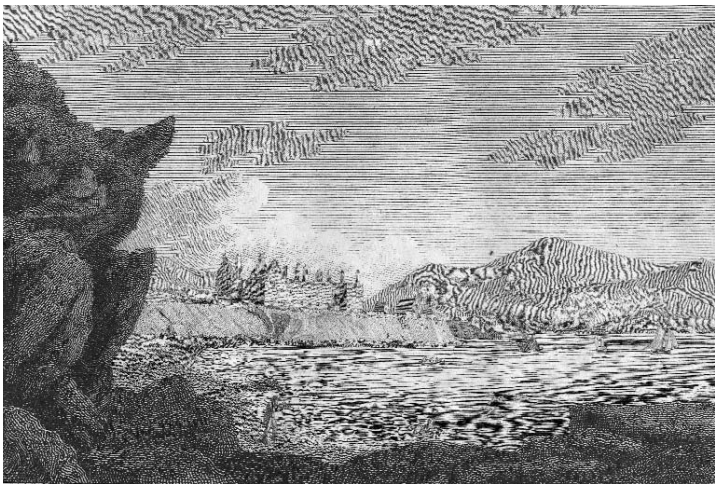
The Dyke of Sean (HY21 SE68), an earthwork which may be medieval (Lamb R G pers comm) extends from the shore of the Loch of Stenness to near the modern shoreline of the Loch of Harray. It almost coincides with the modern parish boundary between Stenness and Sandwick. The location of the parish boundary is surprising in that the natural boundary at the Bridge of Brodgar would seem a more natural division. There is no information concerning the Dyke of Sean itself, although there is an interesting tradition that may be connected to it. The tradition concerns a 'Lady of Brodgar' who (in addition to moving into the church just before her death, presumably to establish her right to burial there) donated lands, including the lands of Brodgar, to the church of Stenness on the condition that she be buried in the Stenness church. Peter Leith (1937) discusses the correlation between the tradition and historical documentation and suggests that

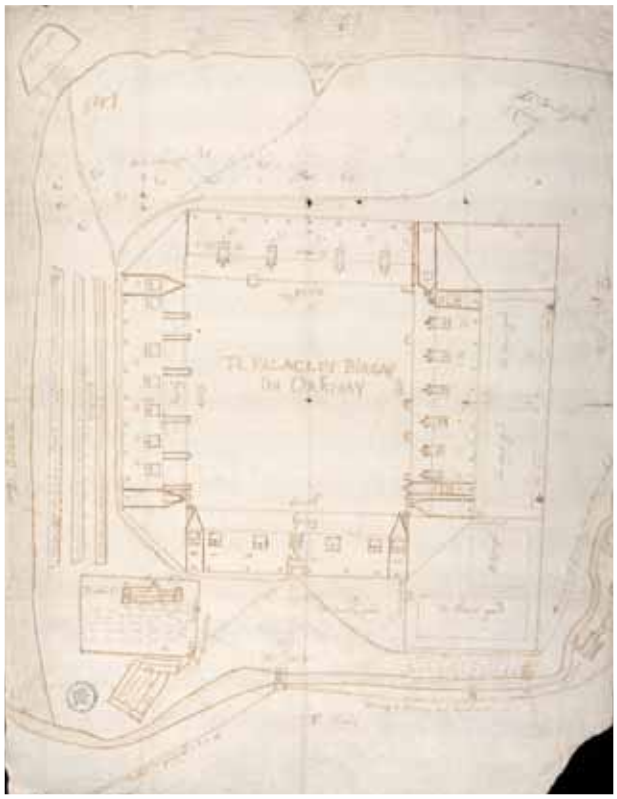
the boundary of the Dyke of Sean might have been built to mark the establishment of the parish boundary incorporating the lands of the donation. As noted above, however, the origins of this earthwork may date back to the prehistoric period.

The present parish church of Stenness (HY31 SW19), which is still in use, has been rebuilt on the same site on at least three occasions. A sketch of the church is recorded in Aberdeen's drawing of 1784, published in Low (1879). The church was originally dedicated to the Holy Cross, and is not reliably dated, but it may have a Late Norse foundation. The arguments for this are based on descriptions of the foundations being clay-bonded (evidenced by Pococke 1887, 144) and on its tower or steeple, which was built on the west end and is comparable to two other towered churches in Orkney thought to be of this date. Limited excavations made by Clouston in 1928 confirmed the existence of the semi-circular tower or steeple (which demonstrated deficiencies in some respects in Aberdeen's sketch) and which was based upon rectangular foundations. Clouston also identified two subsequent re-builds which widened the original church, which he estimates as being 'approximately 23ft wide, with the tower on the middle of the gable of the church' (Clouston 1929, 69). Whatever the many uncertainties relating to the precise dating of the phases of the church on this site, the existence for a pre-Reformation church here seems certain. Weight is added to this by the evidence of a 'Roman Catholic priest's gravestone' which once existed in the graveyard and bronze buckles, thought to be 14th-century, that were found in a grave within the church (Fraser, J 1926, 22).

52. The Earl's Palace at Birsay, built c1574 (Barry 1805)

53. Detailed 17th-century plan of the Earl's Palace at Birsay
National Archives of Scotland, RHP35836.





There is a tradition of a large mansion house called the Palace of Stenness which had its own water source piped up from the loch and was so tall that the ships coming into Stromness could be seen from the top storey. Leith adduces arguments that this was the high status building sold in 1563 to the Bellendens, along with the land which was later referred to as 'the manse' (Leith, P 1937, 41-4). An annotation on Thomas's map of 1849 locates this building to the south-east of the kirkyard and states that the foundations are still perceptible. There is no longer any sign of the building.

Post-medieval Orkney (1615–1840)

There were many changes within the islands in the period from the end of the Stewarts to the 1840s. The start of the period is marked by famine and severe poverty, which is followed by a slow improvement in conditions in the 18th century. This improvement accelerated with the growth in kelp and linen manufacture and the fishing industry. As a

54. Kelp making near Stromness
Thomas Kent, © Orkney Archives.

result of this growth the lairds and the tenants became wealthier. During the 18th century there were a few attempts at agricultural improvement, although the majority of investment was made in kelp and linen production. This period of economic success dwindled in the 1830s with the kelp and linen industries in decline and as a result many landowners were faced with large debts.

The Stewart earls were the last earls to try to create a power base from their lands in Orkney (Figs 52 and 53; Thomson 2001, 395). All earls and tacksmen after the Stewarts held substantial estates elsewhere and were thus less interested in improving Orkney's condition; their main concern was to collect rent. This created resentment within the islands as well as poverty; there was little connection between those exacting the taxes and those paying them (Thomson 2001, 395).

The first decades of the 17th century were particularly difficult for the working population of Orkney. Extremely poor weather conditions, combined with high taxation, led to the exhaustion of both the land and the people. The situation was further compounded by the continued use of the medieval agricultural system of runrig. This system involved the division of each township into equal rigs (strips) of land that limited the crops that could be grown and the yields obtained. Between 3,000 and 4,000 people are estimated to have died in the islands as a result of the climatic deterioration in the 1620s and 1630s, with land also going out of cultivation and the number of beggars increasing dramatically. In 1629, after a decade of famine, plague came to Orkney and, as a precautionary measure to prevent the spread of the disease, all trade was stopped. Further famine in the early 1630s brought the islands to a standstill and yet taxes were still demanded, and sent, to the Crown. Famine returned at the close of the century when again many people died and land again ceased to be cultivated (Thomson 2001, 307-9). Due to these circumstances, the land systems in Orkney changed very little, with land going out of use rather than being brought into use.

Conditions improved dramatically for the population from the 1720s with the development of the kelp (Thomson 1983) and linen industries, which provided extra income for the tenants. The deep-sea fishing industry also developed in the 1700s, along with the Hudson's Bay Company and the whaling ships, both of which required labourers to work in northern climes. New technological advances enabled longer trips at sea and thus increased the demand for labour abroad, so there was a shortage of male labour in the islands during parts of the year. The linen and kelp industries provided work for the women of the islands, and so both men and women became slightly more prosperous. Extensive archaeological evidence for the kelp industry remains in the form of shallow, stone-lined pits along the coast of Orkney (Fig 54) while, in contrast, the linen industry is archaeologically almost invisible.

However, the 1830s saw the collapse of the linen and kelp industries in Orkney as both products could be obtained more cheaply elsewhere. Kelp continued to be produced but never reached the same prices again. Straw plaiting was begun in Orkney in the early 1800s but it too was in decline by the 1830s. The Hudson's Bay Company merged with the North West Company in 1821 and no longer employed as many Orcadians. There were several bad fishing years in the 1830s as well, which affected the cod fishing and lobster exports. Orkney

55. Skaill House, Sandwick

was again in a low economic period and many of the lairds who had invested heavily in kelp and linen were faced with large debts. As a result of the end of the 18th-century boom there was a large unemployed labour force in the islands. The lairds needed money and this combined with a large available labour force and the growth of communications to bring about the start of the farming revolution of the 19th century.

From the 17th century the lairds had increasing power and wealth which they expressed in the erection of small mansion houses. These were either newly built or renovated older properties; examples include Breckness House, Stromness (HY20 NW5); the Hall of Tankerness (HY50 NW81); Langskaill in Gairsay (HY42 SW8); and Skaill House in Sandwick (HY21 NW17). Skaill House provides a good example of the way in which a small mansion house and estate grew and developed in this period (Fig 55). The oldest surviving part of Skaill House was built by 1628; the central wing was then built by George Graham who enlarged the mansion house at Skaill between 1615 and 1643. In 1670 the house was modernised and a walled garden was constructed in the 18th century. William Watt (1787-1810) of Skaill House extended the estate and modernised the home farm, as well as experimenting with kelp production, sea fishing and quarrying. William Graham Watt (1810-1866) abolished run-rig on the estate and enclosed the commons. There was a flax mill and a dovecote on the estate (Irving 1997). Several of these lairds' properties were laid waste when they were burned as a punishment for Jacobean sympathies after the 1745 uprising, including Trenaby in Westray and Sound in Shapinsay; others survived, and those lairds who came through the Jacobite repercussions saw an increase in wealth due to the increase in local industry. They thrived from kelp and linen profits in the early 19th century.

The small lairds and the ministers were bent on improving physical and moral conditions within the islands. As a result some attempts were made at agricultural improvements by the lairds, such as the introduction of new crops (potatoes), the enclosure of some areas and some expansion into the commons. In Birsay there was an early attempt at 'planking' *c*1748, a system where the land was divided into equal value units. By the late 1700s much of Orkney's farmland had been divided into 'planks' of approximately one Scots acre. However, several farmers often shared these planks and they were further divided up into rigs, so the run-rig system continued to be used, although to a lesser extent (Thomson 2001, 333-5). Many of the ministers encouraged education and were often found teaching and helping the poor. During the 18th century many churches were rebuilt, some with laird's aisles, reflecting the close relationship between church and secular authority. As mentioned above, the decline in the local industries in the later 19th century affected the lairds badly and put many into major debt and, as a result, the estate land became the focus of attention.

The post-medieval World Heritage Site and Inner Buffer Zones

The Stenness area was not one of the parts of Orkney where early improvements were attempted and so would have been tenanted out and farmed using the run-rig system. Captain Thomas's map of 1849 (cover; Thomas 1852) gives an overview of farms, field systems and types of land cover in relationship to the major monuments of the Brodgar area. This cartographic evidence has recently been augmented by the results of the WHAGP. This survey has revealed surviving

evidence for post-medieval field systems between the Stones of Stenness and the Barnhouse Stone (GSB 2002; 2003b).

Modern Orkney (1840-1945)

There were a number of events which led to the introduction of widespread large-scale agricultural improvements in Orkney around 1840. The main occurrences were the collapse of the boom economy of 1770-1830, the steady population increase and the increase in communications. The landlords of this time have had a major influence on the development of today's landscape. Agricultural improvement methods were widely known and, because of the increased number of available labourers, it was possible to concentrate on the improvement of the land. The first action taken was the division of the commons; this took place from the early 1800s and was complete by 1860 (Bailey 1971, 120). Labourers were employed to drain and enclose the land and slowly a new landscape of large square fields was created. As noted by George Petrie in a letter to Daniel Wilson in 1849, these improvements had a drastic effect on many archaeological sites. Probably hundreds of sites were removed 'without any attention being given to preserve a record of their construction and contents' (Wilson Collection MS). As part of this squaring system the cottars were relocated by their landlords; an early example resulted in the building of the estate village at Shoreside in Shapinsay *c*1780 to house the cottars and tenants of Thomas Balfour's estate (Thomson 2001, 339, 386). This estate was later completely squared under David Balfour, who imposed a grid of 10-acre fields across almost the whole island. This system replaced Thomas's earlier attempts at squaring and the acreage of arable land in Shapinsay increased from 748 acres to 2248 (Thomson 2001, 386). In Eday, by contrast, the laird's primary interest in the land was as a shooting estate, which led to much of the land being left under heather. The marked contrast between Shapinsay and Eday today exemplifies the landscape legacy left by the 19th-century lairds. Clearances did not occur to any great extent in Orkney, with the notable exception of Rousay, where the entire tunship of Quandale has been left as a fossilised pre-Improvement landscape under a sheep-run. Although the improvements must have been difficult for many of the tenants and cottars, and in many areas the numbers of tiny and ultimately unsustainable settlements of the poor now mark the landscape with their ruins, the long-term effects were fundamental to Orkney's establishment as a leading agricultural area.

56. Fishing station, Stromness
Thomas Kent, © Orkney Archives.

The agricultural expansion was contemporary with the significant development of the herring industry, which not only employed many locals for the short 12-week fishing season but also dramatically increased the population of Orkney during those weeks. Stronsay, Stromness (Fig 56) and St Margaret's Hope were the main settlements to benefit directly from the herring industry, and the villages of St Mary's, St Margaret's Hope, Burray and Herston were all created as a result of the herring industry. Even after 1918 there were 300 drifters and a population increase of 4,000 in Stronsay during the fishing season (Thomson 2001, 369).

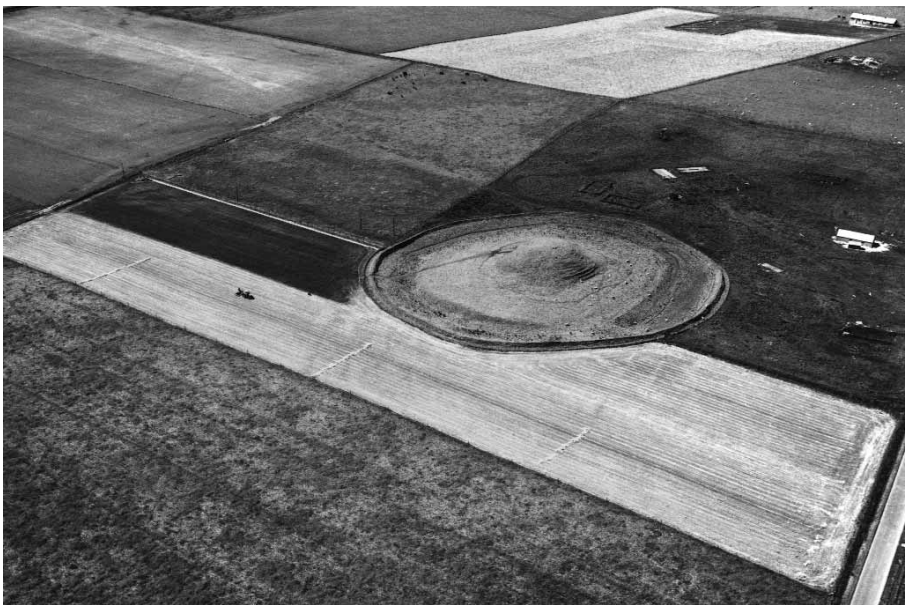
The mid-19th century was a time of development and widening horizons. The newly created land system produced better yields and allowed a larger variety of crops to be grown. Cattle exports from Orkney increased greatly in the period 1846-75 and the egg industry also developed and expanded vastly, in part due to the

57. Scapa seaplane station
Thomas Kent, © Orkney Archives.

establishment of a regular steamboat service to the islands which allowed for easy export. The greater yields resulted in the investment in new machinery and larger farm buildings, not to mention larger profits. The infrastructure on Mainland Orkney was also improved with the building of roads and the establishment of a regular post coach and travelling shops (Bailey 1971, 123). Tourists came to Orkney attracted by the idea of a remote retreat (as described by Sir Walter Scott) although, ironically, it was the development of transport which both allowed them to arrive in relative ease and, at the same time, diminished the very isolation which they came to seek. This was also the period when antiquarianism began (pp 40-46; Wickham-Jones 1998, 181) as landlords investigated the archaeological remains on their land. These explorations were often destructive, although it was during this period that Watt of Skaill discovered Skara Brae and Farrer opened Maeshowe.

By the 1880s the agricultural and fishing boom had ended and, as a result, many landowners were again left in debt. A decrease in population after 1861 meant there was a labour shortage and servants could therefore demand better conditions. As a result of this the social balance was greatly altered and the days of the dominance of the laird and minister were coming to an end. The economy did not deteriorate to any great extent but remained static until 1919 when the knock-on effects were felt after the First World War (WWI). The Orkney lairds had been affected by the Crofters' Commission and the rights to compensation that had resulted in the fossilisation of rents at low rates. This, combined with the increases in taxes in the early 1900s, led to the majority of the large estates being divided and sold after 1919 (Thomson 2001, 416-20). The sitting tenants, who had benefited both from the low rents and the increased sales of produce due to war shortages, were now able to buy the land from the lairds. This created a new class of owner-occupiers in Orkney and, while the rest of the country was in economic decline, the farming population of Orkney maintained itself through the export of eggs and beef, and improved rotation of crops.

War, itself, had a marked effect on the islands (Fig 57). In WWI the importance of Scapa Flow as a naval defence was second to none. As a result there was a great increase in the population with the arrival of large numbers of troops. However, the majority of the armed forces was based on ships and seldom came ashore (Brown and Meehan 1968, 58-68). Nonetheless, there were several bases located in the islands, including two in Stenness: the Standing Stones Hotel (HY31 SW107) was commandeered for the headquarters of the Houton Bay Air Station, while the Loch of Stenness was used as a seaplane base (HY31 SW71) with a subsidiary airstation located at Gernaness, a peninsula on the west side of the loch (Hewison 1995, 28; 2000, 113). The main effect of the rise in population was the increased demand for food which led to increased profits for the local farmers. In WWII there was a land-based garrison of *c*60,000 stationed in Orkney and this had a dramatic effect on the landscape and the people (Bailey 1971, 134). There were many camps and bases built in the islands and soldiers were to be seen everywhere. The Churchill Barriers, built by prisoners of war, permanently linked the islands of Burray and South Ronaldsay to the Mainland. The effect of such a great increase of population led to



58. Aerial photograph of Maeshowe in 1965 showing the remains of some WWII buildings in the immediate vicinity
Crown Copyright: RCAHMS: John Dewar Collection.

59. Military training at the Ring of Brodgar during WWII
By permission Imperial War Museum.

the improvement of the infrastructure in the islands which had remained unaltered from the agricultural expansion period of the previous century. By the 1940s most of the owner-occupiers had paid off their loans and were secure in their own farms due to the profits made supplying food to the increased population from 1914-18 and 1939-45. In addition, the scuttling of the German High Seas Fleet in Scapa Flow in 1919 has left Orkney with an unparalleled underwater archaeological heritage resource; recreational diving is currently a mainstay of the Stromness economy (Oxley 2002, 865).

The period of agricultural improvement from 1840 to 1880 completely recreated the landscape of Orkney and, by introducing a better system of agriculture, enabled the islanders to increase their wealth and to eventually buy their own farms. It is perhaps ironic that the landowners who advanced the farming system were those who benefited the least. The World Wars, although resulting in many losses and tragedies, brought the outside world into closer contact with Orkney and, both at the time and subsequently, greatly increased the wealth of the farmers. As a result of the significance of Scapa Flow, the population who remained in the islands benefited when they might otherwise have experienced economic decline.

The modern period World Heritage Site and Inner Buffer Zones

The perspective of the landscape of today is dominated by the changes that took place over this period. The dividing of the commons and the squaring of land affected the Stenness area, especially at the south end of the Loch of Harray where the better farming land is located. The beginnings of antiquarianism in the mid to late 1800s resulted in the investigation of Skara Brae by the laird of the Skaill estate, and the opening of Maeshowe. The 19th-century meal mill at Tormiston (HY31 SW60), which is now used as a visitor centre for Maeshowe, is an excellent example of a prosperous three-storey mill with overshot wheel, examples of which can be found widely in Orkney. WWII had an effect on the IBZ in Stenness. There was an army camp at Tormiston which was sited adjacent to Maeshowe (Fig 58), destroying several prehistoric burial mounds in the process (HY31 SW21), and which used the Brodgar peninsula as a training area (Fig 59), along with the small holms in the loch of Harray and much of the non-arable land in the surrounding area (Hewison 2000, Appendix II; Leith, P K I 1997, 42-3). There was also a searchlight station, forming part of the defences of Scapa Flow during WWII, located next to the present Buckan Cottage (HY 285 144) and a seaplane base at Gernaness (HY31 SW71) in the Stenness Loch. It was during this period that the monuments of the WHS came into State care (Stones of Stenness and Ring of Brodgar in 1906; Maeshowe in 1910 and Skara Brae in 1924).

PART 3

Research themes

Artefacts, monuments and cultural identity

Siân Jones, Colin Richards and Artefacts, Monuments and Cultural Identity Group

Identity, as an expression of human behaviour, is central to the status and integrity of The Heart of Neolithic Orkney WHS and this is articulated through the artefacts, of which one element comprises the monuments. For this reason 'Artefacts, Monuments and Cultural Identity' is seen as an overarching theme of central importance to this document. The importance of artefacts and identity is clearly evident in the nomination document (Historic Scotland 1998), which sees the shared artefact types and architectural features of this group of monuments as the product of a single coherent cultural tradition associated with a single people. For the most part this interpretation is based on long-standing artefact and architectural typologies. For instance, it is argued that '…the layout of the early houses at Skara Brae is reminiscent of the chamber plan at Maeshowe' and 'Barnhouse settlement in the buffer zone near Stenness and Maeshowe contains similar carving, and was built by people who used the same kind of pottery and other artefacts as those at the earliest excavated village at Skara Brae' (*ibid*, 7). This might suggest that we know a great deal about these areas, or at least that our framework of knowledge is well established and all that is required is the identification of further empirical research areas, but it is not so.

As in all areas of archaeological enquiry the study of artefacts and cultural identity is far from static so that this research agenda cannot merely advocate the ongoing collection and taxonomic classification of artefacts within established typologies. Indeed, the problems created by a simple taxonomic approach, which treats objects as isolated categories and extracts them from their physical contexts, life histories and relationships with each other, need to be explored and overcome. All new projects require the critical examination of existing categories and the assumptions associated with them, eg culture and identity, ritual and domestic, Grooved Ware and Unstan Ware pottery (Fig 60).

60. Grooved Ware pottery from Stenness

The static objectification of artefacts and monuments can best be avoided by adopting a biographical, or cognitive, approach. Objects, like people, have social lives, they relate to other objects and these relationships change as they move through both time and space. Any study should include research on these relationships: on manufacture, durability, refashioning over time and ultimate deposition; and on the social practices in which they are embedded (see Appadurai 1986; Ingold 2000; Jones, A 1997; Jones, S 1997; Mackenzie 1991).

The landscape within which the artefacts and monuments of the WHS exist provides not only an essential framing device within which to study their complex life histories but it may also be one of the main driving forces behind their creation. In this respect, the experiential landscape is of equal importance to the physical. The natural world of the past - terrestrial, celestial and maritime - was observed and experienced in many different ways and for many different reasons, just like the world of today: the eye of the farmer may perceive a fertile agricultural landscape where the eye of the tourist perceives a picturesque photograph to show the neighbours. It is important to recognise this and take account of the ways in which landscape change through time has been articulated, recorded and interpreted, for this has played an important rôle in establishing and perpetuating the cultural identities of the societies with whom we are concerned.

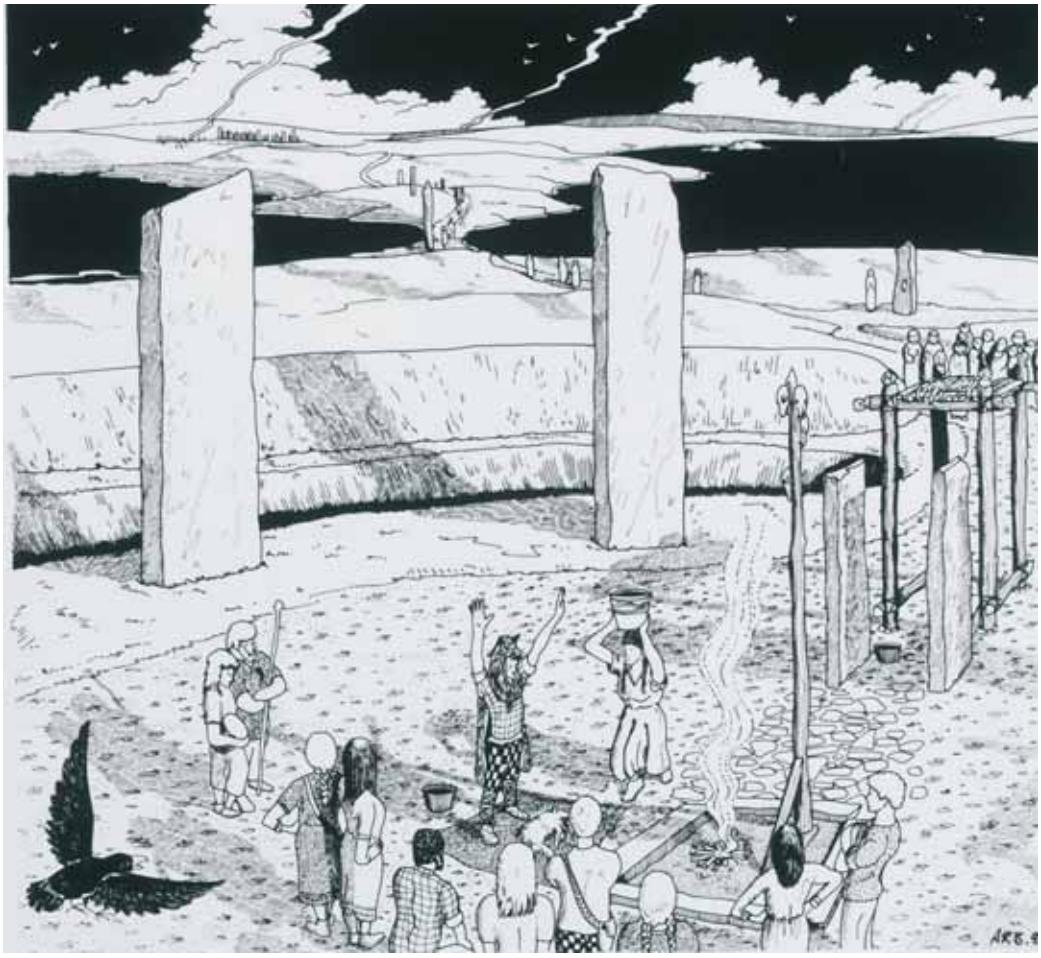
To do this involves the conception of landscape as a tapestry or woven fabric (see Ingold 2000) into which artefacts, monuments, people and resources are interwoven. Importantly, this tapestry is never static as human (and natural) activity ensures that components are constantly reworked or 'darned' over time.

Taking these overarching arguments as a starting point, four specific themes of research (below) have been identified which draw together information on the nature of the materials, their changing place in society both past and present, and their potential for adding to present knowledge of the WHS. The remit for the research covers both the WHS and related sites as well as artefacts in their broader spatial and temporal contexts. In this way specific research projects can be placed within broader regional and comparative frameworks in order to provide the WHS with meaning in the wider world. These themes crosscut many of the traditional specialisations into which the study of the past has been divided, such as artefact analysis, oral history, or monument typology. Such divisions are increasingly found to pose problems for the construction of archaeological interpretation. At this point it is important to remember that, as with the definition of landscape, there is no universal archaeological 'truth': new studies and new work on old studies will constantly come up with individual interpretations. This is a factor that must be taken into account in the presentation and management of the WHS (discussed above, Part 1).

