

PRESERVING OUR PAST RESEARCH CLUSTER

‘CONSENSUS OR COLLISION?: A SITE-SPECIFIC APPROACH TO INTEGRATING METHODOLOGIES FOR STUDYING AND MANAGING THE HISTORIC ENVIRONMENT’



METHODS BRIEFINGS



FROM THE 1ST CLUSTER MEETING:
‘INTRODUCING METHODS FOR STUDYING
THE HISTORIC ENVIRONMENT’

5TH TO 7TH JANUARY, ST BENET’S HALL, OXFORD



Arts & Humanities
Research Council



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Meeting Overview

The first cluster meeting was held at St Benet's Hall, Oxford over 3 days between 5th and 7th January 2007. The meeting aimed to bring together all the core participants in the research cluster to introduce and discuss the methods they employ to study the historic environment. Each participant gave a 15-minute presentation on a method, followed by discussion and questions, which are summarised in the rest of this document. A site visit to the new Oxford Castle site and the Oxford Castle Unlocked heritage centre was hosted by Debbie Dance, Director of the Oxford Preservation Trust. Additional talks were given by Kathy Lithgow (National Trust), on the conservation of historic collections, and Janet Miller (Atkins), who gave a presentation introducing Burslem and its regeneration issues, which forms the focus of the second research cluster meeting. The participation of the National Trust (as 'carers' for many historic environments) and Atkins (as consultants involved in many large regeneration projects) in the research cluster demonstrates our evolving partnership between academics, practitioners and industry.

The group discussions at the first meeting were animated and productive, raising a series of questions which will inform the next two cluster meetings. These questions focus upon a number of aspects of the nature of interdisciplinary collaboration in the study of the historic environment. While the content of the presentations is outlined in the rest of the document, this Overview summarises these questions and discussions, under four themes: (a) *Defining 'Methodologies' and Defining 'the Historic Environment'*, (b) *Public Engagement and Social Value*, (c) *Innovation in Methodologies for the Historic Environment*, and (d) *Research Outputs and Research Users in Interdisciplinary Collaboration*.

(a) Defining 'Methodologies' and Defining 'the Historic Environment'

One of the stated aims for this first meeting was to explore alternative definitions of 'methods' in different disciplinary contexts. The methods discussed by participants, and the material studied, were certainly varied - ranging from artistic film installation inspired by a 19th-century chapel or documentary research into post-medieval buildings to digital photogrammetry for recording Australian rock art, the use of oral history to document the mid 20th-century hedgerow planting practices in the West Country, experiments to measure the influence of foundation stresses upon buried artefacts, ethnographic techniques for exploring the contemporary perception of the historic environment at prehistoric monuments, the use of geological information for stone matching in historic buildings restoration, and the development of techniques of community involvement in the planning and design of public spaces in historic urban areas in London.

Although the participants were drawn from a very wide range of scientific, social scientific and arts and humanities backgrounds, all shared a clear idea of what method meant for them - whether library- or desk-based or lab- or field-based research. A number of social scientific presentations touched upon the relationships between 'method' and 'practice'. It was clear that discussing methods, especially in relation to research aims and objectives and also perhaps a concern for overall 'methodology', represented helpful common ground in which to begin interdisciplinary dialogue on collaborative research into the historic environment. It was clear, that while participants recognised that many of us started from different ontological standpoints,

we were also very keen to have discussions over epistemological issues that sought to ‘speak to’ each other, rather than ‘talk past’ each other, with no-one being seen as a ‘junior’ or ‘less worthwhile’ partner.

Conceptions of the ‘historic environment’ were also very diverse. For some participants this term referred to landscapes and built environments that existed in the past, and that can be reconstructed through research, while for others it referred to contemporary, 21st-century landscapes in which materials from the past survive. In this second view, the significance of the ‘historic environment’ related not simply to the potential for its study to inform our understanding of the past, but also to the conservation of buildings, collections or buried remains, and to the engagement of the public with ideas and senses of place.

