**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 Space allows for only a cursory introduction to individual techniques and information will quickly go out of date as new techniques are developed and existing ones refined.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 14C 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 14C 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.

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 Skalil, 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
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 relatively easy to establish the origin of these mounds, whether man-made or natural, and also assign a tentative function (e.g. 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, finds spots, 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 ¹⁴C 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 © Crown Copyright reproduced courtesy of Historic Scotland.
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
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
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 (δ¹⁵N on amino acids and δ¹³C 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.
### Modelling

Modelling is an essential tool for research into the historical and archaeological dimensions of land sustainability. Recent research using the CENTURY agro-ecosystem 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 roles 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

**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 role 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 ^14C 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 Skail 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
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
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 © S J Dockrill.

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 palaeoenvironmental 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 c1200 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 Nortegiae (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
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; focussed qualitative interviews; historical and documentary analysis; and questionnaires.
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 (e.g., 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 (e.g., 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.