The materialisation of memory and identity

This theme focuses on the artefacts and monuments associated with the WHS and its buffer zones, it considers their biographies and their subsequent rôles in the production of memory and identity in the past. Although the temptation is to stress the Neolithic, this research theme encompasses the entire social lives of these artefacts and monuments (ie across all periods, in order to examine the ways in which they are reconceptualised, reused and refashioned).

This research theme can be divided between artefacts and monuments. It considers their production as well as their life-histories. Artefacts are traditionally regarded as the portable elements of life and this theme is interested in circulation and movement, as well as deposition, in order to explore their rôle in the creation of relationships and identities. Monuments, on the other hand, are less mobile, though they can be changed in



61. Artist's reconstruction of a ceremony at the Stones of Stenness. This was just one phase in the monument's use
Drawing by Alan Brady, © Crown Copyright reproduced courtesy of Historic Scotland.

structure and design. As such, it is the durability of the monuments, their various architectural forms and their changing rôles, that are of concern in order to consider their place in the creation of memory, tradition and identity.

Extensive research has been carried out on Orcadian monuments and artefacts throughout the 20th century (eg Renfrew 1979; Childe 1930; MacSween 1992), but very little of this has focused specifically on the social lives of artefacts and monuments and their rôle in the production of memory and identity. A number of studies of this kind have emerged over the last few years (see Hingley 1999; Jones, A 2002; Richards 1993a; 1996a; 2004), but for the most part it concentrates almost entirely on the Neolithic which, as we have seen, does not fully explain the WHS as we see it today and it is very uneven in the facets covered. In artefact studies, this kind of research often involves the application of specialised techniques such as petrological analysis and residue analysis, which have been carried out on assemblages from some sites but not others.

Currently, within the WHS this theme of research has centred on the late Neolithic period and has been restricted to ceramic analysis and social practices within the Barnhouse village. This study, though limited, gives a good idea of the potential awaiting, should research like this be expanded to cover other artefact types, more sites and different periods. At Barnhouse, aspects of production can be linked with particular households. For instance, the procurement of materials for inclusion within the ceramics of individual households can be shown to have taken place from separate locations within the landscape and this ties in to the basic residential structure of the village. Interestingly, this contrasts with the decoration of the vessels as individual decorative schemes tend towards an overall village or communal identity (Jones, A 2002; Richards 2004).

Given the wealth of archaeological evidence in Orkney, which comprises both habitations and monuments ranging chronologically from the Neolithic to the present day, there is a place for period specific research, but it would be of more value as part of a larger programme of research designed to examine the changing nature of social identity. One important theme, for example, would consider the ways in which material culture has been used in different ways and in different contexts in order to create a variety of identities and, indeed, how these identities have articulated together to form groups (Fig 61). In this way, the changing nature of social identities in the past can be considered. For instance, one starting point is provided by the presence of a broch, Big Howe, adjacent to the Stones of Stenness. This immediately raises questions of social identity relating to the builders and later users of Big Howe, and their own use of the past around them.

This perspective, transcending period boundaries, enables an exploration of the ways in which sites, monuments and landscapes are reconceptualised, reused and refashioned in the dynamic production of identities and cosmologies.

The social construction and constitution of monuments: questions of architecture, place, the human body and materiality

This research theme moves on from the above to focus attention onto the people who used and experienced these artefacts and monuments. It looks at the social use and human experience of monuments, but it also places more emphasis onto the actions and context of construction. It aims to get away from the old idea that construction comprises simply a mechanism by which to erect a monument. It suggests that we should regard it more as an ongoing 'project' and one which, importantly, never quite leads to the final form that we recognise today. A good example of this lies in John Barrett's work at Avebury (1994). Consequently, this theme draws in people, places and things beyond the WHS monuments. The inclusion of monumental construction introduces an understanding of 'landscape' that must appreciate the full significance of the ways in which the people in the past engaged with the physical world that they inhabited. In particular, the engagement of the people with the resources is important for these comprised materials encountered in different places, at different times and under different social conditions that were brought together to create the 'monument'. Only through a close understanding of their world could people create the architecture and material components of the monuments. For the archaeologist, this appreciation demands a more critical view of the nature of the monuments (and indeed of all areas of architecture) in terms of how they were constructed, what materials were employed and the on-going social significance of the act of construction.

Regardless of the intentions of the builders, once architecture comes into being its social meanings are open to re-interpretation and negotiation through social practice and human experience. Here the rôle of architecture, as a planned physical entity that embodies both cultural concepts of order and a mechanism of control, becomes important because thus it can restrict and control human movement so that the human experience becomes structured in specific ways. Herein lies a profound conceptual difference between those monuments that are built to be used and viewed on completion and those that are used and viewed during a prolonged period of construction. At Maeshowe, for instance, we see a concern with the final form of the site and with the human experience of that form. It appears that an enclosing ditch was central to the design of Maeshowe, but what we see is in fact the careful sculpting of natural features so that a cut 'ditch' is only present on the western, southern and eastern portions of its supposed circuit. In other words, the final appearance of the site was of more importance than the act of cutting the 'ditch'. Equally, there is a dramatic contrast between 'inside' and 'outside' at

Maeshowe, revealed by the impressive masonry of the interior when contrasted with the unprepossessing exterior mound (Figs 2 and 15). These architectural devices indicate a monument that was built with great attention to the visual imagery of the site. In this light the different nature of the monuments sited within the WHS and its buffer zones requires careful consideration and we can see that the concept of 'monument' as applied to the WHS may be extremely problematic.

Studies like this drastically alter our understanding of the ways in which people engaged with the various monuments during the Neolithic, but it appears that such distinctions blur through prehistory. Once the monuments were constructed, later generations would engage ever differently with the ever changing architecture of the landscape. The main point to draw here is the fluidity of human experience within the monumental landscape of the Stenness-Brodgar promontories. As monuments came into being and were altered, standing stones were erected and demolished, cist graves were dug and covered over, and burial mounds were constructed, so the landscape and people's lives within it changed. This is important for memory and landscape: some buildings and monuments were actually built from the materials of others, while others were built from specific materials only available in distant places. The choice of material was obviously of vital significance and some were chosen and brought over long distances with considerable effort. Today we, the managers and researchers of this place, perceive this striking area as a palimpsest of sites to be revealed through archaeological activity, but, to the generations inhabiting Orkney in the 2nd and 3rd millennia BC, this was a place of addition and change, of memories and remembering. This is a theme that has repercussions for today and it is discussed in more detail in the next theme.

As these different understandings of 'place' and past come into existence so the human engagement with the landscape, as articulated through social practices, must be changed accordingly. Here architectural representation provides a focus of further study in order to look more deeply at the use and later lives of the monuments. This must include approaches to bodily experience: how was the form of a monument designed to control its use? How could this be manipulated and altered? In order to be successful in providing insight to any built monument, a clear and detailed knowledge of architecture is necessary. Artefact studies are also important here for they have a rôle to play as evidence of the ways in which people have moved through and treated a landscape or site. Of course, this work is not restricted to individual sites but should, in the long run, embrace the entire landscape. Rather than limiting such studies of human experience to single chronological periods (eg Richards 1993b), a more rewarding line of enquiry would involve comparing and contrasting people's encounters with the built environment over longer periods of time.

Without doubt this small part of Mainland Orkney took on huge significance at least during the 3rd millennium BC, as well as, perhaps, at later times. This directs attention to the earlier occupation of this area and how the landscape was conceived at the time when construction began. What made these places so special that they were transformed through a process of spectacular monumentalization? Why was this location chosen? How were they used before the construction of the physical remains that we see today? These must be key questions for any full understanding of the WHS. Under this scrutiny it is clear that our knowledge of the early Neolithic is as thin as that of later prehistoric periods in this region.

The past in the present: the rôle of monuments in the production of contemporary narratives, memories and cultural practices

This theme shifts the focus of attention to more recent times, to look at the rôle of the WHS in Orkney today. The relationship

between archaeological heritage and discourses of authenticity, identity and place in modern societies has become an important field of research. Empirical and historiographical studies have provided new insights into the relationship between archaeology and national identity in particular countries (Díaz-Andreu and Champion (eds) 1996; James, S 1999; Kohl and Fawcett (eds) 1995; Meskell (ed) 1998). However, understandings of how specific archaeological remains are involved in modern societies in a more general way, for example in the construction of multiple identities and in the reinforcement of interests, have received less attention (although see Bender 1998; Herzfeld 1991). This is, nevertheless, an important theme that involves both archaeological enquiry and heritage management. Such issues are particularly pertinent in relation to the WHS given its importance to the local communities and the ways in which the assignation of a heritage status like this can transform the ways in which people experience and engage with the monuments. Existing research relating directly or indirectly to the WHS consists of heritage management, tourist and consumer surveys usually involving questionnaires or focus groups (see Historic Scotland 2001 for discussion of the results). To date this research has provided very basic quantitative data that often focuses on the visitor to the islands rather than on the local resident. Recent surveys have, for instance, been concerned with the proportion of tourists that are attracted to Orkney for its archaeological heritage, and the relative attractions of Maeshowe, Skara Brae, Stones of Stenness and Ring of Brodgar. However, there is considerable scope for more detailed anthropological and sociological research into the relationship between archaeological materials, practice and knowledge on the one hand and the narratives, memories and cultural practices of both locals and visitors on the other.

This information is important and both interview-based and ethnographic research can provide a more fine-grained understanding of people's engagement with the WHS, and related sites and institutions (including museums). At present little research of this type has been carried out in Orkney (but see McClanahan 2004). Ethnographic work has taken place in Orkney (eg Forsythe 1980), but few of the studies focus on the archaeological monuments and their place in contemporary society. Existing studies concerning archaeological remains and archaeological practice have been small in scale though their results show great promise, such as the interview study concerning local attitudes towards the excavations at Stonehall and Crossiecrown (Jones and McClanahan 2000). In this respect, it is, of course, important to include the preconceptions and expectations of those outwith Orkney who, while not tourists *per se*, have played a major rôle in the designation and management of The Heart of Neolithic Orkney as a WHS.

This theme is important for there are large gaps in our knowledge both as to the ways in which archaeological monuments figure in people's personal narratives and memories and as to how they are embedded in people's daily practices and perceptions of landscape. Research such as this is vital if we are to understand the rôle played by the archaeological monuments in the construction of identities, whether personal, local, regional or national. In this respect the work initiated by McClanahan is of particular interest.

Another key area of research related to this theme lies not just in the monuments themselves but in the work done on them. Whether it be research, management or presentation of the archaeological heritage, the work undertaken by the various institutions impacts upon the local community, but we have, as yet, a very hazy idea as to the nature of this impact. Research on this would contribute to an understanding of local values and interests and fulfil UNESCO's expectation that development be guided by policies that respect the cultural life of the community. More specifically, it would provide a body

62. The Ring of Brodgar c1780

of knowledge that can inform the development of sensitive and effective management strategies for the WHS. For, just as it is impossible to manage a site unless we understand it, it is also impossible to manage the relations that people have with sites (including the limitation of potentially damaging activities) unless we understand the values and actions of those people.

Representing monuments: the place of archaeological materials in folklore, literature, map-making, art and other forms of visual depiction

The final theme moves away from people to consider once more the archaeological artefacts and memory. In this case the focus centres upon art and literature as the receptacles of tradition. The monumental scale and aesthetic and mystical qualities of the WHS monuments have had a powerful hold on the imagination and representation of the Orcadian landscape in visual/textual materials. These representations in turn influence people's sense of place and identity, objectifying their relations to the land and to archaeological remains within the landscape. There are obvious connections with the other themes in terms of the issues and subject matter which can be addressed, but this theme concerns research of a different nature, focussed upon texts and images rather than upon people. Substantial studies of Orcadian folklore have been carried out (eg Marwick, E W 1975; Muir, T 1999). However, few of these focus directly on folktales concerning or containing reference to the archaeology, or more specifically on the WHS (though see Marwick, E W 1976 for an exception). Similarly, there are, to date, no thematic studies which focus on the representation of Orcadian archaeology in literature: most studies of Orcadian literature focus on the work of specific authors. There has been much work on changing representations of landscape, but again few of these consider Orkney specifically, much less the representations of archaeology (Figs 62 and 63).

There is, therefore, great scope for research on the representation of archaeology in literature and the visual arts in Orkney, and on the ways in which changing ideologies have influenced our constructions of landscape, history and identity.

63. Ring of Brodgar, Painting by Stephen Seymour Clancy (2000)

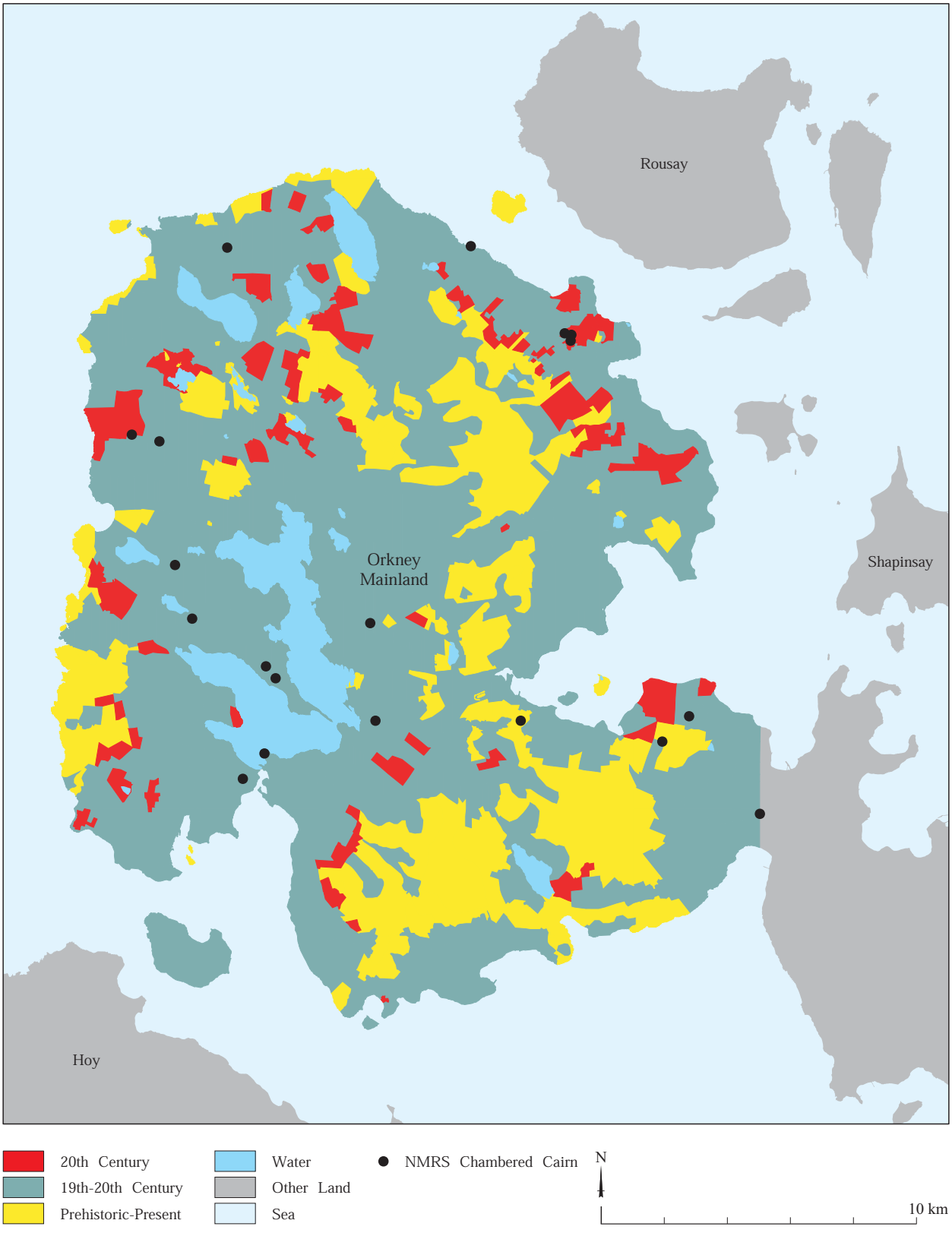
The formation and utilisation of the landscape

Ingrid Mainland, Ian A Simpson, Richard Tipping, Palaeoenvironment and Economy Group, and Formation Processes and Dating Group

During the last glaciation Orkney may have been part of a peninsula that stretched from Caithness to Shetland (Lambeck 1993; 1995). It is not entirely clear whether it was ice-covered at *c*20000-18000 BC or whether the glacial deposits, common for instance in the Finstown-Evie area, reflect an earlier glacial period. Since the onset of rapid deglaciation around 13000 BC, Orkney has been gradually inundated by the sea. This process may have been halted or reversed during the Loch Lomond re-advance, which ended around 9600 BC, and since then it has operated unevenly. It is, however, important to recognise that the islands were, in the late Devensian, hills on a larger landmass. Current orthodoxy is that Orkney was separated from the Scottish land mass between about 9500 and 7000 BC (Verhart 1995). Thereafter a continuing combination of erosion and inundation has led to the island pattern seen today.

From the end of the last glaciation there was a gap of at least 1500 years before humans first become detectable as potent forces in the landscape of Scotland. A general lack of evidence has meant that Orkney was thought to have been entered by and affected by humans even later, but this may well reflect the biases of modern scholarship (and this is now an important research issue).

The people who inhabited the world of the WHS did not live in isolation and the physical world around them was not itself static. The relationship between the two is complex and dynamic, but it is essential to understand it if we are to interpret fully the history of the WHS through the ages. The second overarching theme for research in the WHS thus comprises research into that physical world and its application in terms of human activity. These studies are of human-landscape interaction but the key is to focus on the dynamism of that relationship. The WHS occupies a multi-period agricultural landscape, emphasising the need to focus on long-term changes in land organisation and land management as well as on the transformations of monuments and sites, from the pre-monument site through to present-day conservation management



64. The broad brush mapping of the contemporary landscape and its historic components is a useful means of appreciating general patterns and processes. This map of West Mainland Orkney is derived from the period component of RCAHMS' Historic Landuse Assessment and highlights the predominately 19th- and 20th-century character of the Orkney landscape. Within this zone of the landscape, survival of upstanding earlier material is largely limited to discrete monuments such as the chambered cairns shown on the map, while the majority of sites have little to show on the ground surface. The areas identified in yellow on the map are those areas of rough grazing in which there may be the upstanding remains of sites dating from the Neolithic to the present

activity. Critical to all formation process research is comprehensive application of absolute dating methods.

Although there is now a body of data relating to the understanding and management of the contemporary landscape, ie Landscape Character Assessment (Land Use Consultants 1998) and Historic Landuse Assessment (Fig 64; Dyson Bruce *et al* 1999), the development and character of the Orcadian archaeological or historic landscape is poorly understood, and the establishment of baseline levels of understanding of archaeological (ie past) and contemporary patterns and processes must be a priority.

Palaeoenvironmental data plays a key rôle in elucidating the nature of the landscape and environment within which Skara Brae, Maeshowe, the Stones of Stenness and the Ring of Brodgar were situated and operated, and it provides evidence for long-term environmental change in response to climatic and anthropogenic factors within the WHS and its buffer zones, as well as in the context of the wider Orcadian landscape (Fig 65). The mechanisms that add, remove or transform materials within landscapes and archaeological sites include both natural and anthropogenic processes. In order to discriminate between the two we need to understand the environmental and cultural drivers of landscape formation processes including:

- climate change;
- processes of glaciation and deglaciation;
- sea-level change and the history of Orkney as an archipelago;
- changing water levels and conditions in the Loch of Stenness and the Loch of Harray (both part of the WHS IBZ);
- human activity and the interplay between natural and anthropogenic processes.

65. Taking a core to obtain palaeo-environmental material

The related palaeoeconomic research gives us a valuable insight into the plant and animal resources available to and exploited by human populations living within Orkney and the various economic strategies employed by these peoples both through time and spatially, between different settlements: for example, pastoral vs. arable farming; agricultural intensification; resource diversification and other buffering strategies for dealing with environmental and/or social marginality. Moreover, in addition to elucidating past human diet and subsistence, bioarchaeological evidence is crucial for exploring the social significance of animals and plants in society and how this was articulated.

To fully understand past environments and economies within the specific context of the WHS, it is important that research focuses on palaeoenvironmental and palaeoeconomic trends within the wider context of Orcadian archaeology, both spatially and temporally.

Climate change and Holocene environments

The major impetus in research into climatic reconstruction has come in recent years from:

1. the recognition that Holocene climate change has been abrupt and frequent;
2. the identification within the North Atlantic region of major, repeated and abrupt climatic events and observed

terrestrial environmental repercussions;
3. the suggestion that these events produced impacts on resource availability, access and the viability of human coastal and other communities;
4. a concern to quantify the cyclicity and rates of climate change in order to predict likely events to be faced in the near future;
5. the need to define past climates that might serve as analogues for the future.

In Scotland research has been concentrated in the Western Isles where the scale of past impacts on previous human communities is now better understood. Recently, however, the research interests of many archaeologists have diverged from those of the palaeo-climatologists towards an exploration of internal, societal-induced change, with hostility to arguments that appeared overtly environmentally determinist. These linkages are, however, useful and need to be re-established.

The most exciting data-set relating to climate change comes from North Atlantic ocean sediments, where Bond, G *et al* (1997) suggested that severe disruptions to ocean circulation have occurred throughout the Holocene at regular intervals of around 1500 years. These major impacts occurred at *c*11100, 10300, 9400, 8100, 5900, 4200, 2800 and 1400 cal BP, though other workers have found more frequent oscillations in North Atlantic circulation patterns (Bianchi and McCave 1999; Chapman and Shackleton 2000). These fluctuations are likely to have impacted directly on sea temperature. Bond, G *et al* (1997) suggest that sea-surface temperatures may have dropped by around 2˚C during each event. Early Holocene (11100-8100 cal BP) events may have differed from later Holocene events (Stager and Mayewski 1997), and the event at *c*8200-8000 (8100) cal BP is known to be exceptionally severe, around 6±2˚C in central Greenland (Alley *et al* 1997). Other effects that have been modelled but not demonstrated include marked changes in the amount and intensity of precipitation as well as increased storminess.

Some of these events, but not all, are identified in Greenland ice core studies (O'Brien *et al* 1995), but what effect did they have in Orkney? Some have been recorded in marine sediments around Orkney (Klitgaard-Kristensen *et al* 1998; Kroon *et al* 2000) and certainly the biggest impact, at *c*8100 cal BP, is known to have disturbed vegetation and lake environments elsewhere in Europe (von Graffenstein 1998). Very recently, the majority of these events have been identified within the terrestrial lake sediment record across northern Scotland (Tisdall 2000), but more detailed correlative records are needed to quantify the impact at a local, Orcadian, level.

We are only just beginning to understand the scale of these events, but Bond, G *et al*'s (1997) dates coincide with many previously recorded episodes of significant stress on human populations in northern Scotland. The most recently observed discontinuities relevant to the WHS programme from western Scotland are those suggested by Mithen (2000) at *c*8200 cal BP and Schulting (1998) and Richards and Hedges (1999) at *c*5900 cal BP. These changes may well have led to resource crises, mediated through abrupt shifts in coastal, nearshore and/or marine resources driven directly by North Atlantic ocean change. The impacts need not always have been disadvantageous to human communities: the major climatic deterioration at *c*4200 cal BP appears to have coincided with colonisation of upland areas (Tipping 1994), perhaps through reductions in woodland cover and expansion of montane grazed grasslands and heath (Davies *et al* forth).

We do not know whether each mid-Holocene climatic event generated a human response, though it has been suggested that this was likely given their probable scale (Rahmstorf 1995). Our understanding of the broad-scale impacts on human populations are, at present, limited because they can only be inferred through correlation between different regions and from different parts of the

climate system. It is likely, however, that externally applied forces, such as a climatic shift, act as prompts in the teaching and rehearsal of adaptive strategies, so that frequent stresses lead to the reinforcement of new strategies. This is an important connection between people and climate in which ideas of 'social memory' play a vital rôle (McIntosh *et al* 2000).

Climate change involves the complex interaction of many processes and in Orkney the nature and relative isolation of the archipelago may have magnified its effects. Changing precipitation, air temperature and marine conditions all worked together to determine both resource availability and human access. Travel by sea and access to marine resources were both vulnerable to changing storm frequency and intensity. Abrupt climate change is likely to have driven the rates of sea-level change in the past, much as it does today.

With regard to vegetation, earlier palaeoenvironmental research in Orkney has established broad-scale post-glacial vegetation sequences for the area. By the late Neolithic (late 4th/3rd millennium BC) the scrub birch-hazel woodland, which had developed in the 9th/8th millennium BC, had given way to a largely grass and heathland vegetation, comparable to present day Orkney (Davidson and Jones, R L 1985; Keatinge and Dickson 1979). Recent research, though broadly confirming these trends, has emphasised a greater degree of local variation in vegetation cover (Bunting 1994) as well as indicating that Orcadian woodland may have been more species rich than previously envisaged (Dickson 2000).

On- and off- site palynological and other palaeoenvironmental analyses allow invaluable insight into long-term processes of vegetation change and landscape development at both a regional and local scale. Moreover, in the absence of detailed archaeological evidence, off-site palaeoenvironmental data currently provides the only means to quantify and date the presence and impact of the first human inhabitants of Orkney (Edwards and Whittington 1997). Anthropogenic modification of the environment, including the kinds of grazing and arable practices discussed above, is more likely to be detected at the local rather than the regional scale, particularly if sample sites are located in proximity to known settlements or structures and are carefully placed across the landscape. A key priority for future palaeoenvironmental research within Orkney must, therefore, be increased sampling both on- and off-site, including buried soils as well as peat and loch sediments. In this way the reconstruction of local vegetation development can be integrated with the excavation of settlement sites and the interpretation of off-site structures, such as field systems and boundaries.

A further issue is the identification of sea-level change, a critical element in understanding landscape development and use. Palaeoenvironmental analysis of inter-tidal peat deposits is an important source of evidence for marine inundation, as was demonstrated by Keatinge and Dickson (1979) at the Bay of Skaill. At least 15 further inter-tidal peat deposits are known in Orkney; analyses of these would allow insight into both the timing and impact of sea-level change at various locations throughout the island group. Sediments from the Stenness and Harray lochs may also prove informative. In all cases, research should attempt to make full use of the wide range of palaeoenvironmental proxies; although there has been some use of molluscan evidence (eg Evans 1977), other sources such as insects, diatoms, ostracods or even avian and mammalian evidence have been under-utilised. In this respect the application of research on diatoms to the development of a curve for sea-level change in Shetland (Dawson and Smith 1997) is exciting and bears great potential for development in Orkney.

Chronologically the data on climate change and the development of the Orkney landscape is still poor. The record of vegetation change in the few Orkney

pollen columns is generally not well tied into ^{14}C dates. As with dates for monuments, many existing ^{14}C ages were measured when techniques were less refined so that their usefulness is limited, for instance the ten dates from Keatinge and Dickson's study in 1979. Better chronologies from ^{14}C and tephra are required. Bunting suggests, for instance (Bennett *et al* 1997) that the vegetation on the hills of West Mainland, Orkney (predominantly *Betula-Corylus* with *Salix*, *Alnus*, *Quercus* and *Pinus*), shows evidence of modification by hunter-gatherers after about 8000 BP. She argues that this was compounded in the Neolithic to the extent that woodland cover was finally lost around 5000 BP. More, and stronger, dating sequences are needed, however, to demonstrate the scale of such changes: did they cover wide areas, or were they of mostly local impact?

Clearly, there is great scope for further work on palaeoenvironmental issues in relation to the WHS. We have only just begun to grasp the scale of development and change within the Orkney landscape and the complex relationships between this and the local communities through time. Many areas could be targeted for research and some are identified above. One change to existing directions might lie in increased work below present water levels where improved technologies are reinforced by an expanded awareness of surviving deposits. In particular, the Bay of Skaill offers great potential in the form of suitable sediments in close proximity to known archaeology, as do the Lochs of Stenness and Harray. On land, the application and refinement of work which can then fit into known wider interpretations will continue to provide a sound basis for our understanding of change within the human communities.

Biogeography: migration, colonisation and extinction

Archaeological research into the biogeography of island communities allows unparalled insight into the dynamics of migration, colonisation and extinction over long time scales and, moreover, may provide evidence for contacts, such as trading and exchange networks, between past societies as well as human population movements. Although recent research suggests that Orkney may have been joined by a land bridge to Scotland during the early Post-glacial (McCormick and

66. North Ronaldsay sheep. Studies into this ancient breed give important palaeoenvironmental information
Thomas Kent, © Orkney Archives.

Buckland 1997), the extent to which the colonisation of Orkney by its Holocene fauna was achieved naturally or represents deliberate or accidental introduction by humans remains unclear. Clutton-Brock (1979), for example, suggests that red deer are unlikely to have reached Orkney naturally and hence must reflect human introduction, while McCormick and Buckland (1997) indicate that this species may have been able cross over the land bridge prior to inundation. Interesting also in this context is the presence of pine martens at Pierowall Quarry, Westray (McCormick in Sharples 1984).

A further dimension is provided by the marine resources which are abundant in the archaeological middens. The history of the marine species is of interest in its own right, but it can also shed important light not only on diet and exploitation and, by inference, aspects of technology, but also on the predominant conditions and currents of the Orkney waters. As there are marine resources from a number of middens of differing dates, there is information to be gathered on environmental changes within the Orcadian seas from some 5000 years ago to the present.

It is generally accepted, however, that there was no indigenous domestication within Orkney and that the cattle, sheep and pig present on early farming sites reflect a 'Neolithic package' of introduced species (Fig 66). Noddle (1983) suggested a Scandinavian origin for the cattle and sheep on metrical grounds. Little further work has been undertaken to evaluate more fully the origins of the domestic, or indeed the wild, fauna represented on early Orcadian sites, despite the considerable potential of such research to assess the origins of the first farmers themselves, particularly given recent developments in biochemical analyses within archaeology (DNA, isotopes, trace elements, etc). Haynes *et al* (2001) have, for example, recently demonstrated how DNA analysis of the Orkney vole could potentially be used to explore human migration and colonisation as well as contacts between communities within island groups. Human and/or animal migration and colonisation is of interest in later periods also, the most obvious being the settlement of Orkney in the 1st millennium AD by peoples and perhaps also livestock of Scandinavian origin.

Of equal importance is the question of species extinction in Orkney, particularly for the larger mammals such as red deer and fox, but also for species with highly specific habitat requirements, such as birds. Long-term trends in local or regional extinction will provide useful insight, of interest to conservation biologists as well as archaeologists, into human and climatic impact on island ecosystems, including factors such as population pressure, intensification of farming, anthropogenic or climatically induced reduction of preferred habitat and changing attitudes to animals.

Agricultural landscapes, diet and subsistence

Archaeobotanical and archaeozoological analyses at settlement sites in Orkney have established the palaeoeconomic basis for Orcadian society from the Neolithic onwards, indicating reliance on a mixture of arable and pastoral subsistence farming augmented by (unusually frequent instances of) utilisation of a variety of wild resources (eg Clarke, D V and Sharples 1985; Ritchie, A 1983a; Davidson and Jones, R L 1985; Ballin Smith (ed) 1994; Rackham *et al* 1996). Nevertheless, it could be argued that, with a few exceptions (Barrett, J H 1995; Bond, J M 1995; Guttmann 2001), such research has in general done little more than establish the range of species cultivated or exploited. Moreover, it tends to emphasis continuity with the present or the recent past (eg Renfrew 2000; Rackham *et al* 1996) rather than attempt to explore how subsistence farming, social relationships with animals and other palaeoeconomic activities may have varied through time or between contemporary sites in response to social or economic forces either in Orkney or further afield.

67. Ard marks - traces of prehistoric agriculture at Tofts Ness, Sanday

This in part reflects the archaeological evidence available, which is often restricted to one or two settlement sites with large archaeofaunal or archaeobotanical assemblages per 'period'; in the Neolithic, for example, interpretation is currently mainly based on only one fully published site, Knap of Howar (Ritchie, A 1983a), due to inadequate publication of the work at Skara Brae and Links of Noltland, and to the lack of survival of bone at sites such as Barnhouse and Stonehall. However, the existence of large Neolithic bone assemblages in Orkney should be stressed as an invaluable resource which is unusual in a Scottish context.

The Orcadian middens contain not only terrestrial information but also bird bone and marine resources, both fish and shell fish. In this way, they have the potential to provide vital detail of wider aspects of the environment, human exploitation of that environment and, as information from different sites is added, of changes through time.

Agriculture, arable cultivation, the grazing of domestic animals and the collection/cultivation of fodder, is one of the primary factors behind human modification of the natural environment (Fig 67). Farming practices have been implicated in environmental change at various periods in Orcadian prehistory (Davidson and Jones, R L 1985; Whittle 1989; Dickson 2000). Yet, very little is known about the articulation of cultivation or grazing practices within the wider landscape in particular periods and how this may have changed over time: was early cereal cultivation, for example, restricted to small-scale intensive plots, as has been suggested elsewhere in the Neolithic (Barclay, G J 1997; Halstead 1989) and, if so, when and why did more extensive arable cultivation practices develop; how were grazing animals managed, intensively within enclosures or paddocks, or were more extensive grazing practices, such as transhumance or outfield systems, employed; indeed, at what point did the in-field, out-field system, evident in early historic periods, develop? Exploration of these issues requires an integration of on- and off-site environmental evidence for animal management (Bunting 1994; Mainland forth), cultivation and manuring practices (Hillman 1981; Bond, J M 1998; Simpson *et al* 1998a; 1998b) with structural evidence such as barns, byres and field enclosures.

Several phases of agricultural intensification of varying scales, including expansion or resource specialisation, have been indicated in the Northern Isles, in particular during the early 3rd/late 2nd millennium BC (Hunter 2000; Sharples 1992), the early 1st millennium AD (Bond, J M 1998; Simpson 1998) and the later 1st /early 2nd millennium AD (Barrett *et al* 2000b; Simpson 1997; 1994; 1993). Agricultural intensification and resource specialisation may arise from a variety of socio-economic factors, including population pressure, a response to marginal environments or environmental change, the development of hierarchal societies or of commercial economies.

Further research is needed to address how representative the economic trends identified in particular time periods are for Orkney in general, as well as within a wider archaeological context, and, moreover, to evaluate more fully what resource specialisation reflects within environments, like that of Orkney, which are marginal for arable agriculture (see, for example, the contrasting explanations given for high level of livestock infant mortality in the Northern and Western Isles by Halstead (1998), McCormick (1998) and Bigelow (1992)).

Insight into human diet has traditionally been gained through archaeozoological and archaeobotanical evidence. Recent developments in archaeological biochemistry, specifically isotopic analysis of human skeletal material and lipid analyses of ceramics and other artefacts, are, however, providing new and often more detailed insights into human dietary behaviour in the past (Dudd *et al* 1999; Richards and Hedges 1999). Barrett *et al* (2001) have recently used isotopic analysis to explore changing diet during the Viking colonisation of Orkney. Further such research within Orcadian archaeology, particularly if integrated with more conventional bioarchaeological sources, is likely to allow invaluable new evidence for past foodways, as well as more specific questions, such as the varying utilisation of dietary resources by different segments of past societies (eg Hastorf 1996).

Exchange circulation, status, identity and ritual activity

There is a growing recognition within archaeology that bioarchaeological data does not merely reflect human diet and subsistence or past environmental conditions, but that archaeobotanical and archaeozoological assemblages will often have been structured in response to a variety of non-economic values or activities, including social status and identity, ritual activities and socially-embedded exchange of animal and plant resources (Crabtree 1991; Marshall 1994; Grant, A 1991; Hill 1995; Campbell, E 2000). It is argued that insight into such processes can potentially be achieved through the identification of structured spatial patterning in animal or plant assemblages in terms of the representation of particular species, age groups or body parts within specific deposit types, areas of a settlement or between sites of differing function, as well as through associations between biological and artefactual evidence. Hill (1995), Grant, A (1991) and Campbell, E (2000) have demonstrated how such detailed taphonomic and contextual analyses can be used to elucidate ritual and symbolic attitudes to animals within the British Iron Age. Similar approaches to environmental evidence have been used to explore kinship relations (Zeder and Arter 1996), gender relations (Hastorf 1996), social status and ethnic identity (Crabtree 1991) in various archaeological contexts.

Very little attempt has been made to address such issues within Orcadian archaeology. In the Neolithic, environmental data has typically been used to infer palaeoeconomic activities, and in particular subsistence farming strategies, (Clarke, D V and Sharples 1985) unless derived from funerary and monumental contexts where ritual interpretations prevail (eg Renfrew 1979). Notable exceptions are Sharples (2000) and Jones, A (1998) who both explore the symbolic rôle of animals in Neolithic society through a consideration of faunal evidence from settlement and funerary contexts. In later prehistoric and early historic periods, where archaeological evidence is mainly derived from settlement sites, the reconstruction of subsistence farming practices is again emphasised (eg Ballin Smith (ed) 1994; Rackham *et al* 1996). Sharples (2000) and Jones, A (1998) have demonstrated the viability of non-economic analyses of bioarchaeological data within the context of Orcadian archaeology; arguably further research addressing such issues is required.

PART 4

Techniques

Introduction

This section is designed to provide a brief guide to the range of techniques relevant to archaeological and historical research in the Orkney WHS. Space allows for only a cursory introduction to individual techniques and information will quickly go out of date as new techniques are developed and existing ones refined. In order to keep up to date readers should refer to the Institute of Field Archaeologists who provide excellent up-to-date information on professional standards and health and safety issues for all archaeological work. Their standards have been carefully developed to provide guidelines for professional archaeologists and any work related to the WHS should be undertaken according to their requirements. In addition to their Standards and Policy Statements, the IFA produce a series of technical papers outlining new developments (see www.archaeologists.net for information, visited Dec 2003). Alternatively, readers might contact the specialist below directly.

Dating

Patrick Ashmore and David Sanderson

Background

This section assumes a basic knowledge of the dating techniques most commonly applied to archaeology, or under development. Dating information provided for the period of the WHS monuments is ambiguous for a number of reasons. Radiocarbon dates suffer from a plateau in the calibration curve between about 3400 and 3100 BC, the dating of various different types of samples from tombs and settlements, and the large errors associated with many of the available ^{14}C ages, many of which were obtained several years ago. Tephra layers have been exploited to provide dates only at a few palaeoenvironmental sites. The results of thermoluminescence (TL) dating are few and can be difficult to interpret because of the errors involved. Optically stimulated luminescence (OSL) dating has not been used until very recently; nor has palaeomagnetic dating.

Radiocarbon/AMS dating

Increasing opportunities exist for obtaining larger numbers of ^{14}C dates on a wider variety of materials than hitherto possible, partly as a result of recent investment in the UK laboratory resource by the research councils, and partly as a result of the use of smaller, more precise samples. This can benefit both our understanding of the archaeological communities and our interpretation of the world in which they lived. A range of stable isotope investigations can be added to the generation of systematic data sets from human and animal remains associated with relevant archaeological monuments, in order to provide information on aspects such as diet and economy, as well as on the context of the monuments. In this respect, the increasing use of specific biomolecules for dating and dietary studies is very relevant. At a wider level, high resolution dating should be applied, wherever possible, to reconstructions of sedimentary and vegetational records. Another field of study involves the AMS dating of residues, eg on sherds of pottery. While the precise relationship between the archaeology and the date may (and only may) be more direct here, this technique is still being refined.

However, the precise relationship between a ^{14}C date and the specific activity of archaeological interest needs to be carefully considered (Fig 68). All too often the date provides an age that is only a proxy for the archaeology, as when old, or heart, wood is used to date the human use of that wood. Bone may be an exception, but despite recent advances by Groningen it is possible that poorly preserved bone samples may include carbon from sources other than the animal concerned. With regard to the dating of environmental samples, it is vital to understand the potentially complicated taphonomic processes that led to the formation of particular sedimentary basins or peatlands before samples are taken.

Luminescence dating

The luminescence dating of heated materials provides an opportunity to place ceramics and burnt stones in their chronological setting. As such, it is of great value both to further analysis of existing material and to study newly excavated material. Specific projects of interest here have been listed in the strategy (below). Work should take advantage of recent instrumental and procedural developments to improve overall dating precision where this is critical to archaeological interpretation. Less well contexted material is still relevant as dosimetric reconstruction can be used to look at the environments of critical settings.

68. Hazelnut shells provide a good sample for radiocarbon dating

The OSL dating of sedimentary materials has the potential to provide an absolute chronology for a wide series of sedimentary material associated with the archaeological deposits. This is of prime importance and there are key opportunities for its application, such as in an examination of the environmental history of blown sand in the Bay of Skaill, at Skara Brae and its hinterland. New OSL dating opportunities associated with ditches, cut features and other prepared surfaces could also be explored. Developments in the extension of OSL methods to dating optically bleached lithic surfaces should be monitored. It is of considerable importance to successful use of this method to establish early contact with the luminescence laboratory.

Palaeomagnetic dating

Opportunities for palaeomagnetic dating of hearths and other heat-affected contexts, and silts in ditches, should be identified and investigated. This is particularly important for those periods when there are plateaux in the ^{14}C calibration curve.

Tephra

Different ash fall-outs from separate volcanic eruptions have specific signatures. As the ash tends to be distributed across a wide area, the existence of minute ash layers can provide dateable markers within sedimentary sequences, peat and possibly within sand and colluvium accumulations. At a most basic level, the tephra layers may be used to establish contemporaneity of events over wide areas. At a more detailed level, as the dating of the eruptions is refined, refined dates can be applied to the results from previous studies. The potential of tephra in Orkney is illustrated by the Saksunarvatn ash layer recorded by Bunting (1994) in pollen columns from West Mainland, which coincides with the arrival of Corylus avellana in the islands at around 9,200 BP. Tephra dating is best used in conjunction with other dating methods to ensure that the correct tephra layer has been identified.

Cosmogenic nuclides

The potential rôles of cosmogenic nuclides (3He, 10Be, 27Al, 32Si, 36Cl) in supplementing an understanding of landscape formation history, sedimentary records and the origins and utilisation of archaeological materials in the WHS and its surroundings, should be considered.

Radiogenic chronometers

Radiogenic chronometers (eg 40Ar/39Ar, 86Rb/86Sr, etc) may have potential in studies of the origins and use of lithic resources by early communities associated with the monuments of the study area. Specifically, they can be used to pin the various lithic materials down to particular sources, which has important implications for the study of technology, mobility and social cohesion in the islands.

Geophysics

John Gater

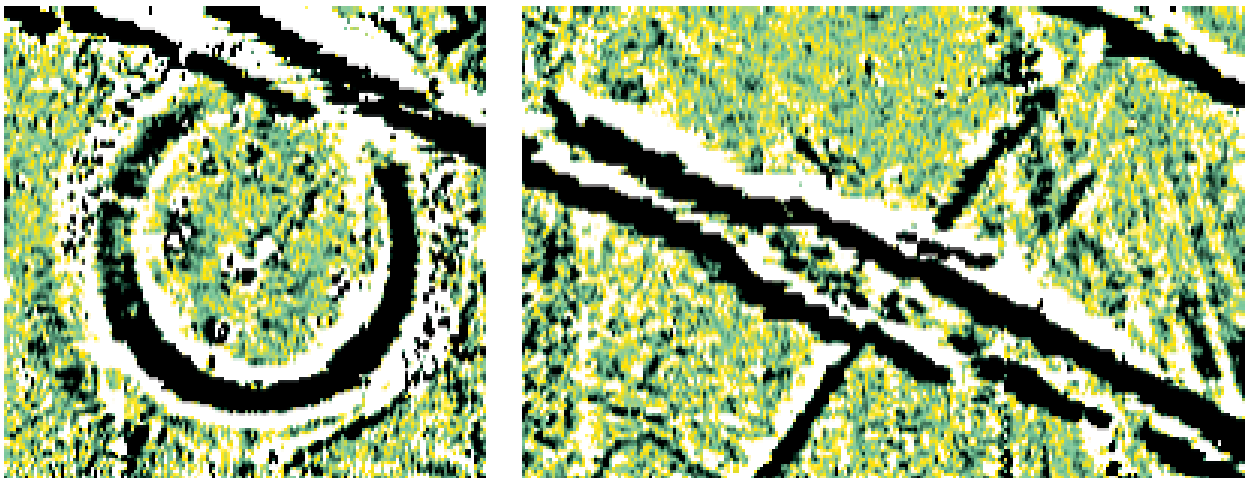
Background

Geophysical techniques are but one tool available to fieldworkers and geophysical work should never be viewed in isolation, a fact that is often overlooked. Geophysics uses techniques of remote sensing in order to provide an idea of surviving archaeological remains. It is of particular value because it is non-invasive and avoids the need to disturb and possibly destroy material. Despite the range of geophysical techniques available, magnetometry (largely fluxgate gradiometers) and resistivity survey (normally twin probe, with selective electrical imaging) are the tried and tested techniques that are most suited to the first stage of geophysical investigation (see David 1995; Gaffney *et al* 2002). Ground penetrating radar (GPR) and electromagnetic methods (EM), and perhaps caesium magnetometers, are likely to play important supporting rôles, but techniques like seismic and gravity surveys are unlikely to feature highly in Orkney given the existing archaeological questions/criteria.

Fluxgate gradiometry has worked extremely well on a number of sites in Orkney and for this reason it has become the preferred technique in recent projects around the WHS. Since 2002, some 61 hectares of magnetic survey has been carried out within the Brodgar IBZ (WHAGP) by GSB Prospection Ltd (GSB 2002; 2003a; 2003b). In 2003 David Griffith of the University of Oxford instigated the first phase of the Birsay/ Skaill Bay Landscape Project (Griffith 2003). This work included geophysical survey around Skara Brae, partially covering the same area surveyed in 1973 (Bartlett and Clark 1973a).

Prior to 2002, the use of geophysical techniques at the WHS in Orkney was piece-meal and unco-ordinated. Only in 2003 were records compiled of all the geophysical work that has been carried out in the Islands (see Appendix 4). The earliest investigations, in the 1970s, were performed by the late Tony Clark and other members of the Ancient Monuments Laboratory, at English Heritage (Bartlett and Clark 1973a; 1973b; Clark 1973). Bradford University also carried out pioneering surveys in the wider WHS landscape, led initially by Arnold Aspinall. However, these surveys were largely experimental in nature and little was published, except as footnotes or as isolated images, for example the survey at the Stones of Stenness (in Clark 1996). This site was re-surveyed in the 1990s by John Gater (Fig 69; GSB 1999a) but, apart from this work, none of the main monuments had been investigated geophysically using modern instrumentation until 2002. Extensive resistance surveying has been carried out in the vicinity of the Barnhouse settlement near Stenness (Challands, in Richards (ed) forth), but the location or extent of other geophysical surveys, in the buffer or wider zone has not been previously documented.

Compared to the WHS of Stonehenge and Avebury (see David and Payne 1997; David 2000) geophysics in Orkney, up until 2002, had a very poor profile, despite



69. The results of geophysical survey at the Stones of Stenness (the ditch of the henge – the dark annular feature – is about 55m in external diameter)

the largely favourable geological and pedological conditions. It is worth noting, however, that the majority of geophysical survey work at the English WHS sites has only been carried out in the past decade or so; Stonehenge itself was surveyed for the first time in 1993-4 (Payne 1994).

Perhaps of greater interest, though, is the fact that most of the geophysical work at Stonehenge and Avebury has been development-led: for example, in advance of the upgrading of the A303 trunk road and prior to the construction of a new visitor centre. Most of the surveys were carried out prior to the establishment, by English Heritage, of local research agendas. By contrast, following the Research Agenda meeting in April 2001, a major geophysical project (the WHAGP) has been instigated by the Orkney Archaeological Trust (funded by Historic Scotland and Orkney Islands Council) and this has already dramatically increased the amount of geophysical work on the Orkney WHS.

In discussing the potential of geophysical techniques at the Stonehenge WHS, David and Payne (1997, 107) stated: 'Our assumption is that the entire surveyable area should be covered in as much detail and by as many compatible and relevant techniques as possible…but it is necessary to be more selective.' While compromises must also be true for the Orkney WHS, there is no reason why total coverage should not be an ultimate goal. In fact the new project already goes a long way towards realising this aim.

The World Heritage Site and Inner Buffer Zones - summary of results

- **Ring of Brodgar** Both the interior of the monument and the numerous mounds in the immediate vicinity have been surveyed magnetically (though the steep slopes and overgrown vegetation precluded survey on the larger mounds), and the work has been extended across the fields to the north of the Ring of Brodgar (GSB 2002). Perhaps the most exciting result is the discovery of an extensive settlement complex surrounding the pair of Bronze Age houses (HY21 SE18), north of the Dyke of Sean (Fig 45; GSB 2003b).
- **Stones of Stenness** Apart from a spectacular complex of igneous dykes crossing the landscape, magnetic survey has provided more information on the possible extent of the settlement at Barnhouse, mapped the site of the Big Howe Broch (Fig 48) and discovered another dense concentration of archaeological activity, indicative of prehistoric settlement, on the Ness of Brodgar (GSB 2002; 2003a).
- **Maeshowe** The area north of Maeshowe is badly affected by 20th-century war activity, though a number of archaeological features have been mapped (GSB 2003a; 2003b). The area south, west and east of the monument needs investigation.
- **Skara Brae** At Skaill Bay the Castle of Snusgar has been surveyed and, in addition, a trial area adjacent to Skara

Brae PIC was covered (Griffith 2003). Although an igneous dyke dominated the results, some potentially archaeological anomalies were located.

The landscape surrounding the monuments of the WHS contains numerous 'mounds' of potential archaeological interest that would clearly benefit from geophysical investigation. The recent results at the mound opposite the Standing Stones Hotel are a testament to this (Challands 2001). It would be a relatively easy to establish the origin of these mounds, whether man-made or natural, and also assign a tentative function (eg burial, occupation, burnt mound or broch) that would help our understanding of the archaeological landscape.

Development

All proposed developments with the wider WHS zone should be preceded by geophysical investigation, or at least a study to assess the suitability of techniques in individual cases. This principle applies regardless of the scale of the project: the erection of display boards and rabbit-proof fences, for example, can have a marked effect on geophysical investigations. This is seen as a prerequisite to any ground disturbance.

Prospecting

Geophysical techniques have been widely employed in helping to locate new archaeological sites using a combination of magnetic scanning, magnetic susceptibility sampling and detailed sample survey blocks. These strategies were largely formulated to investigate development-threatened sites, but they could be adapted to carry out exploratory surveys in the same way that fieldwalking exercises are carried out.

Database

Following the Research Agenda symposium, a compilation has been made of all fieldwork, including geophysical survey, carried out within Orkney since 1945 (Appendix 4). This will now serve as a database of surveys in Orkney as a whole.

Field Survey

Graeme Wilson

Many of the monuments within the WHS exhibit complex relationships with each other, as indicated, for example, by similarities in design and art work seen at Skara Brae and at Maeshowe. Even now, the major monuments remain visible, although there is much still to be discovered about their wider context. Where, today, these monuments inhabit a landscape divided by modern roads and fields, they were once surrounded and linked by numerous settlements, burial sites, field systems and boundaries. Traces of past landscapes have already been recognised in and around the WHS, but undoubtedly many more await discovery. New investigation of the wider hinterland, using field survey, offers the potential to locate and map previously unrecognised sites, thereby enhancing our understanding and appreciation of this rich landscape.

Optimum results are obtained from field survey when a concentrated programme of work is carried out. This might consist of a rapid programme of walk-over survey within a designated area, immediately followed by topographical survey to map the findings. More localised and intensive survey, for example post-ploughing or artefact scatter collection, could follow on from this. Coastal survey is instrumental to locate sites which are being uncovered by the sea.

Field survey techniques are rapid and cost-efficient and they produce results quickly. Walk-over survey (Fig 27) is a good first stage of work, comprising a methodical visual examination of every parcel of land within a designated area. Probable findings include structural remains and earthworks, concentrations of artefacts, building materials and midden deposits; they may

also include evidence of past land use in the form of cultivation marks or soils. The results of an initial walkover and coastal survey are best presented at a scale of 1:25,000. At this scale the locations of all monuments, findspots, artefact concentrations, etc, within the study area can be shown in relation to one another. Smaller scale mapping may also be useful in order to illustrate the outlines of sites together with larger landscape features, such as field systems. Both levels of survey are suitable for inclusion on a GIS system (see below).

More detailed topographical survey can then take place, at a level of detail sufficient to generate plans at smaller, more useful scales, appropriate to the needs of the survey. The survey of individual monuments should be carried out using a grid, with measurements at regular distances. The results should be digitised, so that they can be used in a variety of formats, including contour plans, 3D models of landscape and interactive presentations. A digital archive has other advantages in that it can be reused and re-manipulated as the project requirements change.

In addition to conventional mapping and site description work, survey should also include provision for comprehensive photographic recording. The examination of the wider hinterland and the location of new sites will provide new foci of interest within the landscape and the connections within it can then be better appreciated. A visual record will greatly enhance the exploration of intra-site relations and the place of sites within the surrounding natural landscape.

Although much of the WHA lies away from the sea, coastal and lochside survey has an important rôle to play with regard to the investigation of the wider landscape. Work already undertaken near to Skara Brae and around the mouth of the Loch of Stenness has revealed a number of hitherto unknown prehistoric sites. The importance of the uncultivated coastal edge, as opposed to the farmed hinterland, for site survival is demonstrated (eg Moore and Wilson 1998).

Survey work related to the WHS should aim to be as inclusive as possible and not related to one specific period. While there is much to be understood about the monuments in their original setting, it is equally important to appreciate the influence of both earlier activity and later experience and use. The remains of all periods should be recorded in order to provide a comprehensive history of land use. Close analysis and interpretation of the results will be needed to decode the palimpsest of landscape features and unravel individual strands of evidence. This may be most effectively carried out using a programme of GIS and in tandem with a dedicated series of ^{14}C dates.

Field survey should be regarded as a first step or baseline from which further work can develop. The results will be most useful if they are integrated with other strands of work such as excavation, geophysical survey and historical research. GIS is a useful way to do this. Field survey is also an essential tool for the monitoring of sites and the landscape within which they are sited, and thus it is a vital part of site management.

Underwater exploration

Ian Oxley with Bobby Forbes

Background

Most, but not all, land-based archaeological techniques can be adapted for use underwater, though they may take a bit longer and thus be more expensive. This includes both an initial appraisal and more detailed work. A wide variety of routine evaluation methods are available and these include geophysical and other remote techniques. More detailed techniques include intrusive investigation methods such as coring and excavation. Recent interest in underwater archaeology means that the techniques are rapidly developing.

Archaeological investigation of submerged environments in Orkney

Landscapes in general have undergone considerable changes due to long-term climatic changes and also in the short term due to changing agricultural practices. Consequently, there have been significant changes in both coastal and freshwater shorelines with either a corresponding exposure or submergence of the adjacent landmass. Remote sensing studies for the European Marine Energy Centre off the west coast of Orkney have revealed the existence of the submerged coast line formed during the last glacial period. Studies in other areas have shown that the underwater environment can provide conditions ideal for the preservation of materials that may have long since deteriorated in a terrestrial context.

The WHS is bordered by two of the main lochs in Orkney. Harray Loch, a body of fresh water, and the Loch of Stenness which, at present, has a brackish water environment (Fig 70; see also Fig 14). Remote sensing techniques used in the mapping of the submerged cultural heritage of Scapa Flow (ScapaMAP) are equally applicable to the shallower environment of the lochs. The great potential of submerged archaeological remains is now acknowledged. With regard to the WHS, it is important that any research agenda include an underwater strategy.

Standards

As with land-based archaeology, all work must take place subject to stringent quality and health and safety controls. These can be found through the professional channels of the Institute of Field Archaeologists (IFA) and the standard Health and Safety regulations for Diving.

Collecting known information

Compared to terrestrial sites, the available information on submerged sites in Orkney is sadly scant. Preliminary site surveys at Voy, a relatively short length of loch shore at the western end of the Loch of Stenness, has revealed upstanding sites from a variety of periods previously not recorded. Increasing information on marine archaeological sites is becoming available as greater resources are developed. Information on known sites can be obtained by consulting the national and local inventories (the Orkney SMR

70. The lochs of Harray and Stenness, with the Brodgar isthmus between, from Bookan

and the National Monuments Record of Scotland (NMRS)), though there are inconsistencies in these records. Information may also be available from local maritime interest groups and Orkney's museum service (The Nautical Archaeology Society; Dive Boat Operators Group, Orkney; and Orkney Heritage). Information held locally in private or semi-official hands should not be forgotten

Information on the location of areas of seabed protected under the Protection of Wrecks Act (1973) can be obtained from Historic Scotland. The presence or absence of these designated historic wreck sites does not necessarily mean that other sites do not exist which require (or merit) attention. It is important to consider circumstantial evidence which may indicate whether such remains are present and whether they might be affected by any development proposals.

Assessing archaeological potential

There are a number of strategies that can be employed in order to assess the archaeological potential of an area under water. Inferences can be made from historical evidence and reference to the presence of sites and features on land in adjacent areas. Some idea of the area's past can generally be gained from evaluating known evidence of maritime activity and occupation prior to rises in sea level (Firth *et al* 1997). The concept of a 'maritime cultural landscape' encourages taking a broad view of sources of information which may indicate the presence of sites, for example early maps and charts, place-names and folklore (Hunter 1994).

The possible presence of submerged land surfaces has to be considered and the use of predictive survey in areas of potentially good preservation should be assessed. Certain combinations of chemical, physical and biological characteristics are known to indicate the good preservation of archaeological material (Oxley 1995). In many places information on known sites is poor and there is a high potential for previously undiscovered sites. In these cases assessment of potential is vital, both as a research tool and as a part of the management process. There are, as yet, no formal guidelines for assessing marine archaeological potential.

Evaluation techniques

The importance or significance of sites must be assessed before any intrusive (archaeological or geotechnical) evaluations are permitted because such activities may unwittingly damage archaeological deposits. Visual evaluation, or seabed inspection of identified features, is often the only effective way to estimate archaeological importance. Intrusive methods which involve the disturbance of the archaeological context may be necessary to evaluate the date, nature, extent, condition and preservation of the archaeological evidence, but they should only be undertaken after the development of an acceptable project design.

Excavation

Excavation is the most damaging form of intrusive investigation. Although it is a valid technique on land, trial trenching by divers is usually time-consuming and expensive. Specific small-scale excavations may be necessary (and more practical) to test deposits. There are many different techniques for underwater excavation, and most are similar to land excavation, but they employ different tools and take advantage of the unique properties of the underwater environment. Techniques of underwater excavation are described in various texts (eg Green 1990; Dean *et al* 1995).

Underwater methodologies

Not all land-based archaeological techniques can be directly transferred underwater, but it is fair to say that a greater standard of archaeological work is achievable underwater than is commonly believed. A comprehensive description of the techniques and methodologies

commonly used in the practice of archaeology underwater can be found in other publications (*ibid*). It should be noted that there is often a considerable difference in effectiveness between a technique which is common practice and one which is still in the experimental stages.

Aerial survey

Kenneth Brophy

Aerial survey allows the recovery of information about new sites and new information about existing sites. The view from the air gives a wider picture than that from the ground (Fig 71) and this helps to

71. Aerial photograph of the Brodgar peninsula in 1946. Aerial photographs give a useful overview of sites in the landscape

make sense of the archaeological landscape. Aerial survey not only looks at upstanding remains, it can also indicate sub-soil remains through a variety of factors, such as variations in crop growth which reflect variations in soil moisture over buried walls or ditches (known as cropmarks), or the visibility of shadows from depleted mounds in low sunlight. Aerial photographs can be either oblique or vertical and existing archives of material from previous flights can be a valuable source of information in addition to new, purposely directed flights.

In contrast to the rest of Scotland, Orkney has suffered from a lack of concentrated aerial reconnaissance. In parts of lowland Scotland aerial survey has caused a revolution in our understanding of the prehistoric landscape, but other areas have been neglected. This has been largely due to logistics – RCAHMS flights leave from Edinburgh airport, so journeys to Orkney take several long 'steps' northwards, often lasting a few days and, once there, they are dependent on good weather, something that is not easy to predict. There are also no suitably equipped, or qualified, sponsored or local flyers operating in Orkney as in, for instance, Highland Region or Aberdeenshire.

Nevertheless, limited aerial reconnaissance has been carried out in Orkney, partly through private flyers like John Dewar (who provided spectacular colour images of WHS sites during flights in the 1970s and 1980s) and also some limited reconnaissance by RCAHMS since 1976. This has tended to concentrate on known, upstanding monuments, especially relating to rural architecture, WWI and WWII defences and the oil industry.

Neolithic Orkney has benefited from the above-ground survival of traces of past monuments in the form of earthworks and standing stones. However, there is good reason to believe that sub-surface traces await discovery, as shown by remnant artefact scatters on field surfaces and the discovery of new sites such as Barnhouse. The concentration of agriculture on Mainland and some islands of Orkney, including much of the WHS, has almost certainly resulted in the degrading and flattening of earthworks; and, of course, other more ephemeral constructions, such as timber-works, are impossible to pick up above ground surface. Orkney thus has great potential to yield cropmarks. This is aided by the state of the land: Orkney is relatively flat and covered in a fair percentage of arable land with cereal crops.

A programme of concentrated aerial reconnaissance should be one of the research priorities in the WHS, not only to discover cropmarks of new sites, but also to look for new elements to familiar sites. As well as oblique aerial photography targeted to archaeology, it is vital to assess the archaeological potential of the existing vertical photographic record: eg Royal Air Force and Ordnance Survey coverage since the 1940s. Aerial photography has proved itself to be a powerful and economical tool of prospection that can cover large areas relatively quickly. Importantly, in an area of such familiar archaeology as the WHS, it allows a new perspective. The WHS provides an area of great archaeological potential, but it is a diminishing resource and it is essential that aerial photography be utilised to the full.

Geographical information systems

Angus Mackintosh

Geographical information systems (GIS) are a form of spatial database used to seamlessly integrate and analyse large and disparate digital data sets. They therefore have great strengths for archaeology. Conventionally, the data might comprise digitised topographic data, the results of geophysical survey, aerial photographs etc, but it can also include extended textual records, other forms of digital images, as well as audio and video files (Fig 64 has been produced from a GIS-based system).

A GIS to meet the needs of the WHS should be flexible enough to embrace a

72. Shovel-pitting in advance of excavation on Stronsay

broad range of data related to a variety of themes and interests. One theme would be to look at issues relating to cultural resource management, such as an investigation of the visual impact of new buildings on the fringes of the WHS. The integration of the local SMR and NMRS with the results of current and future archaeological fieldwork would be another. The modelling of sea-level changes and the effect of these on the archaeological record it also important, as are cultural history interviews with members of the local community. It is important to remember that a GIS can hold written, taped and videoed information.

Excavation

Jane Downes and C R Wickham-Jones

Excavation is, perhaps, the best known of archaeological techniques. Excavation techniques are many and diverse and they are well covered in the archaeological literature (eg Roskams 2001). Excavation is only one stage of any project – excavation produces materials which have to be analysed and reported upon, and the results as a whole must be disseminated. The archaeological resource is irreplaceable, and government policy seeks to protect the resource with guidelines and advice (Scottish Office 1994a; 1994b) which advocate *in situ* preservation, if possible. If not possible, all aspects of excavation should be undertaken with a view to sustainability (see pp 120-21).

Conditions of survival and types of sites within the WHS and surroundings vary tremendously and still continue to surprise. Those proposing excavation should ensure they undertake as much assessment as possible in advance (desk-based assessment, remote sensing, sampling and evaluation as necessary and appropriate), in order to minimise the occurrence of unforeseen circumstances. As in any project, specialists should be involved at an early stage in project planning. Sampling strategies should be detailed to include as wide a variety of specialisms as is appropriate to incorporate the research aims of those specialists (Fig 72).

Because of the destructive nature of excavation, consideration should be given before the inception of any excavation project as to whether the research questions could be answered by looking at a site elsewhere in Orkney. Projects

undertaken in the WHS, and related projects elsewhere in Orkney, should be designed with wider applications in mind, whether that be methodological, geographic, heritage management or other applications.

Any excavation that is undertaken in the WHS or the immediate environs (IBZs) will have enhanced management, interpretation and public access issues. Excavation may be required ahead of actions in the Management Plan, in particular those concerning improvement of visitor access, visitor management and erosion at the WHS monuments. Research excavations undertaken should incorporate relevant management issues and wider applications for management, and may also provide opportunities for long-term monitoring following reinstatement of sites.

Excavations in the WHS and immediate environs will be inevitably high profile and highly visible because of the status of the WHS and the large amount of visitors to it. It is important that opportunities for public access, display or leaflets at the time of excavation are considered early in planning stages and are maximised. Prompt dissemination in an accessible form to inform both heritage managers and the public is essential.

Any excavation undertaken in the WHS, no matter what the impetus or source of funding, should be carried out by those who have a knowledge of the history of research of the WHS, and of the broad aims of the research framework (this Research Agenda) for the WHS. That way all archaeological investigations, including those ahead of developer/management activities, can be designed to maximise opportunities to contribute to overall research aims, and can be placed within the research framework that this document provides.

Excavation projects must adhere to the highest professional standards (eg IFA Standards: www.archaeologists.net) and work from the formulation of a robust research design, through fieldwork methods and recording to dissemination and archiving. Importantly, excavation projects must be properly resourced through all these stages of work.

Soil and sediment analyses

Ian A Simpson

Background

Analyses of site formation processes, historic and prehistoric land resources, utilisation and palaeoenvironmental contexts are key research themes associated with the Orkney WHS. One approach to these issues is through soil and sediment analyses. Previous soil and sediment analyses in the Northern Isles, and the North Atlantic region more generally, have developed and tested a number of methods that have potential for application within the Orkney WHS. The use and potential of these methods is summarised below.

Field survey

High quality soil survey and geological survey maps and descriptions for Orkney already exist at a scale of 1:50,000, and these provide a foundation from which to design land resource assessments (Soil Survey for Scotland 1981; British Geological Survey 1936-1994). Soil surveys have, for example, identified significant areas of relict 'deep top' soils in West Mainland Orkney, and these have been demonstrated to be 'plaggen' soils containing significant information on early arable land management practices and the relationship between arable activity and livestock husbandry (Simpson 1997).

Thin-section micromorphology and associated techniques

Thin-section micromorphology allows the microscopic examination of undisturbed soils and sediments (Davidson and Simpson 2001; Courty *et al* 1989), permitting formal description of soil and sediment components (Bullock *et al* 1985).

The use of experimental and ethno-historical approaches to validation, combined with chemical microprobe analyses of key features (Davidson and Simpson 2001; Macphail and Cruise 2001), means that the interpretation of thin-section components is becoming increasingly robust. As a result, this technique contributes information to an increasing range of archaeological questions.

In a North Atlantic context, archaeological midden stratigraphies in Orkney have been examined to elucidate distinctions between specialised fishing communities and farm-fishing sites over various time periods (Simpson *et al* 2000; Simpson and Barrett, J H 1996). Proton induced X-ray emission microprobe analyses with associated micro-focus synchrotron X-ray scattering analysis has been used to establish the origin of crypto-crystalline products of bone decomposition at these sites, providing the potential to retrieve archaeologically significant information from sites with poor preservation (Simpson *et al* 2000; Adderley *et al* forth). Fuel residues in complex midden stratigraphies can also be identified using thin-section micromorphology, and quantified in two dimensions using image analyses techniques, and in three dimensions using high resolution X-ray computed tomography (Adderley *et al* 2001; Simpson *et al* 2003). Similar analyses could be applied to the study of occupation surfaces, and these would provide information on the *in situ* spatial patterning of micro-artefacts and ecofacts in three dimensions, allowing new insights into the functions of archaeological sites. Currently, and of direct relevance to the Orkney WHS, thin-section micromorphology analyses are being applied to midden stratigraphies at Skara Brae (Simpson, forth). There is further scope to consider fossil soils beneath a monument as a way to assess the environmental conditions prior to monument construction (Barclay, G J *et al* 1995; Simpson and Davidson 2000). Thin-section micromorphology can also be applied to the study of 'offsite' soils and sediments, contributing in particular to the identification of manuring and cultivation practices associated with early field systems. Fuel residue inputs, the use of turf and intensities of cultivation, have all been identified in early arable soils, which range from the Neolithic to the early modern period. These observations, when integrated with biomarker analyses, provide powerful new insights into early land management strategies (Simpson 1997; Simpson *et al* 1998a; Simpson *et al* 1998b).

Biomarkers

Innovative organic geochemistry techniques applied to soils and sediments are now making a major contribution to the understanding of early land management practices in Orkney and the North Atlantic region. These techniques include the identification of free soil lipids which permits the identification of organic materials used in manuring strategies – human manures, omnivorous manures and herbivorous manures - within arable and hay production systems (Bull *et al* 1999a; 1999b; Simpson *et al* 1999b). These have now been verified in experimental and ethno-historical contexts. Observations from the Northern Isles suggest a focus on the use of household wastes in maintaining arable land fertility from the Neolithic through to the early Iron Age, with a switch to the use of animal manures from the late Iron Age through to the early modern period. Advanced biomarker analyses using compound specific stable isotope analyses ($\delta^{15}N$ on amino acids and $\delta^{13}C$ on n-alkanoic acids) have further suggested differentiation between manured grasslands, unmanured grasslands and continuous cereal cultivation, together with the differentiation of terrestrial and marine sourced organic inputs to archaeological soils (Simpson *et al* 1997; 1999a). These techniques can be applied and developed further within the WHS to identify the range and intensity of arable and grassland management strategies.

73. Post-excavation work plays a vital role in archaeological research

Modelling

Modelling is an essential tool for research into the historical and archaeological dimensions of land sustainability. Recent research using the CENTURY agro-ecosytem model has demonstrated accurate predictions of crop yields and soil nutrient status in historical arable contexts in the Northern Isles (Adderley *et al* 2000). This allows exploration of a range of arable land management strategies to be made, in particular the levels of manure input required to minimise loss of soil nutrient status and to maintain subsistence or surplus levels of grain yield. Most recently, the CENTURY model has been applied in pre-modern Iceland to examine the relative rôles of climate and manuring strategies in determining arable crop yields, concluding that management of soil nutrient status was the primary limiting factor (Simpson *et al* 2002). Grazing models which explore the relationship between vegetation productivity, grazing preferences and vegetation utilisation, have also been successfully used in the Northern Isles and North Atlantic region (Simpson *et al* 1998b). Increasingly, these models are being related to historical patterns of land degradation and discussions of early land management strategies (Simpson *et al* 2001). There is real potential within the Orkney WHS area to use modelling to consider early land management strategies, their economic and environmental consequences, and to explore 'what if…' management scenarios.

Artefact analysis

Andrew Jones and C R Wickham-Jones

Background

The Neolithic sites contained within the WHS zone comprise some of the best-preserved Neolithic sites from western Europe. They were, in some cases, in use for over a millennium from a period spanning the beginning of the Neolithic and into the Earlier Bronze Age. Their information comprises not only unusual details of architecture but also, because of the remarkable preservation, much of the suite of objects, everyday and otherwise, that made up daily life. This sort of detail is rare elsewhere in Europe. As such these sites provide us not only with a series of windows into the daily life of different people at various points over the period, but they also provide researchers with a unique picture of social change.

Using the material culture from these sites, archaeologists can examine the myriad of ways in which people conducted their daily life (Fig 73). Studies include: how people related to their surrounding environment; how they interacted; how they expressed themselves culturally and artistically; how they dressed and made their tools; how they farmed, hunted, fished and gathered; how they cooked and ate; and how they articulated a relationship with a wider, spiritual, world.

Artefact analysis includes many different processes and specialisations and Orkney provides an ideal laboratory within which to develop its varied applications. The individual techniques are too many to list in detail here, though some are mentioned below. The use of residue analysis provides a good example of the way in which new techniques are constantly under development. In recent years much work on residue analysis has been developed outside of Britain, but new research is beginning to redress the balance and Orkney is well placed to play an important rôle here because of the rich variety of artefacts preserved in the Orcadian middens. Residue analysis comprises the

recovery and identification of traces that are assumed to relate closely to the uses of different artefacts. It involves the study of residues (sometimes microscopic) that have built up and been preserved on artefacts of various different materials. Bone, pottery and stone have all been shown to harbour residues when the circumstances are right. There are many ways in which residues can build up: burnt remains on pottery; the incorporation of stray grains and pollen into the fabric of a pot; traces on stone and bone tools; and alterations of the actual fabric of tools. Not surprisingly, residue analysis incorporates many different techniques in the quest to record and identify these remains. Scanning electron microscopes, chemical work on lipids and starches, pollen analysis and more detailed work such as isotope studies all have a part to play. Once the residue work has been done, there are obvious benefits from the incorporation of the information into wider data sets so that aspects such as content might be played into the pottery research outlined above.

The following discussion is intended to give some idea of the wide range of techniques involved in artefact analysis and to look at how some of the techniques might be applied, but it is not an attempt to be comprehensive.

Ceramics

Ceramics and community identities

Ceramics are critically important for archaeological interpretation because they are used for the processing, consumption and storage of food. While this activity may seem mundane, it is fundamental to all human life and it has been shown to be vital to the expression of social dimensions since in most cultures food plays a crucial rôle in the expression of affiliations between people: at the household; kin group; community; and inter-community level. Not only this, but the production of pottery using specific materials, in different styles and with distinctive decoration, is generally associated with the expression of social identity.

In Orkney, research into the use of the ceramics as an expression of social identity is concerned with the relationship between the production of early Neolithic bowls and Unstan Wares, and that of late Neolithic Grooved Wares. The materials used in the production of the pottery can be examined using petrological thin-sections. This technique has been traditionally used to ask questions concerning the locality of pottery production and the nature of pottery exchange. However, work at the late Neolithic settlement at Barnhouse has taken a different approach (Jones in Richards (ed) forth). By using information from multiple thin-sections derived from pottery from many locations within the settlement, a more detailed picture of pottery production could be produced. This indicated that each household was making pottery from specific raw materials, suggesting that pottery production in the Neolithic was organised by individual households. Using this technique, the Barnhouse analysis was able to trace the life histories of the Grooved Ware vessels from production to deposition. Petrological links were established between the locations of production and those of deposition, not only within the settlement, but further afield in Orkney, at sites such as the Stones of Stenness and the Quanterness passage grave.

This research has provided important evidence of the relationship between people and their environment. By taking it further, researchers can build up a picture of the complex web of links between vessels deposited on the various different types of site, so that material from the henges and passage graves can be related to that deposited in the settlement sites. Furthermore, the links between contemporary settlements can be examined.

Ceramic technology and settlement histories

Orkney has one of the best records of Neolithic settlement in Europe. Furthermore, many of the earlier prehistoric settlements that have been

excavated are deeply stratified with sequences of remains that run from the early Neolithic to the early Bronze Age. As a consequence there are good sequences of pottery for this period. However, the material record is not matched by our understanding; there is still a poor grasp of the nature and periodicity of settlement histories. How long were houses inhabited for? How did house and settlement history change? How, and why, were settlements abandoned? New research at Southampton University is addressing this (Jones forth).

One approach is to combine the examination of architectural history with an examination of the changes in ceramic technology. Subtle changes in the production of pottery can be identified both petrologically (see above) and technologically, and these can be defined in relation to changes in settlement history. In this way a detailed picture of the social processes involved in the establishment, evolution and abandonment of settlements can be drawn up.

Alongside the technological examination of pottery in relation to settlement histories, will be a thorough assessment of the nature and quality of the existing ^{14}C record related to the Neolithic settlements. If necessary, work will include the development of a parallel research programme to obtain increased dates.

Stone tools

Flaked stone tools

Flaked stone tools comprise one of the main sources of artefact information for much of Neolithic Scotland. Their study has widened greatly in recent years with the development and application of techniques of analysis that take into account the many fields of information available, such as raw materials, procurement, technology, use and reuse, movement and deposition. Orkney offers an outstanding opportunity in this respect because the lithic record is derived from a background of unique richness. In this way, information from the stone tools can be set into much wider contexts of social explanation. Sadly, the lack of basic work, including elementary publication, on all but a few of the most recently excavated assemblages, has limited the use of this sort of wider analysis. Work on lithics elsewhere, and on other artefact types in Orkney, shows the great benefits that would accrue from such work.

Provenance and exchange

Other types of stone artefact include both ground and decorated stone, but once again there has been little work on the characterisation and analysis of ground stone tools in comparison to that on pottery production and circulation. There are many stone tools of note from Orkney: including one of the major concentrations of pestle maceheads in Britain; together with a number of other macehead forms; carved stone balls; stone axes; and a variety of coarse stone tools, such as Skaill knives.

There are many different aspects to the analysis of stone tools, but one important facet would be to look at provenance and exchange through a detailed examination of stone tool petrology and sourcing. This has wider application in terms of the nature of interaction networks both within Orkney, and between Orkney and other regions (Shetland and the Scottish mainland). Primary research ought to commence with the construction of a local database of sources, so that coarse stone tools and stone axes which are likely to be of local origin can be assessed. In this respect it is interesting to note that preliminary comparison of the rock sources for pottery production at Barnhouse with the sources of stone tool materials here suggest a close connection. Detailed analysis of the stone tool lithologies is necessary to clarify this connection.

Social context

The recovery of many ground and decorated stone tools from settlement sites and other excavations in Orkney provides another opportunity: that of looking at the use and deposition of these pieces. This should include work on individual sites as well as inter-site comparisons. Elsewhere

74. Faceted haematite from Skara Brae

in Scotland artefacts like these are often found as stray finds with little or no context, so that social interpretation is limited. In this way, information from Orkney could be used to amplify the picture elsewhere.

Bone tools

The sites of the WHS and elsewhere in Orkney have provided a repertoire of prehistoric bone tools that is unique in quality and context. Yet this strand of evidence remains almost unresearched. Potential analysis ranges from straightforward investigations of species selection and technology related to the different types of bone tool that were used, through stylistic comparisons of tool types, to contextual and spatial information that may be built up both at the level of an individual site and between different sites. More complex research includes work on use and residues. This is a new line of research that is currently under development for lithic tools and promises interesting results when applied to other materials.

Haematite and ochre

Pieces of haematite and ochre have long been known from sites such as Skara Brae, but their analysis is only recently under development and it promises new, and exciting, information (Fig 74; Isbister pers comm). Ongoing work is looking at the uses of haematite as a pigment and its relation to prehistoric art as well as other uses such as in medicines. Archaeologically, a major facet of this work is to ensure that all excavators are aware of the potential of these often apparently undistinguished finds.

Experimental archaeology

C R Wickham-Jones

Experimental archaeology has a respectable history (Coles 1973). It is a useful archaeological tool that assists archaeological interpretation at various levels from the analysis of the practicalities of building to that of tool manufacture and use. It can also be applied to more dynamic situations, such as social organisation. Experiment can never show precisely how things were done in the past, but it can help archaeologists to understand how they might have come about. It helps the archaeologist of the 21st century to step back and broaden their understanding of the range of ways in which things might have been done.

A particularly valuable facet of experimental archaeology is the potential that it offers to broaden archaeological work to include the wider community. Some experiments involve many people, others involve just a few individuals, but the value of experiment is that it brings different specialisations and skills to bear upon archaeological interpretation. Builders, silversmiths, cooks and weavers have all played a vital rôle in recent archaeological experiment in Orkney and the list of potential skills is almost endless.

The value of experiment lies not just in its use of related expertise but also in its use as an interpretive tool (Fig 75). Archaeological sites and finds can be difficult to relate to the everyday life of the past. Nothing can beat the practical demonstration of ancient skills, the actual experience of entering a reconstructed building, or the fun of trying something out for oneself. Experiment, in the form of

75. Pre-heating a Grooved Ware-type vessel at Stonehall

experience, is particularly valuable for children, but also, of course, of great interest to the adult community.

Experiment in Orkney is itself longstanding, from the elucidation by Petrie of the manufacture of Skaill knives (Petrie 1868), to the Minehowe Knowhow event in 2002. Despite this, British archaeologists rarely include experiment as a valid part of their studies in the same way that takes place elsewhere, eg in Denmark (http://www.english.lejrecenter.dk/ visited December 2003). The introduction of more archaeological experiment to research related to the WHS would not only benefit archaeological knowledge in the WHS, but also the place of Orkney within the archaeological profession as a whole.

Skeletal studies: human origins, diet and lifestyle

C R Wickham Jones

Recent scientific advances have produced exciting results from the study of human skeletal material. This is wide-ranging research that incorporates many different skills, and much of it is still under development. Orkney contains one of the best collections of human bone from Neolithic Scotland as well as skeletal material from more recent periods. The quality of the human bone record from Orkney including, as it does, both isolated bones and well-stratified skeletons from a range of periods, provides great potential for the development and testing of these methods. This would not only benefit archaeology, but also our knowledge of Orkney. Likely information includes various different aspects of mobility and origin (the birthplace and movements of individuals, as well as possible DNA links), as well as information on diet, such as the relative importance of fish versus meat. In addition, studies of disease and life-style through the bones are undergoing rapid advances and this should be applied to the Orcadian material.

Ecofactual analysis

C R Wickham-Jones

Complementing the rôle of artefact studies in archaeological interpretation is the rôle of ecofactual analysis. Ecofacts comprise the natural finds from a site, including shells and animal and fish bones, unworked antler and so on. Though they have been collected, and influenced, by humans, ecofacts are not worked. They are not tools *per se*, and their relationship with the human community is complex. The high quality of preservation in Orkney means that many sites have a good range of ecofacts and their analysis has a lot to offer. Many different strands of ecofactual analysis are under development and Orkney offers an ideal ground to test and further these studies.

Ecofacts have much to tell us, not only about the world in which the people of the past lived, but also about the ways in which they manipulated and harvested that world (Fig 76). They tell us about the environment and about economy. Shellfish studies, for example, can throw light on the specific coastal conditions in the areas that were harvested. They tell us about the harvesting techniques and preferences of the people and they may give us information on diet and other activities such as medicines and the extraction of dye. Studies of animal and fish bones provide information on climatic conditions, husbandry practices, butchery techniques and diet. They help us to compare the relative importance of wild and farmed foods and this in turn may be tied in to years of environmental difficulty. There are also deeper ways in which these resources may have been embedded into the life of the community, such as in the apparently ritual importance of red deer or other animals, and birds, at some Neolithic sites, and it is important to recognise this if we are to get a full picture of life in the past.

76. Articulated animal bone at Tofts Ness, Sanday

Palaeoenvironmental studies

C R Wickham-Jones

Palaeoenvironmental evidence provides a whole suite of information which complements that from the archaeological site. It may be obtained from the site itself or from its surroundings, and it helps to flesh out the picture of the world in which our ancestors lived. Palaeoenvironmental information is derived from many sources such as pollen, charcoal, beetle and mollusc remains, and it runs alongside the study of the ecofactual material. There are many specialised publications on the different strands of palaeoenviromental evidence (Dincauze 2000; Simmons 2001).

Palaeoenvironmental evidence is important because it does not only touch upon the world in general, but also upon the specific relationships between people and that world. For example, anthropogenic burning episodes may be seen in the charcoal record, woodland management can be shown through pollen studies, and beetle remains have been used to infer periods of disuse and abandonment at settlement sites.

The palaeoenvironmental record from Orkney is a rich one, wherein there is evidence both for the WHS in particular and the rest of Orkney. It is important to include it in any archaeological work that takes place. This should not only apply to tried and tested methods, but also to the application and development of new avenues of research.

Historical and cartographic sources

Sarah Jane Grieve

Historical and cartographic sources provide a basis for understanding the evolution and development of the medieval and modern landscape and therefore significantly enhance our understanding of the WHS and its context.

Although these sources are not without problems, a critical appreciation of the agendas and biases allows them to be used to further knowledge at a landscape-holistic level as well as a more site-specific level.

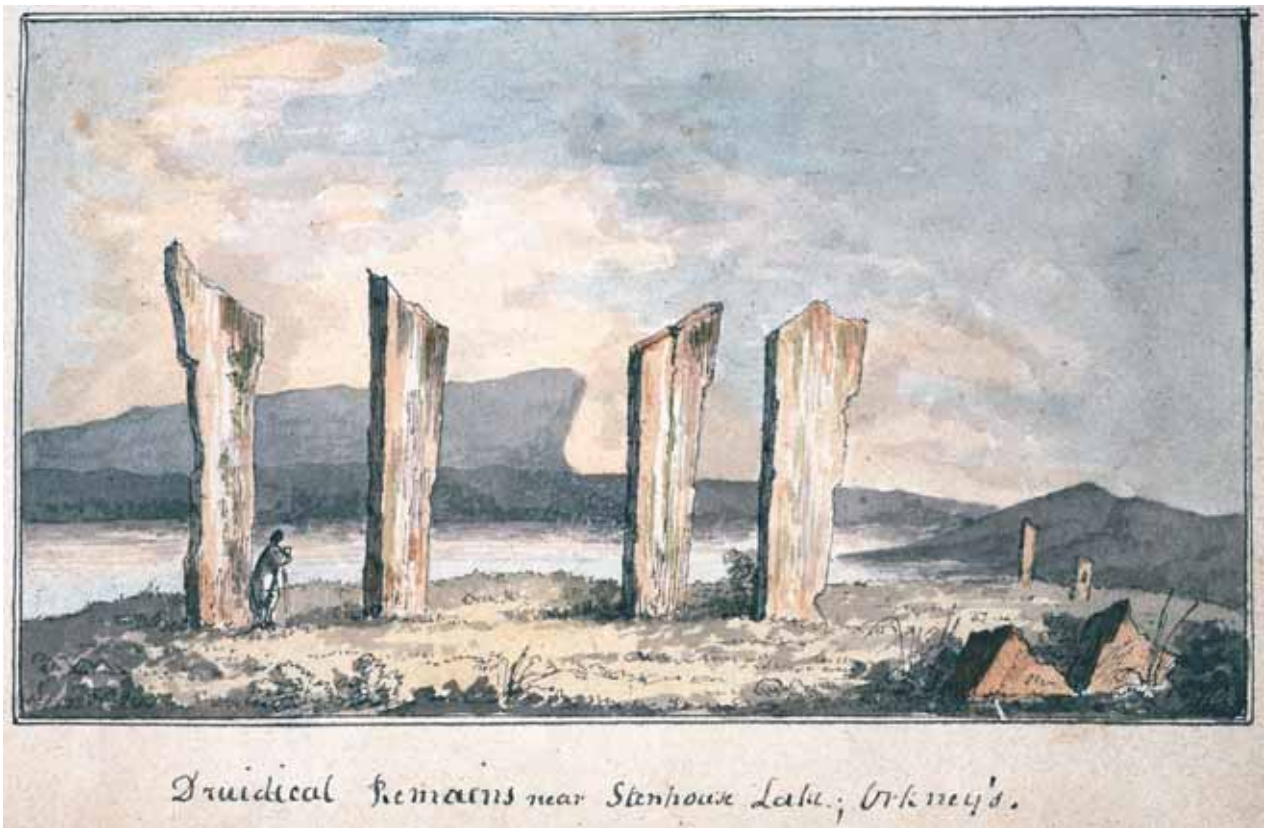
Historical sources

There are very few early historical sources relating to Orkney. The first major source is the Orkneyinga Saga written AD *c*1200 in Iceland and detailing, in typical saga prose, the lives and exploits of the Norwegian earls of Orkney (Taylor 1938). The importance of this source should not be underestimated; it not only provides information on the settlement patterns of 12th-century Orkney, but it was also the basis for a number of influential studies in the early 20th century in Orkney which developed the concept of a Viking 'Golden Age'. Other Scandinavian sources with reference to Orkney include *Hakonar Saga*, *The Icelandic Annals* and *Historiae Norvegiae* (Dasent 1894; Storm (ed) 1880; Storm (ed) 1888).

The first indigenous sources are a series of taxation rentals, the earliest dating from 1492, which detail the earldom and bishopric lands of Orkney (Peterkin 1820; Thomson 1996). These provide useful information on townships and farms (especially the place-names and rental values) from which it is possible to recreate much of the 15th-century agricultural landscape of Orkney. Previous scholars have used these Rentals retrospectively to postulate land settlement patterns for the Norse period, and although the medieval taxation system was relatively static, this is now considered to be a misapplication of the rental information.

There are a number of medieval sources such as Decrees, Dispositions, Sasines and Charters as well as estate papers, some of which were collected and published as *Records of the Earldom of Orkney* (Clouston (ed) 1914). Other papers are to be found in the *Old-Lore Miscellany* series (1892 onwards) and the Orkney Archive, and all of these provide further information on the nature of: land division; the emergence, development and dissolution of estates; boundary delimitations; and other issues pertaining to settlement and land. These sources provide a wealth of information which has not, as yet, been systematically or critically assessed to any great extent, though scholars such as Clouston ((ed) 1914; 1927; 1932a), Marwick (1929d), and especially Thomson (1996), have shown the potential of these sources for studying the development of the medieval landscape of Orkney.

Later sources, more readily available, include the Old and New *Statistical Accounts*, which in many instances provide the first recorded description of monuments and sites. The level of detail in these was very dependent on the particular interests of individual parish ministers, however, for example they give only very basic descriptions of the monuments in Stenness, though there is more detail of those in Sandwick (OSA vol 14, 134-5; OSA vol 16, 451-2, 458-61; NSA vol 15, 68; NSA vol 15, 53-8). There are several *Tours* of the Northern Isles and *Descriptions* such as those by Ben (1529), Wallace (1693), Brand (1883), Low (Cuthbert 2001), Barry (1805) and Tudor (1883); and the detailed work of the



77. 'Druidical remains near Stenhouse Lake, Orkney's', an example of an early pictorial record of a monument

ecclesiologists Muir (1885), Neale (1848) and Dryden (in MacGibbon and Ross 1896) which provide information on standing monuments. These sources are the result of the antiquarian movement which developed throughout the 19th century and they are useful because they not only provide detailed descriptions of sites now lost or ruinous, but they also preserve folklore and traditions which have since become obscure. A more ambiguous source from this period lies in the various collections of watercolours and drawings depicting monuments and churches such as those in the Robertson Collection (privately owned) (Fig 77), the Dryden watercolours (Orkney Archives) and Aberdeen's sketches (Orkney Archives). An increased interest in antiquarianism, spurred by a growth in nationalism in the late 19th century and early 20th century, is exemplified in the large number of studies focussing on the 'Norseness' of Orkney, including Clouston's *History of Orkney* (1932a); Marwick's series of place-name articles published in the *Proceedings of the Orkney Antiquarian Society* (eg 1923b; 1931); and most overtly in Johnston's formation of the Viking Society and his studies into Udal Law. This development resulted in many excellent, and some suspect, studies of Orkney and 'Orkneyness' and has influenced scholarly thought throughout the 20th century. These early 20th-century articles, when used critically, can provide valuable information for future research.

Over recent years the RCAHMS has been completing an extensive survey of all WWI and WWII remains in Orkney, bringing together contemporary documentary sources (including photographs and oral history interviews) and modern surveys of the surviving structures. This collection of information is able to provide a useful insight into how the WHS was utilised during both World Wars. Publication of the results of this survey work is due in the near future but can be accessed in the meantime through the RCAHMS.

Orkney is fortunate to have both a photographic and sound archive, based within Orkney Archive. The Sound Archive holds recordings from as far back as the 1950s, with Ernest Marwick's collection, copies of recordings made by

Alan Bruford of the School of Scottish Studies, and holds the archive of recordings made for BBC Radio Orkney. These have been supplemented with a variety of more recent oral history projects which have included oral history and folklore-based work. The Photographic Archive has a vast collection of photographic material which covers the WHS. Both archives have the potential to yield useful information which should be the base from which any future oral history or folklore research is developed.

Cartographic sources

The early cartographic sources, including sea charts, estate maps and maps formed during the Division of the Commons, provide useful and important information on early land systems. When combined with the Rental information, they help to provide an enhanced understanding of pre-improvement Orkney (as shown in Thomson 1996). The most important early charts for Orkney are Mackenzie's Charts of 1750, which include township boundaries, manor houses, large farms and churches. These not only preserve the township areas but also provide a source of place-names. A significant later source is the Ordnance Survey first edition maps and the Original Name-Books, which often preserve accounts and locations of previously unrecorded sites, authenticated by local testimony.

The above sources provide significant contextual information, which not only provides insight into the medieval landscape of Orkney but also charts the progress of antiquarian study and shows the impact that this has had on our understanding of the monuments and the landscape in which they stand. To ensure that these sources are used to their full potential, an inventory of the material available for the Orkney WHA would be a welcome addition to the SMR or the Orkney Archives.

Qualitative interviewing and participant observation

Siân Jones and Angela McClanahan

Research into the beliefs and values of local communities in relation to archaeological remains and sacred sites has led to productive developments in terms of heritage management, legislation, research practices and visitor management. In this work participant observation and qualitative interviewing are important methods to acquire knowledge. This approach involves a variety of methods derived from anthropology, sociology and heritage management, including questionnaires, focussed interviews and participant observation, and it is seen as an important contribution to challenge conventional aspects of heritage management policies (eg see Bartu 1998; Moser 1999). Though it started out in the context of post-colonial countries with vocal indigenous minorities/local communities, it is now seen as a productive part of the process of heritage management in Britain.

The method of research requires engagement with various different communities and individuals, such as local inhabitants, farmers, archaeologists, visitors, tourist organisations, etc, in a variety of social settings, and this is achieved through the overarching framework of 'multi-sited' ethnography (see Marcus 1998). This anthropological strategy is intended specifically to observe the behaviour and social engagements of groups and individuals in different places. It centres on spending significant amounts of time in different cultural settings (both physical and virtual; for example, an archaeological site vs. an internet discussion forum), viewing each place/situation as an individual field 'site'. Within each site a combination of specific methods can be employed: participant observation; direct observation; focused qualitative interviews; historical and documentary analysis; and questionnaires.

78. Museums provide a place for study as well as for display
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Participant observation involves living amongst, and participating in, the activities and daily lives of the specific communities which are the focus of research and it is widely regarded as yielding the most in-depth insights and understandings of people's beliefs, traditions and practices (for an overview see Jorgensen 1989). Interviews comprise an important part of this in order to deal with specific issues: they may range from impromptu, informal, but focused, conversations that take place during routine interaction, to formal semi-structured interviews that have been specifically arranged. In the context of the WHS, the incorporation of relevant textual material relating to archaeological sites and monuments (eg in leaflets and on display boards), heritage management policies, community and agricultural organisations, folklore, newspaper articles etc, is important. This work draws not only on contemporary practice, but it is also important to provide a historical dimension through the use of oral and written historical evidence. In this way it is possible to provide a historical context for people's beliefs, traditions and practices.

Studies of this type are taking place in Orkney (currently by Angela McClanahan as a PhD studentship, supervised by Siân Jones, Manchester University and funded by Historic Scotland; McClanahan 2004) and they will provide in-depth knowledge about people's beliefs, perceptions and practices as they relate to the WHS. More broadly, the rôle of the WHS in the development and transformation of a sense of place and local identity can be explored in relation to other historic sites in Orkney and elsewhere. At a national (or international) level the WHS offers a detailed case study to explore the wider issues concerning the impact of archaeological monuments, and their research, management and presentation, upon a contemporary society.

Museum-based studies

Anne Brundle

Museum collections hold original archaeological and historical material, and associated information. They have great research potential. Previously published material can be usefully re-examined with

reference to new information or collections, sometimes overturning previous assumptions (eg Forsyth 1995; Heald 2001). The principal archaeological collections from excavations in Orkney are in the Orkney Museum and the National Museums of Scotland, but there are a surprising number of other museums, elsewhere in Britain which also hold some of the older Orkney material.

Access to museum collections is hampered by museum catalogues, many of which are incomplete and unpublished. The Museums Registration scheme includes a general requirement for registered museums to address catalogue backlogs, and the Orkney Heritage Development Plan 2000-2003 included a commitment by Orkney Islands Council to establish a five-year plan to address this issue, but, at present, only part of the Orkney Museum's archaeological collection is catalogued by the museum; most of the remainder is accessible only through excavation archives and published reports.

Museums hold material from published and unpublished excavations and isolated finds. For the published material, there are post-excavation reports. Some of these include wide-ranging re-evaluation of a class of material (eg MacSween 1997). Other specialist reports are produced with limited resources, so that it is not possible for the authors to look at comparative material in other collections, or to find parallels which may be obscure. These materials covered by such reports might well reward further study (Fig 78).

It is more difficult to study unpublished assemblages, particularly those from older excavations. Researchers may have to rely on the advice of museum curators, or personal networks, to get access to information not yet in the public domain. Information about individual finds and small assemblages should be available through museum catalogues.

Sadly, research visits to museums are rare, as are detailed enquiries. They need to be encouraged. Museum collections are the public heritage; they and their associated information should be as freely available as is possible within the limits of the conservation needs of the material and of the museum resources of time and space.

With regard to the WHS, priority should be given to putting together a catalogue of all relevant museum holdings and their location. Past archaeological research in the WHS has created a wealth of material from which more information can be gained. This includes material derived from sites elsewhere across Orkney, as well as material from the WHS itself. Finds from previous excavations are a valuable archaeological resource, the material remains of sites that have been wholly or partially excavated away. There is a still a great deal to be learned from them.

PART 5

Research strategy

Introduction

The preceding chapters demonstrate the lengthy history of archaeological and related research concerning the WHS. This is not surprising in an area that is defined as being of such great archaeological significance. It is also clear that research relevant to the WHS comprises not only projects that look at the Neolithic, but also those that cover both preceding and all other periods, up to and including the present day. It all adds up to an impressive foundation for future research. The preceding texts have combined the work of many authors in setting out a comprehensive review of existing knowledge of the WHS, identifying research themes, relevant techniques and gaps in knowledge. It is to the credit of the extraordinary quality and character of the archaeological remains that such a broad group of specialists could be assembled and persuaded to contribute.

A research strategy should provide priorities and methods for implementing a research agenda, and so this strategy has been formulated as a means by which the Research Agenda might be put into action. The strategy is intended to help those responsible for funding decisions to place individual projects within a wider context and assess the value of the proposed research, and to provide a means by which those who intend to carry out research can best plan their research.

Broad research themes were identified and discussed in Part 3; this section starts to break that down into a series of managable topics and projects. We have not tried to prioritise individual projects because the specific factors leading to prioritisation will change with time, but we have set out a method by which priorities can be drawn up.

We hope to see research moving forward within an ethos of sustainability which is, we feel, the spirit that best safeguards the future well-being, and our understanding, of the WHS. The following paragraphs outline this approach.

Sustainable research

Sally M Foster

'Scotland's built heritage should be managed in a sustainable way, recognising that it is an irreplaceable resource' (Historic Scotland 2000, Article 3). How should this be applied in the context of research in general, for the Orkney WHS in particular? As a starting point, it is useful to paraphrase the Council for British Archaeology's definition of sustainable development: 'sustainable research meets the needs of today without compromising the ability of future generations to understand, appreciate and benefit from the historic environment of the WHS and its environs' (Clark 1993, 90). With this in mind there is only one serious point at which there is the danger of research not being sustainable and that is through the destructive process of archaeological excavation, as recognised above (pp 33-5). However, there are many ways in which the sustainable qualities of excavation, and indeed of non-invasive research, can be enhanced. Drawing upon the broad principles for conservation set out in the Stirling Charter (Historic Scotland 2000), and Historic Scotland's (2002) policy on sustainable management of the historic environment, it is possible to

identify a set of principles that should underpin any research in the WHS and surrounding areas.

- Research aims should include the conservation of the WHS for the benefit and enjoyment of present and future generations.
- Research should recognise that the resource is irreplaceable and seek to ensure that all aspects of its practice are as sustainable as possible.
- There should be a general presumption in favour of preservation. Intervention should be the last resort, after all other avenues of research have been explored, and then it should be minimal.
- The precautionary principle should apply; unless it is possible to assess the impact of any interventions or other actions on the cultural and natural heritage resource, including that which is *not* to be disturbed, then potentially damaging actions should be avoided.
- In the case of invasive work, arrangements should be made for long-term monitoring of the condition of the site once works have been completed, in order to understand better the consequences of such intervention and feed this knowledge into future strategies.
- As in all aspects of archaeological work, the highest standards must apply, not least with regard to recording, ensuring that there are proper records before, during and after work.
- Parties should work together to share knowledge and resources, find solutions to common questions or problems, and maximise benefits, not least by ensuring that research objectives address the broadest possible spectrum of interests, including those of heritage managers.
- Addressing back-logged research must be a priority in order to make all available information widely accessible.
- Those undertaking research, particularly in the case of excavation, must have the highest quality knowledge, skills, technologies and resources available to them. All periods of human activity should be valid subjects for research, not just the main periods of the monuments in the Site.
- Investigation should, where possible, contribute to the understanding of the broader environment and the impact of human actions on natural resources through time.
- Appropriate measures should be taken to assist all people, particularly the local community and tourists, to enjoy, appreciate, learn from and understand the WHS.
- All research should aim not only to address the specific requirements of the WHS and its environs, but to constitute examples of best practice with wider applicability.

It is also important not to lose sight of the fact that significant, if less visually impressive, archaeology lies on the doorstep of the WHS, and indeed is to be found throughout Orkney. With an eye to sustainability, undue concentration of effort on the WHS should never be prejudicial in the long-run to other archaeological (and associated social) interests. The first question to be asked of any research proposal must be whether it can *really* only be addressed through work in the WHS. It is vital to continue to ask questions of what has happened in the past and what we are doing now, but we have to make sure that individual research designs be assessed against a broader research agenda, the horizons of which extend well beyond the WHS itself.

Research rationale

Jane Downes and C R Wickham-Jones

Research can be related to various basic themes within archaeology and, as set out above, this document has chosen to eschew the traditional period, subject, or management-based themes for two broader themes into which all traditional themes can be bound.

Artefacts, monuments and cultural identity looks both at groups of artefacts, such as pottery, and at the monuments themselves, such as the stone circles. In doing so it removes the distinctions of scale often applied by archaeologists to their material.

The interplay between the different elements of archaeology is examined to see how they related and were used to construct a world, both at various times in the past and in the present. In this way all archaeological finds within the WHS are recognised as valid research objects in their own right, whatever their size or period. It is also recognised that at any one time in the past there have been previous pasts to which people have related. At the same time, the rôle of archaeology in the world of today is a source of interest.

The formation and utilisation of the landscape looks at the different processes that have gone on to produce the landscape of the 21st century. Under this research theme it is appropriate to stop the process at any one particular time, in order to highlight that period or process: for example early Holocene climate change or the introduction of agriculture. By building up a series of slices of information, projects that work within this theme will be contributing to the wider picture.

It is recognised that research relating to the WHS will not only take place in the WHS. The WHS has never existed in isolation; it is part of a wider system. Information from outwith the WHS has great bearing on the WHS, both as part of its natural setting and at an individual level as detail from sites elsewhere can be used to explain gaps in our knowledge of the WHS sites. From the perspective of Orkney, there are thus four geographical frameworks for research that may be set out, though they are not intended to convey any sense of project value:

- site-specific research;
- WHS-specific research;
- zone-specific research;
- research that is specific to Orkney as a group of islands.

Sample research

For the purposes of this document, examples of research have been divided into broader topics and then set out as specific projects. In this way it is possible to see how research might go forwards as a series of manageable actions that combine to provide wider information. The broad scale topics have been set out first, but it should be emphasised that this list is by no means exclusive. It is not intended as an end point in itself, but rather as stimulation to the individual reader.

Sample research topics: artefacts, monuments and cultural identity

Siân Jones, Colin Richards, Artefacts, Monuments and Cultural Identity Group, Temporality and Period-Based Research Group

Archival assessment and synthesis

Successful research depends on a good knowledge of the artefact assemblages and related archival material held in museums. At present there is no archive of relevant material. The finds from Orcadian sites are scattered across many museums, within Scotland and further afield, and in some cases finds from a single site reside in several different locations. A basic assessment and synthesis of museum-based material (to include both finds and archive material) in relation to the WHS and its buffer zones is necessary. An inclusive and accessible archive, perhaps in the form of a web-based index, would provide a vital tool as a starter for any research.

Architectural life histories

Much research has been carried out on the architecture of the Neolithic sites and monuments included with the WHS area and its buffer zones. This has, however, largely ignored the length of time over which these monuments have survived and their differing rôles throughout that time. There is a great need for research which explores the durability of the architecture over time, and the ways in which these sites and monuments have been re-thought, re-fashioned and reused. This research extends beyond the Neolithic to include sites and monuments from other periods, and especially the dynamics of their relationships to the Neolithic remains.

The creation of the monuments

Detailed studies of how the monuments were created – including both the mechanics of construction, and the selection and acquirement of suitable materials, as well as a consideration of the act of construction as an ongoing project.

The life histories of artefacts

The production, use, consumption and deposition of artefacts. Ultimately this research should extend beyond site specific projects to comparative and synthetic research. This might, for example, look at networks of production, circulation and consumption. Most artefact studies focus on particular materials and it seems likely that there is useful information to be gained from trans-material studies.

Review and strategy for detailed physical and chemical studies of artefacts

This research should focus particularly on existing museum collections and address questions such as:

- What is the status of current analytical techniques?
- What artefacts might benefit from analysis?
- Where are these artefacts currently housed?

Residue analysis

This is a specialised study incorporating a variety of techniques. Residue analysis locates, extracts and identifies ancient residues from a range of tools, including tools made of stone, bone and pottery. The high quality of artefact survival in Orkney means that the development of residue analyses holds particular potential. Work to date on pottery has shown that the survival of lipid/organic residues is variable but well worthwhile. Further work is, however, needed. For example, it is possible to find a chemical indicator for barley but as yet it is impossible to say whether this implies porridge, 'bread' or beer. Work so far has been small scale and there is a general lack of comparative or control data. The high concentration of Neolithic pottery in the WHS and surrounding area mean that a large project incorporating pottery from several sites would be valuable.Work on residues and wear on lithic tools has been shown to be of value to archaeology, notably in the identification of ancient plant remains, though this has largely been ignored in Britain. In the context of the early farming communities who built the monuments of the WHS, examination of the survival and identification of starch grains would be of particular relevance. Residue work on bone tools is currently being developed for Britain. The survival of a unique suite of well contexted bone tools in Orkney means that the application and development of this work has especial relevance here.

Period-specific research on social identity

Broader programmes of research can be linked to examine the changing nature of social identity through different times and locales.

Typological reviews

Typology is a complex tool of artefact research and many existing typologies have not been reviewed for a long time. The most popular basis for typology is shape, sometimes combined with manufacture, but this has rarely been examined in the light of recent knowledge and techniques. What, for instance, do the different pottery types mean? If the apparent mutually-exclusive distribution of collared Unstan Wares and of flanged-rim bowls is real, what else does it involve and what implication does this have for our interpretations of Orkney's Neolithic? Similar work could look at the distribution and meaning of different lithic assemblages, bone tools and so on.

Experimental archaeology

Experiment is vital if we are to fully understand the remains of the past. It provides an important dimension to the build-up of a lifestyle picture, forces investigators to consider practical elements of interpretation, social questions and environmental issues, and helps to form a dynamic link between an excavation and the post-excavation study of artefacts. In comparison with work elsewhere, it has been largely neglected in Britain. Experiment also provides an excellent medium for education and interpretation. It is of particular value in that it broadens the base of archaeological expertise to include present-day craftspeople. This is of especial relevance to Orkney where there is a largely untapped source of local expertise.

Landscape survey

Including studies of both the experiential and the physical landscape – terrestrial, marine and celestial. There is a need for clear and detailed knowledge of the relationship between the sites and the landscape. Experientially, this should include research on how the landscape was viewed, inhabited and negotiated, and it should compare and contrast results through different periods of time. Physically, further exploration and evaluation of the landscape, both in the Neolithic and more recent times, would serve to enhance our understanding of the archaeological and historic landscapes (see also *Formation and Use of Landscape*).

Boundaries

The landscape has been used and compartmentalised from the earliest times to the present day, but little is known of how those divisions were manifested and manipulated. This must include both architectural, physical, divisions and mental boundaries; and it should look at their changes through time.

Useful research includes:

- establishing the date of boundary dykes;
- research into the construction of boundaries, including both techniques and organisation, as well as materials;
- the elaboration of the purpose of boundaries and how they may reflect variously stability or change within the social, economic, religious and political life of the world around them;
- research into the use of boundaries through time, including an examination of maintenance, change, reuse, dislocation and abandonment, including an exploration of the existing Sound Archive for references to boundaries;
- an understanding of the ways in which boundaries may affect the interpretation and experience of landscape, both in the past and today (see also *Formation and Use of Landscape*).

Astroarchaeological meanings

It is generally accepted that certain celestial events were important to prehistoric people with concomitant consequences for our interpretations of monuments and for culture. Research into the WHS should take account of this. Events such as the prediction of eclipses, the appearance of the moon at 'maximum standstill', the heliacal rising of certain stars or asterisms, like the Pleiades, the sun touching a special mountain, or the periodic appearance/ disappearance of a planet are all of potential significance. One approach is to collect surveys that integrate landscape and 'skyscape' (ie skyline measurements, prominent features, favoured or limited ranges of visibility, etc) and to try to correlate these with data from neighbouring sites. This, more or less, is the classical approach. Another approach might pay more attention to both quantitative and qualitative details of the landscape and combine these with findings from the specialised analysis of finds.

Visitor surveys

Little exists by way of baseline statistics for visitors to unstaffed monuments. This data

is required to inform site management and interpretation as well as to monitor and assess visitor impact. This should relate to contemporary experience (see below).

Contemporary experience

There is a general lack of research on the attitudes and experiences of residents and visitors within the WHS and surrounding area. Little is therefore known as to how the monuments figure in people's memories, identities and attitudes. Research in this field might involve two specific techniques, each with its own time-frame:

- interview-based research would provide immediate results and should be considered a high priority. In particular, this might look at the impact of WHS status and its associated management and presentation demands;
- ethnographic research over a longer period of time, involving participant observation should provide more detailed and fine-grained insights.

The rôle of archaeology in education in Orkney

An assessment of the current rôle of archaeology in education in Orkney, and of the educational potential of the WHS, is important if the aims of increasing public education and enjoyment of the WHS are to be fulfilled. This should include an examination of the ways in which artefacts from the WHS (both from existing museum collections and newly excavated sites) can be used in education and display.

Local history

Little is known of the place of the archaeological sites and landscape in the local history of the area. In this respect, the use of oral history techniques to focus specifically on the archaeological monuments and antiquarian/archaeological practices would provide great insight into the ways in which personal memories and narrative have been informed by the archaeology. An exploration of the existing Orkney Sound Archive for memories and experiences relating to the monuments would also prove valuable and extend the period of study beyond current living memory. This should include traditions of folklore and land use.

Literary research

Orkney has a strong and long literary tradition, but little is known of the influence of Orcadian archaeological sites on this. Conversely, the influence of literature on archaeological research is also unknown. Both constitute useful areas of research, necessary for a rounded picture of the part played by the WHS over the ages.

Folkloric research

Again, there is a strong tradition of folklore in Orkney, and archaeology plays a prominent part in this, but its rôle has never been quantified in detail. A synthesis and analysis of folklore concerning both archaeological materials in Orkney in general, and also the monuments within the WHS and IBZ in particular, would be of great interest.

Visual representations and the perception of landscape

There are many artistic representations of the archaeological landscape, and these derive from Orcadian artists as well as from many who visit from further afield. This resource has been little studied, however. Studies of the representation of landscape, and the historic material within it, in a variety of media, are important because they can provide a clear insight into the ways in which the perceptions of landscape and monuments changed through time. This may then be used to examine the rôle of visual representation in constructing a sense of place and identity.

Place-name research

Existing work on place-names took place some time ago, and a critical evaluation would be worthwhile, especially in

conjunction with specific research focussing on archaeological sites and monuments both within and beyond the WHS.

Sample research topics: the formation and utilisation of the landscape

Ingrid Mainland, Ian A Simpson, Richard Tipping, Palaeoenvironment and Economy group and Formation Processes and Dating group

Soil formation

One priority is to establish the non-anthropogenic component of soil formation as a baseline. During rapid inundation terrestrial deposits may have been preserved underwater. The complex patterns of currents in the archipelago mean that the pattern of islands has changed over time so that some deposits may have been lost. Nevertheless, it is likely that pockets of early soils survive and it may be possible to identify sealed remains of soils and sediments in contexts such as the currently brackish Loch of Stenness that will allow characterisation of purely non-anthropogenic soils. Other preservation contexts may include the currently fresh-water Loch of Harray. Good soil baselines will facilitate the identification of natural and anthropogenic changes in subsequent periods. In addition, the study of soil formation processes must both acknowledge and contribute to our understanding of wider landscape changes.

Modelling of landscape changes over time

This is an important component of the research framework. The major changes in the coast line at Skara Brae, both before and after the construction of the settlement, are well known; and the pattern of aeolian deposition there can be retrieved for recent times through documentary research. The shapes of the Lochs of Stenness and Harray have changed over time, though it is not clear when the originally fresh-water Loch of Stenness was linked to the sea (see also *Artefacts, Monuments and Cultural Identity*).

Monument formation processes

Elucidation of the processes of monument formation, from the pre-monument soil conditions through their construction and alteration, to the introduction today of new materials to the monuments as a part of conservation and management, is important. It is important to recognise the varied opportunities offered by the different groups of monuments; indeed, the presence of mounds and banks of different ages creates a great potential for a better understanding of the soil chrono-sequences, based on fossil soils under the monuments.

Agricultural and social landscape formation processes

The survival of old land surfaces under monuments and colluvium of various dates in the Bookan, Wasbister and Brodgar locality presents various opportunities for the multi-period analyses of small areas. It may be possible to recover information about land division and land use and their variations in time (see also *Artefacts, Monuments and Cultural Identity*).

A comprehensive programme of dating

This should be designed to provide an absolute chronological framework and it should include past landscapes, monument formation, use and reuse and the broader environmental context. It should make use both of newly available samples and dating techniques, as well as samples from older excavations and existing dating techniques. It is of crucial importance to reconsider the taphonomy of samples from old excavations before any dating is undertaken.

Existing bioarchaeological data

Excavation in Orkney over the last hundred years has created an unusually rich resource of bioarchaeological evidence, albeit mainly faunal, which could potentially be used to address many

research issues. To facilitate future investigations, there is a need to compile an inventory of this material indicating, at the very least, where the collection is stored, some basic information on the contents of the collection (eg faunal material and carbonised seeds), date of excavation, recovery methods (ie hand recovered or sieved), whether the collection has been analysed and the location of any archive or published reports on the material.

Further excavation

This would be aimed specifically at the recovery of large, well-stratified and well-preserved bioarchaeological assemblages and is necessary to implement many of the research themes identified. If analysis is to move beyond the site-specific interpretations of archaeofaunal and archaeozoological remains, there is a need to target excavation towards varied contemporary sites within the archaeological landscapes, and in particular to ensure the analysis of environmental data from sites of varying function. It can be argued that analysis of bioarchaeological evidence from multi-period sites would allow useful insight into long-term palaeoeconomic trends and processes, and economic strategies, thus avoiding period-specific biases.

Modelling climatic change

Precipitation is a major driving force behind climatic change (Vassijev *et al* 1998) and the least ambiguous results are to be obtained from the analysis of lake-level changes (rises and falls) in upland, or gradually (or only modestly) anthropogenically modified catchments. In the last four years a sedimentological approach to interpreting lake-level change has been developed and this has resulted in the first continuous Holocene chronology for precipitation in the UK, from west Glen Affric in northern Scotland (Tisdall 2000). This approach uses the spatial and temporal changes between lake sediment and fen peat from transects of correlated cores. It allows for the development of models of climate change, and a number of appropriate basins for this sort of analysis lie within the WHS and its buffer zones.

Initial post-glacial colonisation of Orkney

An understanding of the initial post-glacial colonisation of Orkney is important if we are to understand properly the basis for the flowering of culture that led to the monuments of the WHS. Very little information is currently available on this and it should be accorded a high priority. It should be recognised that rising patterns of sea-level mean that submerged sites are likely to play an important rôle in the recovery of information relating to the initial settlers of Orkney and their world.

Use of plants, especially cultivated plants, in prehistoric Orkney

Current understanding of the balance between plant and animal diet in Neolithic Orkney and later is based more on inference than on sure data. Further recovery and analyses of plant remains from archaeological contexts are necessary and isotope analysis of human bone would be very useful.

Non-economic values and activities apparent in bioarchaeological evidence

There is much scope for a reappraisal of existing data, and the targeting of future recovery strategies, to investigate the representation of particular species and their associations with particular contexts and or artefacts. Existing work has highlighted the potential non-economic value of certain species in various different contexts (eg sea eagle at Isbister; red deer at Noltland) and this is worthy of further development. This research would be focused on aspects such as the relationship of various species to social identity, symbolic significance, ritual and concepts of wild/domestic. Changes in

practice through time should not be forgotten, nor the changing interplay between humans and animals/plants in different settings.

Sample Projects

All Discussion Groups

Background

The projects below have been drawn from the contributions made by those attending the symposium and members of the AHRCC at various stages in the consultation process. The list is not intended to be exhaustive, nor is it set out in any order of priority. Rather it is intended to act as a stimulus to those research workers and funding bodies who have an interest in the future of The Heart of Neolithic Orkney. An attempt has been made to classify individual projects to the themes and scale of research outlined above but, as readers will quickly realise, this is, in practice, difficult. Nevertheless, it is worthwhile because it helps to give a guide as to the scale and direction of each project.

Artefacts, monuments and cultural identity

Site specific

1. Refinement of the dating of the monuments of the WHS through the compilation of a comprehensive dating programme for the monuments and their surrounding landscape. New dates should include the use of a wide range of dating techniques. In addition, a register of all dateable and dated material should be built, as well as a re-consideration of the taphonomy of all existing dates.
2. New excavation to establish the chronological position of important complexes of monuments, such as those at Ring of Brodgar and Maeshowe.
3. A study of the mechanics of construction of the different monuments.
4. Examination of the possible meanings attached to the actions of monument construction.
5. A study of each monument to produce a history, not only of its construction but also of its alteration and use through time to the present day.
6. Experimental studies relating to individual types of artefact, eg of the manufacture and use of pottery. This should include work on the source materials and could be extended to look at the relationships between different types of artefact, such as the sources used in pottery production and stone tool production.
7. Residue analyses to determine the function of various artefacts, such as pottery, bone or stone tools.
8. An examination of the preparation for site construction relating to individual monuments: is there evidence of ground preparation and/or the use of introduced materials to create a platform? If materials were imported to the site, what is their nature and origin?
9. Maeshowe: examination of the complex construction of the core cairn. What rôle did its revetting walls play during natural consolidation of mound material and thus shrinkage after construction, and how did this relate to the built walls of the chamber? Was the choice of mound material made with consolidation in mind?
10. Maeshowe: what is the hydrological status of the mound and how does that affect its long-term stability?
11. Maeshowe: conventional geophysics is of limited value here but the mound would serve as a test-bed for GPR, electrical imaging and seismic study, while the base of the mound and platform would benefit from intensive survey.
12. Skara Brae: analysis of the middens to examine their development, use and modification over time. Fuel residue analyses of midden deposits will be important both in identifying the original fuels and understanding the importation of material to the site.
13. Skara Brae: functional analyses of the various occupation surfaces.
14. Skara Brae: analyses of site taphonomy including the decomposition products of bone, (calcium, iron and phosphate

features) and of shell (calcium carbonate features), the use of turf or other materials for roofing, and the decomposition of stone.
15. Examination of the impact of earlier excavation and conservation measures on the sites.
16. Assessment of the impact of the introduction of new turf material and associated biological agents for the managed sites.
17. Assessment of the impact of the introduction of new stone material for managed sites.

WHS specific

18. Compilation of an archive/synthesis of museum-held material relating to the WHS.
19. Compilation of an updated inventory of historical, pictorial, oral history and cartographic sources relating to the WHS.
20. Compilation of a database of photographs relating to the monuments of the WHS. This should contain information on current locations and be suitable for annual updating.
21. New excavation to establish the chronological position of important complexes of monuments related to the WHS, such as the site at Bookan.
22. Investigation of the importance of the WHS area to preceding non-farming groups.
23. Exploratory geophysical survey of the WHS to locate new archaeological sites, using a combination of magnetic scanning and magnetic susceptibility sampling across detailed sample survey blocks.
24. Survey by geophysics of specific sites related to the WHS area, such as 'Stenness Palace'.
25. Construction of a detailed oral history of the WHS monuments in Orkney.
26. Examination of the rôle of the monuments of the WHS in contemporary Orcadian society.
27. Examination of the place-names of the WHS.
28. The continuation of a fieldwalking programme to cover whole of the WHS.
29. The evaluation of the results of fieldwalking.

Zone specific

30. A programme of astro-archaeological research relating to the major monuments and their relationship with the surrounding land.
31. Exploratory geophysical survey of the buffer zones to locate new archaeological sites, using a combination of magnetic scanning and magnetic susceptibility sampling across detailed sample survey blocks.
32. All future developments with the wider zones should be preceded by appropriate geophysical investigation.
33. Systematic topographic survey of the setting of the WHS in order to record new sites and provide a wider landscape context to the monuments of the WHS.
34. Field survey along the coast adjacent to Skara Brae and along the shorelines of the Lochs of Harray and Stenness, as well as coastal survey within the OBZ, in order to record eroding sites.
35. The continuation of a fieldwalking programme to cover whole of the IBZ.
36. The evaluation of the results of fieldwalking.
37. Systematic underwater survey and evaluation of Harray and Stenness lochs, the results to be integrated with those of land-based survey.

Orkney specific

38. The petrological and macroscopic examination of stone tools from Orkney, along with a contextual analysis.
39. Analysis of the relationship between the sources of materials used for artefacts in Orkney and known sources further afield, such as the (Group XXII) axe production site at the Beorgs of Uyea on Mainland Shetland.
40. A detailed study of the bone, antler and shell tools of Neolithic Orkney, to include information on manufacture,

style, use and deposition.

41. An examination of the social meaning of specific artefact styles.
42. An examination of the meaning and function of Beaker pottery in Orkney.
43. An examination of individual artefacts and monuments as period specific indicators of social identity.
44. Intra- and inter-site studies of artefact manufacture, use and deposition.
45. The examination of the use of natural pigments, such as haematite, in prehistoric Orkney using experimental and other techniques.
46. Skeletal studies: Orkney holds an unparalleled skeletal record for some periods of prehistory and recent advances in techniques mean that this could be used to shed light on many different aspects of great relevance to the WHS, such as diet, illness, mobility and origins.
47. Investigation of the size of the population in Orkney through time, and the changing effects of population pressure.
48. Investigation of the evidence for, and date of, the initial post-glacial settlement of Orkney.
49. Investigation of the mobility and connections with the wider world among the first inhabitants of Orkney.
50. Investigation of the advent of farming and nature of transition from hunter-gatherers in Orkney – what were the relationships between the two groups?
51. Investigation of the nature of Bronze Age settlement in Orkney.
52. Investigation of the nature, date and function of burnt mound sites in Orkney.
53. Investigation of the nature, date and function of souterrains in Orkney.
54. Mapping and investigation of crannog sites in Orkney.
55. Investigation of archaeology as an educational tool in Orkney.
56. Investigation of the influences of archaeology on literature in Orkney.
57. Investigation of the influences of archaeology on art, both historical and modern, in Orkney.
58. An evaluation of existing research into the place-names of Orkney.

The formation and utilisation of the landscape

Site specific

59. An examination of the pre-monument landscape: soil conditions immediately before monument construction.
60. An examination of the evidence for pre-monument construction activity: is there any evidence for activities prior to the construction of individual monuments, such as agriculture, funerary activity, the building of settlements, or the erection of stone settings?
61. Skara Brae: an examination of the sequences of sand accumulation and soil formation.
62. Skara Brae: Geophysics to assess the effects of coastal erosion by helping to define the extent of the site along the seashore and the limits inland.
63. An examination of local drainage: what changes in local drainage are associated with monument construction, within and around individual sites? What rôle did the construction of drains play in alleviating the potentially negative impacts of new drainage regimes? What effects did new drainage regimes have on soil stability and bearing strength of soil?

WHS specific

64. Compilation of an inventory of existing bio-archaeological data for the WHS.
65. An examination of agricultural history within the WHS: were materials imported to create cultivation beds?
66. Analyses of pre- and post-depositional taphonomic history for faunal assemblages in Neolithic cairns and settlement sites.

Zone specific

67. Production of an agricultural history of the WHS and buffer zones through related techniques such as detailed soil analyses and palaeo-environmental analysis.
68. Production of a detailed plan of land boundaries in and around the buffer zones and an examination of their

construction, morphology, functions and meaning.

Orkney specific

69. The construction of a detailed history of field management strategies in Orkney through hand-auger survey of known deep topsoil areas within West Mainland, in order to provide depth distributions of these cultural soils which can then be related to settlement sites. This should be combined with survey to identify new areas of deep topsoil.
70. The location of buried, fossil, plaggen-type soils of prehistoric age, as at Tofts Ness, Sanday could be undertaken and related to soil development in the WHS, for example in the wind-blown sand areas of Sandwick.
71. The recovery of palaeo-botanical data and an examination of the rôle of plants in prehistoric Orkney.
72. Investigation of the date and nature of the deglaciation of Orkney.
73. A programme of palaeo-environmental work across Orkney to investigate the environmental history of the Holocene.
74. Investigation of sea-level change in Orkney through the Holocene, including information on submerged landscapes.
75. The survey of submerged areas to recover information on archaeological preservation.
76. Investigation of the faunal history of Orkney with reference to both wild and domestic species.
77. Investigation of woodland usage and management during the Holocene.
78. The colonisation of Orkney by its mammalian fauna, especially in relation to human migration.

Cross-theme

WHS specific

79. The production of an enhanced SMR specific to the WHS. This should be on-line and designed for maximum public accessibility.
80. Compilation of a database of all existing geophysics work in the WHS. This should be held centrally and suitable for the addition of new work.
81. Compilation of a database of aerial records relating to the WHS in particular.
82. The analysis and publication of back-logged research, particularly regarding unfinished excavation projects in the WHS.
83. A season of concentrated aerial reconnaissance in Orkney targeting the WHS.

Zone specific

84. Compilation of a GIS system relating to the WHS and the buffer zones to combine information on field survey, topographical history, monument location.
85. Desk-based assessment of the archaeological value of the current aerial records, including both vertical and oblique photographs.

Orkney specific

86. Establish a research centre for archaeology in Orkney, under the auspices of an Archaeology Institute for the Highlands and Islands: to act as an umbrella organisation for research on the WHS.
87. Establishment of a post of community archaeologist.
88. Compilation of a database of aerial records relating to Orkney in general.
89. The analysis and publication of back-logged research, particularly regarding unfinished excavation projects in Orkney.
90. Study of history of archaeological research on Iron Age onwards in Orkney.
91. A review of existing evidence relating to the Late Neolithic - early Bronze Age in Orkney, together with targeted fieldwork/artefact-based research in order to investigate this poorly understood period.

Prioritisation of research

Julie Gibson

This volume has not tried to prioritise research either by theme or topic, or on a

project by project basis. Instead, we have devised a mechanism that takes account of a variety of archaeological, historical and related projects. This mechanism may be used to assess, prioritise and further research. In this way, all types of project can be considered and relevance given to changing priorities. This method accepts that priorities change so that it is not possible to set out here a list of priorities that will last into the long-term future. Instead, the table below outlines a scoring system based on a series of *Threats and Opportunities* which can be tailored to meet the needs of future management.

This strategy assumes that a basic check on sustainability will be considered first. This check should take account of the following factors:

- Is the proposer competent and is the project adequately resourced?
- Does the project offer an enhancement of knowledge and understanding?
- Does the project lead to the destruction of the resource and if so is the destruction necessary, acceptable and inevitable?
- If it is a destructive project, should it be done within the WHS and buffer zones?
- What mitigation strategies are in place to ensure that damage is limited?
- What are the sustainable outcomes of the project?

After this has been done, the following table functions as a mechanism to enable the factoring in of the many elements in order to assist in the validation of a

Threats and opportunities Low – high	Range of options:	Score 1-10
Threats		
- timescale of loss of information	slow/chronic – rapid/catastrophic	
- extent of loss of information	slight – total	
- amount of damage anticipated if no action taken	very little – total destruction	
Opportunities		
Management Opportunities		
- securing preservation for some time	less than 10 years – perceived as permanent	
- methodological application	limited – wider	
Importance of site/landscape		
- scale of importance	very local – international	
Funding opportunity		
- type	partial – total	
- value for money	bad – good	
Educational opportunities and community access		
- academic quality	poor – excellent	
- academic publication	local – international	
- range of inclusion	community excluded – community participation	
- applicability to WHS interpretation	poor – good	
- range of dissemination	narrow – wide	
Developing understanding (range and depth of applicability)		
- theoretical approaches	poor – good	
- methodological development	poor – good	
- conservation issues and techniques	poor – good	

particular project, or to prioritise competing designs for a project. This table is intended as a guide for those who are working on the development of research projects and also as a guide for those who fund them. It is not a dogma.
Using this table to prioritise projects, a project to record folklore in and relating to the WHS might currently score very highly in this table, especially if local volunteers were used, and if the results were sustainable and accessible through the local archives and an internet resource. Where invasive archaeology is involved this system of prioritisation, working together with the sustainable approach, encourages the development of high quality projects offering value for money. Furthermore, it emphasises community participation and the need for widespread access.

Communication and dissemination

C R Wickham-Jones

Research will inevitably lead to the collection of new data regarding the WHS, but this is of limited value if it never reaches the public arena. Data has to be communicated to be useful.
Communication is an integral part of any research project. There are many methods for data communication: publications; lectures; electronic dissemination; use of the media such as radio and television. All have a respectable history regarding information relating to Orkney. Two levels of dissemination are relevant: academic and public. Academic communication comprises more attention to the details of the data themselves; public communication comprises more attention to interpretation. Both may be used by people as they see fit and both are clearly necessary if knowledge and management of the WHS is to advance. Public communication has a clear rôle in education, itself a vital aspect of the archaeological approaches to the WHS.

World Heritage Sites are designated to the benefit of all, including the varied audiences of the future. Given that most people do not have the specialised knowledge of the researchers who work within the WHS, interpretation is crucial to any WHS. This is not the place for a detailed discussion of interpretative techniques, but for the purposes of this document all interpretation can be regarded as education, thus bringing together two powerful tools of communication. As such, interpretation takes place in different places (on-site and off-site) and it takes place on different levels (from the activity group of the primary school pupil, to the tour of specialists).

Archaeologists working in Orkney are generally well aware of the value of public communication and education. Orkney in the 21st century is a society highly aware of the rôle of the past, and most archaeologists who work here have spent time on public lectures, open days, seminars and demonstrations. This is of particular importance in an area such as Orkney where many finds are still made each year by members of the public, particularly within the farming community. This should not be allowed to drop and it could be developed further to include systematic work within the education system, if support be found. At the moment archaeological contributions to schooling are given on *an ad* hoc basis but it is clear that there would be considerable benefit were it to be developed. In this respect, the development of a Young Archaeologists Club in Orkney, which has been given limited support by the Orkney Islands Council, is an important step forward, as are Historic Scotland's proposals for a WHS Ranger Service.

Professional communication is important if we are to make the most of our research opportunities. This includes not only pre-project communication but also post-project work. The archaeological sites of Orkney (and indeed elsewhere) have been dogged by the failure of many excavators to process and publish their results. Yet, if results are not made available to the wider world, the site is lost. It is not uncommon in the early 21st century to meet

professional archaeologists who know nothing of the rich midden and artefactual remains of Neolithic Orkney, simply because of the failure to publish a few key sites. As we have seen, the Heart of Neolithic Orkney plays a crucial rôle in our understanding of its times and this is a situation that must be rectified. It is, at the time of writing, approaching solution with the publication of the Barnhouse volume, and work on the 1970s excavations at Skara Brae is once again underway, but there are still other sites to be published and professional archaeologists must be careful to ensure that this state of affairs does not happen again.

Interpretation relies on research to provide the data which it will work into information. It is fluid, constantly changing as new research gives precedence to new ideas. Interpretation is nothing without research, but it will stagnate if not fuelled by criticism and questioning, both of which rely on access. There is thus a vicious circle in that a key contribution to research comes from its very audience. When research is placed in the public arena, the enhanced levels of criticism and questioning that result themselves play vital rôles to ensure that interpretation remains meaningful and moves forward. For interpretation to be of maximum benefit it is thus essential that it can take account of change: whether this is in the renewal of text on interpretation boards; the regular updating of guidebooks; new lectures; ongoing training of interpreters; or the devising of new workshops. These are all vital to the success of the WHS in Orkney.

Logistics and funding

C R Wickham-Jones and Jane Downes

Previous research agendas for other areas (eg Brown and Glazebrook 2000) have emphasised the necessity for research initiatives to work together. Isolated research projects can lead to duplication and redundancy, or limited information. Research in Orkney is generally strong on cross-institution and cross-discipline collaboration. The Mine Howe excavation project, for example, makes use of specialists from Orkney College and Orkney Archaeological Trust, the University of Bradford, and the National Museums of Scotland as well as various individual consultant archaeologists. Funding for projects such as this is drawn from a complex suite of grants including research grants, local authority money and national funding from bodies such as Historic Scotland. Projects like this are not unusual in Orkney and they have an enhanced value. One aim of this Research Agenda is to promote the continuation and further development of that ethos by bringing together scholars of different disciplines from a variety of institutions as well as independent researchers.

Careful project design is obviously central to the success of any research. No matter what the scale of a project, precise questions and targeted work are essential in order to base it on a sound design. This extends to the actual undertaking of the project. Vigilant project management and monitoring are vital parts of any project whether it be a student thesis or a large scale excavation and interpretation exercise. It is also important that the initial design includes all stages of research – for instance, an archaeological project runs from desk-based research, through field investigation and post-excavation to publication, artefact conservation, the formation and storage of an archive and the deposition of material in a museum. The construction of comprehensive project archives and their deposition in a central point, such as the Orkney Museum, or the NMRS, provides a vital source of data for future generations. Once destructive excavation has taken place archives provide the only means for testing or enhancing interpretation; they should thus incorporate access to more recent work.

Financially, past archaeology has been both rescue- and research-led. Both the impetus for projects and the sources of funding have been divided. Rescue work took place because a resource was under threat, whether by developers or nature,

and it was funded either by the developer or by national bodies such as Historic Scotland. Research work, on the other hand, was driven by the desire to fill perceived gaps in archaeological knowledge and usually funded by money from a variety of places including national and local research bodies, as well as national and local authorities. In reality, the perceived importance of Orkney as an archaeological resource has been such that research has always played an important rôle even where considerations of destruction were the main stimulus for work. Today, the concept of sustainability and the requirement to make best use of scarce resources render such a distinction unhelpful and it is likely that future projects will make use of funds drawn from a wide and varied field.

Funding is one of the most obvious logistical factors to affect research in the WHS. Quite apart from the various potential sources of funding for archaeology, an important concept here is the oft quoted 'value for money' that is so important to agencies such as Historic Scotland. It makes sense to ensure that funds are used carefully so that both data and interpretation can be maximised. Nevertheless, it can be difficult to define what, precisely, individual agencies mean by 'value for money'. Indeed, different funding bodies may well judge it in contrasting ways. Historic Scotland note that post-project review should be an integral element of any value for money assessment, and have set out the following criteria for any one project (Historic Scotland 1996): it must be necessary; it must be done at an appropriate scale; it must be well planned; it must be efficiently executed; it must be well and promptly reported; it should not be overly complex; it should not be overly intensive.

Larger archaeological projects can sometimes involve single organisation funding, such as the contract work funded by Historic Scotland which covers the investigation of findings of human remains by a commercial archaeology unit (at the time of writing, AOC (Scotland) Ltd).

Developer funding is another example of single-organisation funding for an archaeological project. It is, however, an infrequent source of major funding in Orkney. Commercial pressures here, as elsewhere in Britain, tend to make it hard to maximise the potential of such work. Many projects, however, work to a package of funding including money from Historic Scotland, Orkney Islands Council, and research funds. Work such as this currently includes both university projects and projects run by commercial units.

The smallest scale of project might comprise an individual research student, working on a closely defined project for a student thesis. In some cases students work with minimal funding - just enough to finance travel and accommodation; other students use money from one or other of the research bodies, whether they be university specific funds (eg the Munro Fund of the University of Edinburgh) or medium research bodies (eg the Society of Antiquaries of Scotland), or larger Councils (eg the British Academy). Some students gain partnership funding, such as a University grant plus money from Historic Scotland, and this is especially useful for wider projects such as PhD theses. Other students come to work on training excavations such as Mine Howe. Excavations like this (funded by a wide package, see above) provide important teaching opportunities not only for young professionals but also for volunteers who, while they do not intend to draw a living from archaeology, wish to develop their skills in it. There is an active body of archaeological volunteers in Orkney, co-ordinated under the aegis of the Friends of Orkney Archaeological Trust. Volunteer work does not just include excavation: post-excavation work is equally important and takes place throughout the year, whether in Orkney Archaeological Trust, the Orkney Museum or for commercial archaeological contractors.

As has been emphasised throughout, research into the WHS includes many disciplines and these can each open doors to different sources of funding. Some

projects, as noted above, combine disciplines and thus call on an even broader base of funding. Some of the larger funding bodies, such as the Leverhulme Trust, positively encourage inter-disciplinary work, thus opening the way for more projects of significant international value. There are plans in Orkney for the creation of a research centre for archaeology in Orkney, under the auspices of an Archaeology Institute for the Highlands and Islands. When this comes into existence it will be a useful umbrella body to help co-ordinate funding bids and house information.

It is important that individual research projects do not take place in isolation but rather add to the collective whole. In that way the limited resources that are available for archaeological and historical research can be maximised, and the finite resource that is archaeology can be carefully managed (see p 35). Furthermore, the importance of making findings accessible and publishing results cannot be overstated for it is by this means that a wide research community centred around the Orkney WHS can be maintained and sustained.

Management

Jane Downes and C R Wickham-Jones

The well-being of the archaeological resource is of paramount importance and to this end Historic Scotland has already produced a Management Plan (Historic Scotland 2001). This Research Agenda has been produced to be used hand in hand with the Management Plan. Research projects such as those outlined above provide two sorts of information: they provide information that contributes to our understanding of the rôle of the monuments at various times in the past; and they provide information on the physical make-up and current conditions of the monuments as well as on any changes that have taken place with time. Both types of information can be played into the management practices in use at the WHS in order to benefit that management. In this way good management can be built up on a broad foundation of information to assist the well-being of the monuments, as recognised in the Management Plan.

At this point the importance of communication becomes apparent as this can be where the interests of different groups diverge. The formation of the AHRCC was designed to take account of the views of all parties and this has been played into the writing of the Research Agenda. As noted above, Orkney has an active tradition of inter-communication between interest groups and it is important to continue this. The existence of the AHRCC as the most appropriate umbrella under which individual projects can thrive is vital, and it is recommended that this Committee continues to function both as a body which can facilitate communication about projects as well as advise on projects and research directions, and can review and update the Research Agenda.

The quality of individual research projects is of central importance - the highest standards and all relevant techniques have to be employed right through to publication and archiving. This is not to say that all projects should emanate from within the Committee, just the opposite. Outside projects and ideas are necessary to keep up the stimulus that enables management and interpretation to move forwards. The rôle of the Committee is to maximise the context and implementation of any research project. In this context the possible development of a new Institute of Archaeology is exciting, with its potential rôle as a co-ordinator for bodies such as the AHRCC and as a centre for the exchange of information and ideas. While the physical facilities of an Institute would offer important benefits for the storage, processing and analysis of materials, the virtual facilities of a talking-shop are just as important.

Orkney is a relatively isolated northern archipelago and it has both a perceived and a real geographic isolation, which can act as a drawback for researchers from elsewhere. This adds to the value and importance of effective communication. In

this respect an Institute, with a dedicated web of electronic communications, could be a vital lynchpin for the way forward for research in the WHS. Not only might it provide basic information on the locations of information, artefacts, or archives; it could also help to co-ordinate research and avoid repetition and redundancy; and at the same time help with centralised equipment and facilities as well as financial and project development advice. The vision is one where local expertise is tied into outside specialisations, and collaboration between residents and visitors is encouraged to thrive. In this way the shared sense of ownership that lies at the heart of the World Heritage concept can truly flourish.

Concluding comments

Research is vital to the well-being and development of The Heart of Neolithic Orkney WHS. It may seem from this document that there are many gaps indeed in our knowledge of the WHS, and this is so, but we do know much: otherwise The Heart of Neolithic Orkney would not exist as a WHS. This section has tried to look at some of the realities behind research in the WHS and to set out possible directions forward. It is not intended to be prescriptive, but rather to inform those who have an interest in the area of ways they might undertake research. Only time will tell whether our deliberations of the early 21st century were running in the right direction.

PART 6

Appendices

Appendix 1: Select investigations at the monuments in the World Heritage Site

Nick Card

Skara Brae

(HY21 NW12; OR 1246)

Note: the investigations listed here extend to the IBZ, that is the scheduled area, rather than the much smaller boundary of the area in State care (the PIC).

1850-68	Following the exposure of the site by a severe storm in the winter of 1850, William Watt, the laird of Skaill, conducted a series of investigations. Four of the houses were cleared (Petrie 1867; Traill 1868a).
1888	A Viking long cist containing a male inhumation was discovered *c*200m to the west of the PIC (Watt 1888).
1913	Mr Balfour Stewart, the tenant of Skaill House, revealed parts of House 2 (Stewart and Dawkins 1914).
1924	The site was placed under the guardianship of H M Commissioners of Works.
1925-6	Work starts on sea-wall defences.
1927	Preservation of the structures starts under the supervision of J Wilson Paterson (Childe and Paterson 1929).
1928-30	Excavations conducted by V Gordon Childe, in conjunction with conservation measures. Four phases, two major and two minor, were identified (Childe, 1930, 1931a, 1931b; Childe and Paterson 1929).
1972-3	Excavations by D V Clarke and A Ritchie addressed many unanswered questions posed by Childe's work. Environmental and ^{14}C samples were recovered. Two major phases were identified (Clarke 1976a).
1973	A geophysical survey was carried out to the south and west of the PIC (Bartlett 1973a).
1977	Eroding walls and a 'stalled' structure excavated by D V Clarke, *c*25m to the west of the PIC (Clarke 1977b).
1978	A photographic and resistivity survey was undertaken of the eroding settlement mound to the west of the PIC (Morris *et al* 1985).
1982	Comparative survey work continued at eroding settlement site to west of WHS (DES 1982, 17).
1982	A rune stone was found face down during conservation work at Skara Brae (Ashmore and Johnsen 1984).
1993	A Neolithic butchery site was revealed by storms to the west of the PIC. Excavations undertaken by C Richards (Richards, forth).
1998	Geophysical survey and excavation were undertaken in the proximity of an eroding drystone wall and associated middens *c*200m west of the PIC (DES 1998, 71).
2000	During a watching brief to observe the removal of old fence posts to the south and east of the PIC, midden deposits were encountered close to the south side of House 7. Cobble tools, Skaill knives and a bone point were recovered (DES 2000, 66).

2003 A new magnetometry survey immediately to the south of the PIC is undertaken (Griffith 2003).

Stones of Stenness

(HY31 SW2; OR 1366)

A full history of the Stones of Stenness up to 1976 forms an integral part of J N G Ritchie's excavation report (Ritchie, J N G 1976).

1700 First reference to the stones (Wallace 1700).

1701 Brand mentions the site during his tour (Brand 1883).

1760 Richard Pococke, Bishop of Ossory both illustrates (British Library, Add. Ms 14257, f 79v) and describes the site (Pococke 1887). First reference to the number of standing stones (four erect, one recumbent) and to the surrounding ditch (fossee). He estimates that there were originally eight stones.

1769 Robertson (1769) refers to the tradition that the moon was worshipped at the Stones of Stenness and that victims were tied to the Odin Stone.

1772 Sir Joseph Banks and his party illustrate (Fig 24; Cleveley, J, British Library, Add. Ms 15511, f10), survey (the first measured plan) and describe the site (Lysaght 1974).

1774 George Low, minister of Birsay and Harray, mentions the site on his tour through Orkney and Shetland (Low 1879). First account of the 'Promise of Odin'.

1781 Alexander Gordon, Principal of the Scots College in Paris, visits and describes the stones (Gordon 1792). Gordon considers the original number of stones as seven.

1789 The Stanley expedition surveys, illustrates and describes the site (West 1970-6).

1805 Barry in his *History of the Orkney Islands* (1805) attributes the stones to the 'Scandinavians' and gives credence to a 'dolmen' in the centre of the circle.

1805 Hibbert makes the first reference to the stones as the 'Temple of the Moon'. He also notes their similarity to the 'Druid' stone circles of England (Hibbert 1823).

1805 Neill visits and describes the site during his tour of the Northern Isles (Neill 1805).

1814 Sir Walter Scott visits the site and later includes it as a scene in his novel, *The Pirate* (1821). Scott's description, in conjunction with Barry's (1805), gives rise to the myth of a 'dolmen' in the centre of the circle.

1814 Partial destruction of the Stones of Stenness and removal of the Stone of Odin by Captain W MacKay, the tenant farmer (contemporary correspondence relating to this is held in the Orkney Library, D2/17/4).

1848 Petrie briefly describes the stones in one of his notebooks (MS 542).

1849 An accurate survey was undertaken by Captain F W L Thomas as part of his general survey of the Brodgar area (see cover). He is one of the first authorities to speculate that there were originally 12 stones forming a circle. He also sketches the 'cromlech' in the centre of the circle (Thomas 1852).

1879 Tudor gives a detailed description of the site (Tudor 1883).

1885 Visited by General Pitt-Rivers (notebooks in Public Records Office, PRO Work 39/15), in his capacity as Inspector of Ancient Monuments. He is accompanied by his illustrator, W S Tomkin, who produces sketches of each stone (notebooks in Public Records Office, PRO Work 39/16).

1905 A survey and report for the Society for the Protection of Ancient Buildings was undertaken by the architect Basil Stallybrass. He recommends re-erection of the fallen stones (Stallybrass 1906).

1906 Monument taken into State care; re-erection of stone no. 5 (Spence 1906).
1907 Re-erection of stone no. 7 and creation of the 'dolmen'.
1929 Discovery of a stone socket close to the Watch Stone during roadworks.
1972 Top stone of the dolmen removed.
1973 Geophysical survey (Clark 1973) of the Stones of Stenness, was followed by the excavations of Dr J N G Ritchie (Ritchie 1976).
1991 Relocation of the socket for the Stone of Odin and another nearby socket (Richards 2004).
1997 RCAHMS take detailed aerial photographs of the site (D 16529 CN; D 16530 CN; D 16533 CN).
1998 Fieldwork was carried out to investigate the acoustic properties of the site (Watson and Keating 2000).
1999 A new geophysical survey is undertaken by J Gater (GSB 1999a).
2001 Historic Scotland commissions a new detailed topographic survey of the PIC (Archival Drawing no. 555/285/34).

Apart from the illustrations listed above in connection with other work, a full catalogue of early illustrations of the Stones of Stenness and the Stone of Odin, by J N G Ritchie and E W Marwick, forms Appendix 11 in Ritchie 1976, 52-5.

Ring of Brodgar

(HY21 SE1; OR 1314)

1529 First mention of the Ring of Brodgar (Ben 1529).
1650's Cromwellian troops dig into Salt Knowe (Thomas 1852).
1700 Wallace briefly describes the Ring of Brodgar and considers it a 'High-Place in Pagan Times' (Wallace 1700).
1760 Richard Pococke, Bishop of Ossory, both illustrates (British Library, Add. Ms 14257, f.77v.) and describes the site (Pococke 1887). His illustration shows the stones as being balanced on the inner lip of the ditch, with no representation of the causeways (Ritchie, J N G 1988, 342, fig 15.2).
1769 Robertson (1769) refers to the tradition that the sun was worshipped at Brodgar.
1772 The Sir Joseph Banks expedition produced a series of illustrations and a survey of the Brodgar area (Fig 24). On the plan (Ritchie, J N G 1988, 343, fig 15.3) produced by Frederick Herm Walden, the expedition surveyor, both causeways are shown and upright and fallen stones are differentiated. Walden refers to the Ring of Brodgar as the 'Circle of Loda'. The mounds around the ring are also plotted for the first time (Lysaaght 1974).
1774 Low briefly describes the site and speculates that the surrounding 'tumuli' were formed from the earth from the ditch (Low 1879).
1781 Gordon records 16 stones still standing and with eight being recumbent (Gordon 1792).
1789 Sir John Henry Stanley's expedition produced plans (Ritchie, J N G 1988, 344, fig 15.4), drawings and descriptions of both the Ring and some of the surrounding mounds. Like Walden's plan, fallen and upright stones are differentiated and the causeways are shown (West 1970-76).
1805 Barry briefly describes the circle (Barry 1805).
1805 Hibbert in his description of the site makes reference to it as the 'Temple of the Sun' (Hibbert 1823).
1805 Neill estimates that there were originally about 60 stones of which 'fourteen are still complete and standing on end' (Neill 1805).
1848 Petrie briefly describes the circle in one of his notebooks (MS 542).
1849 Captain F W L Thomas produces the most accurate plan to date of the whole of the Brodgar area (see cover). Within the detailed description of the site he

notes ‘thirteen erect and perfect; ten others are nearly perfect, but prostrate; and……stumps or fragments of thirteen more’ (Thomas 1852).

1851 Sir Henry Dryden and George Petrie accurately planned the site (Ritchie 1988, 345, fig 15.5) and also produced a panorama of the stones (*ibid*, 347, fig 15.6), differentiating between upright and fallen stones (NMRS ORD 89/10-13).

1853 Partial excavation of Fresh Knowe was undertaken by Farrer and Petrie. ‘A very considerable cut…. was made across…the north end, but did not lead to any discovery’ (Petrie 1857).

1854 Plumcake Knowe was opened by Farrer and Petrie, who discovered two cists, one containing a large steatite urn (Petrie 1857).

1875 A plan of the stones was made by Captain W St G Burke of the Royal Engineers. This included accurate elevations of many of the upright stones (reproduced in RCAHMS 1946, ii, 301, fig 376; Ritchie 1988, 348 fig 15.7).

1885 Visited by General Pitt-Rivers (notebooks in Public Records Office, PRO Work 39/15), in his capacity as Inspector of Ancient Monuments, and accompanied by his illustrator, W S Tomkin (notebooks in Public Records Office, PRO Work 39/16).

1905 A survey and report for the Society for the Protection of Ancient Buildings was undertaken by the architect Basil Stallybrass. He records 13 upright, 3 part upright, 11 prostrate, 10 stumps and one in fragments. His report initiated remedial work to the site over the next 3 years (Stallybrass 1906).

1906 The site was taken into State care. Remedial work on the re-erection of the stones commenced.

1907 The Office of Works surveys the site (MW/1/1248).

1908 Runes were discovered on one of the stones during remedial work (Cursiter 1908; Olsen 1909).

1929 Charles Calder produces a plan for the RCAMS (RCAHMS 1946, ii, 300, fig 374).

1971-4 A and A S Thom undertook a series of surveys and observations relating to their theories about the Ring of Brodgar being used as a lunar observatory (Thom and Thom 1973; 1975).

1973 A geophysical survey (Bartlett 1973b) was followed by A C Renfrew’s excavations. Three small trenches were opened, two across the ditch and one in an attempt to identify an outer bank (Renfrew 1979).

1980 Stone 17 of Calder’s RCAHMS plan was shattered when struck by lightening.

1985-6 The heights of the stones are remeasured (Ritchie, J N G 1988).

1997 RCAHMS take detailed aerial photographs of the site (D 16524 CN; D 16525 CN).

1998 Fieldwork was carried out to investigate the acoustic properties of the site (Watson and Keating 2000).

2000 Historic Scotland commissions a new detailed topographic survey of the PIC (Archival Drawing no. 551/042/32).

2002 A new magnetometry survey is undertaken within and around the site as part of the WHAGP (GSB 2002).

Maeshowe

(HY31 SW1; OR 1365)

1153 Maeshowe is broken into by Harald Maddadarson (*Orkneyinga Saga*) and ‘Viking’ (Norse) crusaders under the leadership of Earl Rognvald Kali.

1650’s According to Hibbert (1823) Cromwellian soldiers dug into the mound but found nothing.

1805 Hibbert gives the first real account of Maeshowe, but interprets it as a target raised for archery practice (Hibbert 1823).

1849 Captain F W L Thomas gives the first accurate description of the site. Although his survey of the Brodgar area does not extend as far as Maeshowe, he includes an elevation of the mound (see cover; Thomas 1852).

1861 Farrer breaks into the mound. An account of his 'investigations' is published by Petrie (1861a). Petrie concludes that the mound was probably raised by others before the runes were cut.

1862 Farrer catalogues and numbers the runic inscriptions (Farrer 1862). Mr Balfour, the owner, begins work to reinstate the collapsed roof of the tomb and installs a gate in the chamber entrance. The site is visited by Dr E Charleton who publishes an extensive account on his visit and interpretation of the runes (Charleton 1865).

1864 Stuart (1864) not only describes the runes, but also gives scholarly consideration to the date, nature and history of the structure. He makes comparisons with Newgrange and concludes that Maeshowe was built for a much earlier Celtic chieftain than the runes would imply.

1885 Visited by General Pitt-Rivers (notebooks in Public Records Office, PRO Work 39/15), in his capacity as Inspector of Ancient Monuments.

1905 A survey and report for the Society for the Protection of Ancient Buildings were undertaken by the architect Basil Stallybrass. He makes recommendations for the preservation of the site (Stallybrass 1906).

1910 Maeshowe is taken into State care.

1954-5 V G Childe (1956) conducts a series of excavations on behalf of the Ministry of Works. He discovered the revetted structure of the mound and the artificial nature of the platform on which the mound was constructed. He regarded the surrounding bank as being modern.

1973-4 The Department of the Environment excavations, directed by C Renfrew, concentrated on the retrieval of samples for 14C analysis. Two trenches were opened across the ditch, the outer bank and the platform (Renfrew 1979).

1986 A previously observed incised motif is reinterpreted as being Neolithic, rather than being part of a runic inscription (Ashmore 1986).

1990 Geophysical survey was undertaken between the tomb-mound and the ditch (Richards forth).

1991 In advance of minor remedial works, excavations by C Richards discovered a covered drain underneath the clay platform outside of the entrance to the tomb. Also discovered was a socket for a standing stone on the platform and a collapsed stone wall under the turf bank surrounding the ditch (Richards forth).

1994 Michael Barnes produces the definitive work on the Maeshowe runes (Barnes 1994).

1998 Fieldwork was carried out to investigate the acoustic properties of the site (Watson and Keating 2000).

1998- Ongoing research on the winter solstice by Victor Reijs and Charles Tait.

1999 In addition to the Neolithic carvings noted in 1986, a series of Neolithic incised motifs were identified within the chamber and passage (Bradley *et al* 1999; 2001).

Appendix 2: Resources

Nick Card

Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS), John Sinclair House, 16 Bernard Terrace, Edinburgh, EH8 9NX. RCAHMS is the Royal Commission on the Ancient and Historical Monuments of Scotland. It is an executive non-departmental government body financed by Parliament through the Scottish Executive under the sponsorship of the Architectural Policy Unit. The RCAHMS holds the **National Monuments Record of Scotland**. Canmore and PASTMAP allows on-line access to the database of the NMRS, http://www.rcahms.gov.uk

Sites and Monuments Record is housed at the Orkney Archaeology Trust, Archaeology Centre, Orkney College, East Road, Kirkwall, KW15 1LX. Work is under way to make the SMR publicly available on the Internet.

Kirkwall Library, Junction Road, Kirkwall. The library houses the **Orkney Room**, which holds a comprehensive collection of books and articles relating to Orkney, the **Orkney Archive** which houses numerous documents, maps etc, and the **Radio Orkney Sound Archive**.

Society of Antiquaries of Scotland, Royal Museum, Chambers Street, Edinburgh. The entire contents lists, and digital copies, of *Archaeologia Scotica*, the *Proceedings of the Society of Antiquaries of Scotland*, and out-of-print monographs, are available on the website of the Archaeology Data Service at: http://ads.ahds.ac.uk/catalogue/library/psas/

Museums and institutions holding significant archaeological collections from Orkney

Orkney Museum (formally Tankerness House Museum), Broad Street, Kirkwall, Orkney, KW15 1DG
National Museums of Scotland (NMS), Chambers Street, Edinburgh, EH1 1JF
Historic Scotland, Longmore House, Salisbury Place, Edinburgh, EH9 1SH
British Museum, Great Russell Street, London, WC1B 3DG
Hunterian Museum, University of Glasgow, Hillhead Street, Glasgow, G12 8QQ
Marischal Museum, Aberdeen, AB9 1AS
Natural History Museum, Cromwell Road, South Kensington, London, SW7 5BD

Museums and institutions holding minor archaeological collections from Orkney

Berwick Museum (Foxon, nd)
Cambridge University Museum of Archaeology and Ethnology
Carrick House, Eday, Orkney
Free Church College, Aberdeen (Foxon, nd)
Kelvingrove Art Gallery and Museum, Glasgow
Manchester Museum (Foxon, nd)
Museum of the Society of Antiquaries of Newcastle-upon-Tyne (Foxon, nd)
Scapa Flow Visitor Centre and Museum, Lyness, Hoy, Orkney
Stromness Museum, 52 Alfred Street, Stromness, Orkney, KW16 3DF
Tomb of the Eagles Visitor Centre, Liddle Farm, South Ronaldsay, Orkney

Scottish Wetlands Archaeological Database (SWAD)

The Scottish Wetlands Archaeological Database (SWAD) is a Historic Scotland-commissioned project designed primarily to produce a fuller understanding of the

potential of Scottish wetland archaeology. As it now stands there are over 6,000 records in the database. The database is available at http://www.geo.ed.ac.uk

English Heritage Geophysics Survey Database, although covering mainly English sites, also holds reference to early geophysical work in Orkney.
http://www.eng-h.gov.uk/SDB/

Historic Scotland's Radiocarbon Data Base. List of Scottish radiocarbon dates This searchable database of Scottish ^{14}C dates can (in 2004) be found on the Historic Scotland web site: http://www.historic-scotland.gov.uk under Archaeology: Carbon Dating Search. Despite its title it is up to date for dates paid for by HS until about AD 2000. It does not include many dates recently obtained from developer-funded excavations, nor some of those obtained with funding from outwith Scotland, for instance recent dates obtained for the early medieval cemetery at Newark, Orkney.

Tephra Base is a tephrochronological database hosted by the Department of Geography, Edinburgh at http://www.geo.ed.ac.uk/tephra/

ScapaMAP (Scapa Flow Marine Archaeology Project) is a multi-disciplinary, multi-institution, international project involving government agencies, industry and the academic community, designed to document a unique marine archaeological area in the waters of Scapa Flow, Orkney.
http://www.icit.demon.co.uk/scapamap1.htm

Appendix 3: Current student research relating to the archaeology of Orkney (last revised 2003)

Nick Card

Queen's University, Belfast	Russell, C	Domestic Architecture in Atlantic Scotland 2000 BC-AD 1000	PhD
University of Bradford	Challinor, C	A Holistic Approach to the Identification of Dairying in the Later Prehistoric and Protohistoric Northern Isles	PhD
University of Bradford	Milnes, J	An Investigation of Iron Age Settlement Sites in the Northern Isles through the Indicators of Craft Specialisation and Material Wealth	PhD
University of Bradford	Walmsley, C	The Contextual Analysis of Faunal Assemblages from Orkney	PhD
University of Bristol	Mukherjee, A	The Links between Grooved Ware Pottery and Pig Exploitation and Processing	PhD
University of Cambridge	Baxter, M	A Re-interpretation of Neolithic Mortuary Practices at Isbister and Quanterness	PhD
University of Cardiff	Pannett, M	The Origins and Development of the Neolithic in Caithness and Orkney	PhD
University of Glasgow	Anthony, I	Characterisation and Dating of Scottish Burnt Stone Mounds	PhD
UHI Millennium Institute	Grieve, S	Origins and Early Development of the Parish in the Orkney Earldom.	PhD
University of Manchester	Carruthers, M	Within, Without, Below and Beyond. Place, Deposition, and Identity in the Many Dimensions of Orcadian Iron Age Monumental Architectures and Landscapes *c.*800BC-AD200	PhD
University of Manchester	MacKintosh, A	Small in Size, Large in Meaning: A Re-evaluation of Late Neolithic Social Life in the Stenness-Brodgar area of Western Mainland, Orkney	PhD
University of Manchester	McClanahan, A	Archaeology and Culture: an Ethnography of Heritage and Identity in the Orkney Islands	PhD
University of Reading	Stammers, J	Walking between Worlds	PhD
University of Sheffield	Craigie, R	Pollen and Related Studies of Inter-tidal Peats, Rousay, Orkney	MPhil
University of Sheffield	Downes, J	Burial Technology and Ritual in a Landscape Context	PhD
University of York	Ashby, S	Trade and Identity: Antler Combs in Early Medieval Europe	PhD
University of York	Harland, J	A Study of the Spatial and Temporal Patterning in Zooarchaeological Record of Late Iron Age to Medieval Northern Scotland, with Specific Reference to the Site of Quoygrew, Westray, Orkney	PhD
University of York	Rahn, B	Locational Analysis (GIS) and the Anthropology of Orcadian Iron Age Society	PhD

Appendix 4: Table of Archaeological Fieldwork Undertaken in Orkney 1945-2003

Nick Card

Fieldwork in Orkney since 1945 (by parish)

Key to fieldwork

N/A = not applicable
negl = negligible finds
nya = not yet allocated
nyr = not yet received
nyc = not yet catalogued
NMS = National Museums of Scotland
NHM = Natural History Museum, London
OM = Orkney Museum

PARISH & SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS.	NMRS No.	SMR No.	NGR	DIRECTOR	MUSEUM	CAT. No.	BIBLIOGRAPHIC REF.
Birsay, Beachview	settlement	medieval	excavation		HY22 NE19	OR 2527	HY247275	Morris, C D	OM	1995.052	Morris, C D 1996
Birsay, Beaquoy	burnt mound	Bronze Age	excavation		HY32 SW11	OR 1588	HY301220	Hedges, J W	OM	1979.128	Hedges, J W 1975
Birsay, Brough Rd	multiple	late prehistoric	excavation	YES		various	HY243288	Morris, C D	OM	1989.036	Morris, C D 1989
Birsay, Buckquoy	settlement	Iron Age	excavation		HY22 NW11, 14	OR 1669	HY245282	Ritchie, A	OM	1976.036	Ritchie, A 1977
Birsay, Garsetter	cist	Bronze Age	informal excavation		HY22 NE30	OR 2522	HY256278	Wilson, B	OM	1985.135	Hedges, J W 1981
Birsay, Point of Buckquoy	settlement	Iron Age	excavation		HY22 NW12	OR 1670	HY243284	Wainwright, F T	OM	nyc	Morris, C D 1996
Birsay, Point of Buckquoy			geophysical survey	YES		various		Griffith, D	N/A		Griffith, D 2003
Birsay, Queenafiold	cist	Bronze Age	excavation		HY22 SE36	OR 1727	HY265250	Ritchie, J N G and A	OM	1986.029	Ritchie, J N G and Ritchie, A 1974
Birsay, Quoyscottie	barrows	Bronze Age	excavation		HY32 SW10	OR 1587	HY302227	Hedges, M	OM	1980.002	Hedges, M E 1977
Birsay, Saevarhowe	settlement	Iron Age/Norse	excavation		HY22 NW5	OR 1663	HY246270	Hedges, J W	OM	1984.323	Hedges, J W 1983a
Birsay, Spurdagrove	settlement	Bronze Age	excavation		HY22 SE2	OR 1711	HY253247	Hedges, S E	nya		Hedges, S E 1980
Birsay, St Magnus Kirk	ecclesiastical	medieval	excavation		HY22 NW4	OR 1666	HY248277	Barber, J	OM	1996.116	Barber, J 1996
Birsay, the Brough	ecclesiastical	medieval	excavation		HY22 NW1	OR 1338	HY239285	Cruden, S	NMS/OM	OM 1982.050	Curle, C L 1982
Birsay, the Brough	ecclesiastical	medieval	excavation	YES	HY22 NW1	OR 1338	HY239285	Hunter, J R	NMS		Hunter, J R 1986
Birsay, the Brough	ecclesiastical	medieval	excavation		HY22 NW1	OR 1338	HY239285	Morris, C D	NMS		post-excavation
Birsay, the Earl's Palace	residential	medieval	excavation		HY22 NW6	OR 1664	HY248277	Lewis, J H	OM	1996.020	Morris, C D 1996
Birsay, the Earl's Palace	residential	medieval	excavation		HY22 NW6	OR 1664	HY248277	Ballin Smith, B	OM	1996.020	Morris, C D 1996
Burray, the Bu Sands	?settlement	?Pictish/Norse	rescue		ND49 NE18	OR 2370	ND485975	various	OM	1989.038, 1993.007	Hunter, F 1993
Burray, the Ruff	barrow	modern	excavation		ND49 NE9	OR 1790	ND453966	Downes, J	negl		Downes 1999

PARISH & SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS.	NMRS No.	SMR No.	NGR	DIRECTOR	MUSEUM	CAT. No.	BIBLIOGRAPHIC REF.
Deerness			survey			various		Lamb, R G	N/A		RCAHMS, 1987
Deerness			survey			various		Steedman, K A	N/A		Steedman, K A 1980
Deerness, Hornip's Point	boat noust/ tomb	Neolithic/ medieval	excavation	YES	HY50 NW	OR 1165	HY544063	Hunter, J R	negl		Hunter, J R 1993
Deerness, Newark	settlement/ cemetery	medieval	excavation		HY50 SE3	OR 1176	HY574041	Brothwell, D	NHM		post-excavation
Deerness, Newark	settlement/ cemetery	medieval	excavation		HY50 SE3	OR 1176	HY574041	Lowe, C	OM	nyr	post-excavation
Deerness, Skaill	multi settlement	multiperiod	excavation		HY50 NE19	OR 2033	HY588064	Gelling, P	OM	1989.81	Buteux, S 1997
Deerness, the Brough	ecclesiastical	medieval	excavation		HY50 NE14	OR 1147	HY595088	Morris, C D	OM	1985.72	Morris, C D 1987
Deerness, the Riggan o' Kami	broch	Iron Age	excavation		HY50 NE20	OR 1150	HY591074	Gelling, P	OM	nyc	post-excavation
Eday			survey			various		Lamb, R G	N/A		RCAHMS, 1984
Eday	sub-peat dykes	Bronze Age	survey			various		Nayling, N	N/A		Nayling, N 1983
Eday,	burnt mounds	various	excavation			various		Sanderson, D	nya		Robertson *et al* 2000
Eday, Green			fieldwalking					Mason, P	OM	1995.13	
Eday, Setter	barrow	Neolithic	excavation	YES	HY53 NE28	OR 748	HY595369	Downes, J	nya		Downes, J 1999
Firth			fieldwalking			various		Richards, C			post-excavation
Firth, Damsay			survey			various		Whitworth, S	N/A		Whitworth, S 1997
Firth, Moan	cist	Bronze Age	excavation		HY31 NE22	OR 2564	HY368155	Richards, C			post-excavation
Firth, Stonehall	settlement	Neolithic	excavation	YES	HY31 SE38	OR 2344	HY363125	Richards, C	nya		post-excavation
Firth, Torrieday	cist	Bronze Age	excavation		HY31 SE31	OR 2573	HY353127	Hedges, J W	negl		Hedges, J W 1981
Firth, Wideford Hill	settlement	Neolithic	excavation	YES	HY41 SW17	OR 2348	HY407126	Richards, C	nya		post-excavation
Harray, Howe	cist	Bronze Age	excavation			OR 2317	HY328174	Lamb, R G	OM	nyc	post-excavation
Harray, Geroin	cist	Bronze Age	excavation				HY329175	Toolis, R	nya		post-excavation
Harray, Hindrafiold	cist	Bronze Age	excavation		HY31 NW57	OR 2569	HY325186	Wilson, B	negl		Hedges, J W 1981
Harray, Knowes of Trotty	barrows	Bronze Age	excavation	YES	HY31 NW42	OR 1642	HY342174	Downes, J	nya		ongoing
Harray, Upper Bigging	cist	Bronze Age	excavation			OR 2315	HY328192	Lamb, R G	OM	nyc	post-excavation
Harray, Werne	cist	Bronze Age	excavation		HY31 NW56	OR 2568	HY321180	Appleby, A	OM	1985.136-47	Hedges, J W 1981
Holm, Blomuir	cist	Bronze Age	excavation		HY40 SE16	OR 707	HY471032	Lamb, R G	OM	1981.030	Lamb, R G 1981
Holm, Blomuir (Craebreck)	cist	Bronze Age	excavation		HY40 SE20	OR 926	HY472031	Ballin Smith, B	OM	1983.019	post-excavation

PARISH & SITE NAME	TYPE	PERIOD	FIELDWORK	GEOPHYS.	NMRS No.	SMR No.	NGR	DIRECTOR	MUSEUM	CAT. No.	BIBLIOGRAPHIC REF.
Holm, Hamly Hill	settlement		geophysical survey	YES	HY40 SE46	OR 2395	HY499045	Gater, J (GSB)	N/A		GSB 2001d
Holm, New Holland			survey			various		Card, N	N/A		Card, N 1999b
Hoy and Walls			survey			various		Lamb, R G	N/A		RCAHMS 1989
Hoy, Graemsay			coastal survey			various		EASE	N/A		Moore, H and Wilson, G 1997a
Hoy, Graemsay			survey			various		Card, N	N/A		Card, N 1999a
Hoy, Graemsay, Sandside	cist	Viking	excavation		HY20 NE28	OR 2456	HY266061	Hedges, J W	unknown		Hedges, J W 1978
North Ronaldsay			survey			various		Lamb, R G	N/A		RCAHMS 1980
North Ronaldsay			coastal survey			various		EASE	N/A		Moore and Wilson 1999a
North Ronaldsay, Torness	barrows	Bronze Age	survey		HY75 NE2	OR 223	HY756553	Downes, J	N/A		Downes, J 1997b
Orphir			fieldwalking			various		Richards, C			Richards, C 1985
Orphir			coastal survey			various		EASE	N/A		Moore and Wilson 1998
Orphir, Cava			survey			various		Hunter, J R	N/A		Hunter, J R *et al* 1984
Orphir, Gyre Farm steading	cist	Bronze Age	excavation		HY30 SW12	OR 1416	HY341046	Simpson, D D A	NMS		
Orphir, Lavacroon			fieldwalking		HY30 SW4	OR 1424	HY332044	Batey, C E	OM	1984.65	Batey, C E and Freeman, C 1987
Orphir, the Earl's Bu	various	medieval	excavation		HY30 SW2	OR 1426	HY334045	Batey, C E	OM	nyr	post-excavation
Orphir, the Earl's Bu			geophysical survey	YES	HY30 SW2	OR 1426	HY334045	Johnston, P G	N/A		Johnson, P G *et al* 1991
Papa Westray			survey			various		Lamb, R G	N/A		RCAHMS 1983
Papa Westray			coastal survey			various		EASE	N/A		Moore, H and Wilson, G 1998
Papa Westray, Kraa-tooies	barrows	Bronze Age	survey		HY45 SE3	OR 820	HY494544	Downes, J	N/A		Downes, J 1997b
Papa Westray, St Boniface	settlement	Iron Age	excavation		HY45 SE26	OR 847	HY487527	Lowe, C	OM	1997.030	Lowe, C 1998
Papa Westray, St Tredwell's	settlement/chapel	multiperiod	survey	YES	HY45 SE4	OR 850	HY496509	Bowman, A	N/A		Bowman, A 1991
Papa Westray, Holm of Papa			geoph-survey	YES		various		Hughes, T	N/A		

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Papa Westray, the Holm of Papa	tomb	Neolithic	excavation		HY55 SW2	OR 1129	HY504522	Ritchie, A	OM	nyr	post-excavation
Papa Westray, the Knap of Howar	settlement	Neolithic	excavation		HY45 SE1	OR 1130	HY483518	Ritchie, A	NMS		Ritchie, A 1983a
Rendall, Ferndale	cist	Bronze Age	excavation			OR 2881	HY384203	Will, R (GUARD)			post-excavation
Rendall, Gitterpitten	barrows	Bronze Age	excavation	YES	HY32 SE8	OR 666	HY393207	Downes, J	nya		Downes, J 1999
Rendall, Ha'	cist	Bronze Age	excavation		HY42 SW 19	OR 2041	HY424203	Marwick, E W			Hedges, J W 1981
Rendall, Kewing	cist	Bronze Age	excavation			OR 2677	HY401222	Robertson, J	nya		post-excavation
Rendall, Lower Ellibister	cist	Bronze Age	excavation		HY32 SE20	OR 2594	HY386212	Hedges, J W	OM	1985.148	Hedges, J W 1981
Rendall, Riff	cist	Bronze Age	excavation		HY41 NW	OR 2369	HY424193	Gibson, J	nya		post-excavation
Rendall, Sandyha'	cist	Bronze Age	excavation		HY31 NE7	OR 664	HY399194	Marwick, E W			Hedges, J W 1981
Rendall, South Ettit	cist	Bronze Age	excavation		HY41 NW9	OR 1777	HY422197	Marwick, E W			Hedges, J W 1981
Rendall, Tammas Kirk	broch and chapel	Iron Age/ medieval	geophysical survey	YES	HY42 SW11,12	OR 1765-6	HY425209	Martlew, R	OM	nyc	Martlew, R 2000
Rendall, Varmedale	barrows	Bronze Age	excavation	YES	HY41 NW2	OR 663	HY406198	Downes, J	nya		Downes, J 1999
Rousay			fieldwalking			various		Jones, A	nya		Jones, A 1995
Rousay, Egilsay & Wyre			survey			various		Lamb, R G	N/A		RCAHMS 1982
Rousay, Brettaness	crannog	Iron Age	excavation		HY33 SE12	OR 468	HY397332	Marwick, J	nya		post-excavation
Rousay, Kirk Brae	chapel/burials	multiperiod	excavation		HY32 NE24	OR 460	HY395278	Marwick, J	negl		post-excavation
Rousay, Egilsay, Midskaill	cist	Bronze Age	excavation		HY43 SE9	OR 2042	HY462300	EASE			Moore, H and Wilson, G 1995
Rousay, Rinyo	settlement	Neolithic	excavation		HY43 SW20	OR 633	HY440322	Childe, V G	NMS		Childe and Grant 1947
Rousay, St. Mary's/ Wirk	settlement/ religious	Viking	survey		HY33 SE16, 17	OR 486-7	HY373302	Lowe, C	N/A		Lowe, C 1984
Rousay, Westness	cemetery	Viking	excavation		HY32 NE7	OR 545	HY376293	Kaland, S	NMS		Kaland, S H H 1993
Rousay, Westness			assessment	YES	HY32 NE7	OR 545	HY376293	EASE			Moore, H and Wilson, G 1997b
Rousay, Westness	animal remains		excavation			OR 2376	HY380290	Buckland, P and Edwards, K			Buckland, P *et al* 1997
Sanday			survey			various		Lamb, R G	N/A		RCAHMS 1980
Sanday	farm mounds		survey/sampling			various		Davidson, D A			Davidson, D A *et al* 1986

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Sanday			coastal survey			various		EASE	N/A		Moore, H and Wilson, G 1999a
Sanday	farm buildings	historical	survey			various		RCAHMS	N/A		RCAHMS 1996
Sanday, Elsness	barrows	Neolithic/ Bronze Age	survey		HY63 NE5, 6, 13	OR 307, 309	HY676375	Downes, J	N/A		Downes, J 1997b
Sanday, Elsness	various	Neolithic/ Bronze Age	geophysical survey	YES	HY63 NE5, 6, 13	OR 307, 309	HY676375	Martlew, R	N/A		Martlew, R 1999
Sanday, Hermisgarth	burials	Iron Age	excavation	YES	HY64 SE55	OR 2371	HY662428	Downes, J	OM	2000.002	Downes, J 1997b
Sanday, Loth Road			survey	YES		various		Hunter, J R	N/A		Hunter, J R and Dockrill, S J 1991
Sanday, Loth Road	burials	Bronze Age	excavation	YES	HY63 SW9	OR 368	HY605345	Peace, R	OM	nyr	post-excavation
Sanday, Ness of Brough	various	multiperiod	excavation	YES	HY64 SE6	OR 264	HY654425	Time Team	nya		post-excavation
Sanday, Northskaill	multi settlement	multiperiod	survey	YES	HY64 SE12	OR 386	HY694444	Riding, M	N/A		Riding, M 1987
Sanday, Pool	multi settlement	multiperiod	excavation	YES	HY63 NW17	OR 290	HY619378	Hunter, J R	OM	1997.033	post-excavation
Sanday, (near Pool)	settlement	multiperiod	geophysical survey	YES		OR 2373	HY626384	Hunter, J R	N/A		Hunter, J R *et al* forth
Sanday, Quoyness	tomb	Neolithic	excavation		HY63 NE1	OR 308	HY677378	Childe, V G	NMS		Childe, V G 1952
Sanday, Scar	burial	Viking	excavation	YES	HY64 NE7	OR 259	HY677458	Dalland, M	OM	1992.022	Owen, O and Dalland, M 1999
Sanday, Stenchme	cist	Bronze Age	excavation			OR 2597	HY758439	Robertson, J			post-excavation
Sanday, Stove	settlement	Neolithic	excavation		HY63 NW9	OR 136	HY612353	Bond, J M *et al*			Bond, J M *et al* 1995
Sanday, Stove	settlement	Neolithic	fieldwalking		HY63 NW9	OR 136	HY612353	Morrison, J	OM	2000.003	Morrison, J 1995
Sanday, Tofts Ness	various	multiperiod	survey		HY74 NE1	OR 399	HY757464	Stevenson, J	N/A		RCAHMS 1980
Sanday, Tofts Ness	settlement	Neolithic/ Bronze Age	soil-sampling		HY74 NE1	OR 399	HY757464	Guttman, E			post-excavation
Sanday, Tofts Ness	various	multiperiod	geophysical survey	YES	HY74 NE1	OR 399	HY762473	Dockrill, S	N/A		Dockrill, S J 1984
Sanday, Tofts Ness	settlement	Neolithic/ Bronze Age	excavation	YES	HY74 NE3	OR 399	HY757464	Dockrill, S	OM	1997.029	post-excavation
Sanday, Tresness	tomb	Neolithic	survey		HY73 NW4	OR 330	HY711375	Ballin Smith, B	OM	1984.221	Ballin Smith, B 1983b
Sandwick			fieldwalking			various		Richards, C			Richards, C 1985
Sandwick			geophysical survey	YES		various		OAT/ GSB	N/A		ongoing
Sandwick, Bookan	tomb	Neolithic	excavation	YES	HY21 SE10	OR 1322	HY286141	Card, N	nyr		post-excavation
Sandwick, Castle of Snusgar			geophysical survey	YES	HY21 NW21	OR 1255	HY236196	Griffith, D	N/A		Griffith, D 2003

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Sandwick, Lingafiold	barrow	Bronze Age	excavation		HY21 NE19	OR 1279	HY264153	EASE			Moore, H and Wilson, G 1995
Sandwick, Lingafiold	barrows	Bronze Age	excavation	YES	HY21 NE19	OR 1279	HY264153	Downes, J	OM	2000.001	post-excavation
Sandwick, Sandfiold	cist	Neolithic/ Bronze Age	excavation		HY21 NW35	OR 2328	HY242195	Dalland, M	OM	1997.032	Dalland, M 1999
Sandwick, Skaill Bay	settlement/ burial	medieval	survey	YES	HY21 NW30.0	OR 2514	HY229187	Morris, C D	N/A		Morris, C D *et al* 1985
Sandwick, Skaill Bay	cist	Iron Age	excavation		HY21 NW 30.02	OR 2514	HY229187	James, H			James, H 1999
Sandwick, Skaill	settlement	prehistoric	excavation	YES	HY21 NW30.01	OR 2514	HY229188	Simpson, B	nya		Simpson, B 1998
Sandwick, Skaill House	cemetery	medieval	excavation		HY21 NW40	OR 1251	HY234185	James, H	negl		post-excavation
Sandwick, Skara Brae	settlement	Neolithic	geophysical survey	YES	HY21 NW12	OR 1246	HY231187	Bartlett, A D H	N/A		Bartlett, A D H and Clark, A J 1973a
Sandwick, Skara Brae	settlement	Neolithic	excavation		HY21 NW12	OR 1246	HY231187	Clarke, D V	NMS		post-excavation
Sandwick, Skara Brae	settlement	Neolithic	excavation		HY21 NW12.02	OR 1246	HY231187	Richards, C	nya		post-excavation
Sandwick, Skara Brae	settlement	Neolithic	geoph-survey	YES	HY21 NW12	OR 1246	HY231187	Griffith, D	N/A		Griffith, D 2003
Sandwick, Unigarth	souterrain	Iron Age	excavation		HY21 NW29	OR1258	HY246174	Cruden, S			
Sandwick, Verron	broch	Iron Age	excavation		HY21 NW22	OR 1256	HY231197	EASE	nya		post-excavation
Sandwick, Vestrafiold	barrows	Bronze Age	excavation	YES	HY22 SW9	OR 1205	HY242221	Downes, J	nya		Downes, J 1999
Sandwick, Vestrafiold	quarry	Neolithic	excavation	YES	HY22 SW7	OR 1203	HY239218	Richards, C	N/A		post-excavation
Sandwick, Vestrafiold	tomb	Neolithic	excavation	YES	HY22 SW10	OR 1206	HY204218	Richards, C	nya		post-excavation
Sandwick, Voy			survey			various		Forbes, R	N/A		
Shapinsay			survey			various		Lamb, R G	N/A		RCAHMS 1987
Shapinsay, Burroughston	broch	Iron Age	reconstruction		HY52 SW4	OR 1123	HY541210	Hill, J	nya		post-excavation
Shapinsay, Wardhill	cairn	medieval	excavation	YES	HY52 SW6	OR 1081	HY508174	Downes, J	nya		Downes, J 1999
South Ronaldsay			coastal survey			various		EASE	N/A		Moore, H and Wilson, G 1997
South Ronaldsay, Banks	cist	Bronze Age	excavation		ND48 SE3	OR 1883	ND463832	Simison, R			post-excavation
South Ronaldsay, Cairns o' the Bu	broch	Iron Age	geoph-survey	YES	ND48 NE14	OR 1869	ND454869	Carruthers, M	N/A		Carruthers, M 2003
South Ronaldsay, Isbister	tomb	Neolithic	excavation		ND48 SE1	OR 1881	ND470845	Simison, R	OM	1990.112	Hedges, J W 1983b
South Ronaldsay, Liddle	burnt mound	Bronze Age	excavation	YES	ND48 SE2	OR 1882	ND465841	Hedges, J W	OM	1979.24	Hedges, J W 1975

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South Ronaldsay, St Margaret's Chapel	supposed chapel	modern	excavation		ND49 SW9	OR 1799	ND445934	Ballin Smith, B	OM	1985.20	Ballin Smith, B 1980
South Ronaldsay, Mossetter	souterrain	Iron Age	geophysical survey	YES	ND48 NW16	OR 1850	ND447860	Carruthers, M	N/A		Carruthers, M 2003
South Ronaldsay, Muckle Skerry			survey			various		Hunter, J R	N/A		Hunter, J R and Dockrill, S J 1982a
South Ronaldsay, Switha			survey			various		Hunter, J R	N/A		Hunter, J R *et al* 1984
South Ronaldsay, Windwick	souterrain	Bronze Age/ Iron Age	excavation	YES	ND48 NE8	OR 1864	ND459867	Carruthers, M	nya		Carruthers, M 2003
St Andrews			survey			various		Lamb, R G	N/A		RCAHMS 1987
St Andrews, Minehowe	ritual	Iron Age	excavation	YES	HY50 NW38	OR 63	HY510060	Card, N and Downes, J	OM	nyr	ongoing
St Andrews, Round Howe	broch	Iron Age	excavation	YES	HY50 NW8	OR 2	HY508059	Card, N and Downes, J	OM	nyr	ongoing
St Andrews, St Peters Bay	broch	Iron Age	geophysical survey	YES	HY50 SW21	OR 61	HY537045	Gater, J (GSB)	N/A		GSB 2001c
St Andrews, St Ninians Chapel	chapel	medieval	geophysical survey	YES	HY50 NW6	OR 20	HY509062	Gater, J (GSB)	N/A		GSB 2001b
St Ola and Kirkwall			fieldwalking			various		Richards, C	nya		post-excavation
St Ola, Cleat	cist	Bronze Age	excavation		HY41 SE15	OR 1536	HY470117	Marwick, E W			Hedges, J W 1981
St Ola, Crantit	tomb	Neolithic	excavation	YES	HY40 NW17	OR 2365	HY439099	Ballin Smith, B	OM	nyr	post-excavation
St Ola, Crossiecrown	settlement	Neolithic/ Bronze Age	excavation	YES	HY41 SW154	OR 2358	HY423137	Downes, J	nya		post-excavation
St Ola, Grain earth house	souterrain	Iron Age	excavation		HY41 SW24	OR 2329	HY442116	Haigh, D and Smith, B	OM	1982.315	Haigh, D with Smith, B 1983
St Ola, Holland	burial	Bronze Age	excavation		HY41 SE13	OR 1538	HY477112	Neil, N R J	OM	1982.193	Neil, R J N 1981b
St Ola, Holland	souterrain	Iron Age	geophysical survey	YES	HY41 SE24	OR 765	HY477113	Carruthers, M	N/A		Carruthers, M 2003
St Ola, Kirkwall			excavation			various		McGavin, N	OM	1986.6-9	McGavin, N A 1982
St Ola, Kirkwall, Broad Street	settlement	Iron Age	excavation		HY41 SW133	OR 2386	HY449108	Lamb, R G *et al*	OM	1988.207	Lamb, R G 1986
St Ola, Kirkwall, the Earl's Palace	residential	medieval	excavation		HY41 SW11	OR 1564	HY450108	Cox, E	OM	nyc	Cox, E *et al* 1998

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St Ola, Kirkwall, the Watergate	residential	medieval	excavation		HY41 SW41		HY449107	Ballin Smith, B	OM	1984.16-17	Ballin Smith, B 1984
St Ola, Orquil	souterrain	prehistoric	excavation		HY40 NW 7	OR 1528	HY428097	Simpson, D D A	none		
St Ola, Pickaquoy	burnt mound	Bronze Age	geophysical survey	YES	HY41 SW13	OR 1561	HY441112	Aspinall, A; GSB	N/A		Aspinall, A 1973; GSB 2004
St Ola, Quanterness	tomb/ settlement	Neolithic	excavation		HY41 SW4	OR 1571	HY418129	Renfrew, A C	NMS		Renfrew, A C 1979
Stenness			fieldwalking			various		Richards, C	nya		Richards, C 1985
Stenness			geophysical survey	YES		various		OAT/ GSB	N/A		ongoing
Stenness, Barnhouse	settlement	Neolithic	excavation	YES	HY31 SW61	OR 2388	HY308127	Richards, C	nya		post-excavation
Stenness, Brodgar Farm	settlement	Neolithic	excavation	YES			HY303128	Ballin Smith, B			post-excavation
Stenness, Little Barnhouse	tomb	Neolithic	geophysical survey	YES	HY31 SW24	OR 1381	HY302116	Challands, A	N/A		Challands, A 2001
Stenness, Lochview	burial	Bronze Age	excavation		HY31 SW72	OR 2587	HY302128	Card, N	nya		post-excavation
Stenness, Maeshowe	tomb	Neolithic	excavation		HY31 SW1	OR 1365	HY318218	Childe, V G			Childe, V G 1956
Stenness, Maeshowe	tomb	Neolithic	excavation		HY31 SW1	OR 1365	HY318128	Renfrew, A C	unknown		Renfrew, A C 1979
Stenness, Maeshowe	tomb	Neolithic	excavation	YES	HY31 SW1	OR 1365	HY318128	Richards, C	nya		Richards, C (ed) forth
Stenness, Nether Onston	cist	Bronze Age	excavation	YES		OR 2880	HY293117	Ballin Smith, B			post-excavation
Stenness, Odin Stone	standing stones	Neolithic	excavation	YES	HY31 SW40	OR 1395	HY306126	Richards, C	nya		Richards, C (ed) forth
Stenness, Ring of Brodgar	henge	Neolithic	survey	YES	HY21 SE1	OR 1314	HY295133	Bartlett, A D H	N/A		Bartlett, A D H and Clark, A J 1973b
Stenness, Ring of Brodgar	henge	Neolithic	excavation		HY21 SE1	OR 1314	HY295133	Renfrew, A C	Southampton		Renfrew, A C 1979
Stenness, Ring of Brodgar	henge	Neolithic	survey		HY21 SE1	OR 1314	HY295133	Historic Scotland	N/A		
Stenness, Stones of Stenness	henge	Neolithic	excavation		HY31 SW2	OR 1366	HY307125	Ritchie, J N G	NMS		Ritchie, J N G 1976
Stenness, Stones of Stenness	henge	Neolithic	geophysical survey	YES	HY31 SW2	OR 1366	HY307125	Clark, A	N/A		Clark, A 1973
Stenness, Stones of Stenness	henge	Neolithic	geophysical survey	YES	HY31 SW2	OR 1366	HY307125	Gater, J (GSB)	N/A		GSB 1999a
Stenness, Summersdale	barrow	Bronze Age	excavation		HY31 SW15	OR 1375	HY347105	Wainwright, F G			Ashmore, P 1974

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Stromness			coastal survey			various		EASE	N/A		Moore, H and Wilson, G 1998
Stromness, Arion	cist	Bronze Age	excavation		HY21 SE23	OR 2378	HY256144	Macgillivray, E	OM	1985.125-6	
Stromness, Breckness	broch	Iron Age	excavation		HY20 NW9	OR 1459	HY225093	Ballin Smith, B	OM	nyc	Ballin Smith, B 1993
Stromness, Bu broch	settlement	Iron Age	excavation		HY20 NE11	OR 1467	HY269093	Hedges, J W	OM	1982.33	Hedges, J W 1987
Stromness, Bu of Cairston	cemetery	medieval	excavation		HY20 NE10	OR 1466	HY272096	Stevens, T (AOC)	nya		post-excavation
Stromness, Deepdale	standing stones	Neolithic	excavation		HY21 SE25	OR 1483	HY271116	Burton, J	negl		Burton, J 1980
Stromness, Howe	multi settlement	multiperiod	excavation		HY21 SE41	OR 1495	HY276109	Ballin Smith, B	OM	1982.202	Ballin Smith, B 1994
Stromness, Mousland	burial	Bronze Age	excavation		HY21 SW6	OR 2359	HY231126	Downes, J	OM	nyc	Downes, J 1994
Stromness, Redlandhill	cist	Bronze Age	excavation		HY21 SE	OR 2314	HY265132	Lamb, R G L	OM	1987.04	Lamb, R G 1987
Stromness, Seatter Farm	settlement	Neolithic	survey	YES	HY21 SE58	OR 2520	HY267128	Richards, C	nya		Richards, C 1985
Stromness, Warebeth	settlement	Iron Age	excavation		HY20 NW17	OR 1461	HY237082	Bell, B J	OM	1987.137	Bell, B J and Dickson, C 1989
Stronsay			survey			various		Lamb, R G	N/A		RCAHMS 1984
Stronsay, Linga Holm			survey			various		Card, N	N/A		Card, N 2002
Stronsay, Millfield	settlement	Mesolithic/ Neolithic	excavation		HY62 SE22	OR 437	HY659250	Wickham-Jones, C R	OM	nyc	Wickham-Jones, C R 1992
Stronsay, St Nicholas Chapel	chapel	medieval	excavation	YES	HY62 NE14	OR 174	HY669291	Lowe, C	OM	nyr	post-excavation
Walls			survey			various		Lamb, R G	N/A		RCAHMS 1989
Walls and Flotta			survey			various		EASE	N/A		Moore, H and Wilson, G 1997a
Walls and Flotta, Fara			survey			various		Hunter, J R	N/A		Hunter, J R *et al* 1982
Walls and Flotta, Hackness Battery	gun battery/ cairn	19th C/ Bronze Age	excavation	YES	ND39 SW9	OR 2050	ND337915	Headland Archaeology	nya		post-excavation
Walls and Flotta, Rysa Little			survey			various		Hunter, J R	N/A		Hunter, J R *et al* 1984
Walls and Flotta, the Loft			survey			various		Card, N	N/A		Card, N 1998b
Westray			survey			various		Lamb, R G	N/A		RCAHMS 1983
Westray			survey			various		EASE	N/A		Moore, H and Wilson, G 1998

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Westray, Berst Ness	mortuary structure	Iron Age	excavation	YES	HY44 SW2	OR 719	HY441418	EASE	nya		ongoing
Westray, Cleat	settlement	Viking	excavation		HY44 NE11	OR 706	HY467466	Barrett, J	nya		post-excavation
Westray, Gill Pier	burnt mound	Bronze Age	excavation		HY44 NE10	OR 705	HY450492	Lehane, D			Lehane, D 1990
Westray, Kestro / Baikie	farmstead	medieval	excavation	YES	HY44 SE11	OR 1041	HY450432	EASE	nya		post-excavation
Westray, Langskaill	settlement	Iron Age/Norse	excavation		HY44 SW9	OR 729	HY438429	EASE	nya		ongoing
Westray, Links of Noltland	settlement	Neolithic/ Bronze Age	excavation		HY44 NW33	OR 1976	HY428493	Clarke, D V	NMS		post-excavation
Westray, Links of Noltland	settlement	Neolithic/ Bronze Age	survey		HY33 NW33	OR 1976	HY428493	Dunwell, A	N/A		Dunwell, A 1995
Westray, Links of Noltland	settlement	Neolithic/ Bronze Age	fieldwalking		HY44 NW33	OR 1976	HY428493	Richards, C	NMS		post-excavation
Westray, Links of Noltland	settlement	Neolithic/ Bronze Age	survey/ excavation	YES	HY44 NW33	OR 1976	HY428493	EASE/ Barrett, J	nya		post-excavation
Westray, Peterkirk	broch	Iron Age	excavation	YES	HY44 SE2	OR 724	HY499401	EASE	nya		post-excavation
Westray, Pierowall Quarry	tomb/ settlement	Neolithic/ Iron Age	excavation		HY44 NW32	OR 914	HY438490	Sharples, N	OM	1981.001	Sharples, N 1984
Westray, Point of Cott	tomb	Neolithic	excavation		HY44 NE3	OR 906	HY465474	Barber, J	OM	1997.031	Barber, J 1997
Westray, Quoygrew	settlement	medieval	excavation		HY45 SW4	OR 677	HY443506	Barrett, J	nya		ongoing
Westray, Rapness	burial	Bronze Age	excavation		HY54 SW11	OR 884	HY500404	Barber, J	OM	nyc	Barber, J *et al* 1996
Westray, Tuquoy	settlement	Viking	excavation		HY44 SE5	OR 710	HY454431	Owen, O	nya	nya	post-excavation

PART 7

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