(b) Public Engagement and Social Value

A second aim of the first meeting was to consider the ways in which research methods help or hinder public engagement with the historic environment. An important point of departure for many of the humanities- and social scientific-based researchers was ideas of value and significance - what makes environments ‘historic’ rather than simply ‘historical’. This sense of valuing highlighted how lived human populations can create, perhaps even form part of, a ‘historic environment’. For some participants, this raised ethical, as well as practical or theoretical, issues in relation to methodology. This led to a discussion of alternative approaches to public engagement, in which a wide variety of perspectives were voiced by participants. For some, public engagement formed part of research output (eg in artistic practice), for others working with the public through participant observation or interviews and focus groups was part of their methodologies for studying the historic environment, and for others the importance of engaging with the public related only to the dissemination of the results of the research - like any other field’s obligations to the public understanding of science. For some of the science-based participants, the potential of the scientific methods they use as ways to engage the public was seen to be something worth harnessing further. Work such as innovative experiments using cornflakes to simulate buried artefacts under stress from foundations could help engage the public in understanding the issues surrounding development pressure on the historic environment. A concrete example of this was given by the involvement of volunteers in photogrammetric recording of rock art using low cost digital cameras.

Finally, a degree of scepticism over the usefulness and significance of ideas of ‘social value’ was expressed on several occasions. The value debate has framed much public policy in relation to the historic environment in recent years, through methods such as conservation planning, but the focus of most of the participants here was upon the study of materials (whether microbes, stones, documents or buildings).

(c) Innovation in Methodologies for studying the Historic Environment

A third aim of the first meeting was to consider how the development of novel methods for studying the historical environment can be encouraged through interdisciplinary exchanges. A number of participants commented on how the experience of talking about methodologies in such an interdisciplinary environment served to increase their own awareness of disciplinary identity, and encouraged them to share knowledge of established technologies and approaches within their own fields. Here, the most successful interdisciplinary exchanges occurred within

disciplines that are relatively closely related - such as anthropology and archaeology, or geography and geology - or especially where disciplines are united by a common material context or problem - such as the study of the effects of microbes upon building stone, and the historical study of the built environment. However, there were also useful reflections on how to make more daring links, between microbiology and video art for example. As the cluster moves into its second phase, the issue of promoting innovation in interdisciplinary collaboration is sure to prove an important theme.

(d) Research Outputs and Research Users in Interdisciplinary Collaboration

A final aim of the first meeting was to consider how multi-disciplinary projects can most successfully bring together very diverse methods to produce new research outputs that are of use to research users both within and outside of higher educational institutions (HEIs). A major theme of debate was the existence of alternative modes of interdisciplinary collaboration. Some participants described how scientific methods are often employed as ancillary techniques in social scientific or humanities-based projects to answer specific problems. This leads to a particular kind of interdisciplinary exchange - with a single output, grounded in one particular discipline, which sees interdisciplinary exchanges as the provision of application of method. This can mean that other disciplines are *reduced to methodology or technicians* - which risks the naïve use of the perspectives of other fields.

Such single outputs from multiple disciplinary perspectives is an important model (a good example might be the development of radiocarbon dating for buried archaeological remains), but in discussion the potential for collaboration to lead to two or more very different outputs - for example, an artistic film and a peer reviewed scientific paper - was raised. The challenges for funding councils here would be to develop research schemes that made possible the assessment of applications and outputs that ranged across a number of disciplines. This would be a very different model from the kind of innovation described in (c) above, but in some cases might maximise the benefits to all partner disciplines.

The potential for multiple outputs might also maximise the contribution of the research to the practical aspects of conservation, exhibition, and understanding of the historical environment. Indeed, a regular theme in our discussions of the form of research outputs was the question of defining research users. Research into the historic environment can benefit a wide number of groups, from the communities funded by Heritage Lottery Fund to, avocational groups, local and national government, and the private sector, as well as research users within HEIs. These themes of the diversity of potential research outputs from, and research users for, interdisciplinary research into the historic environment will be explored further in the next cluster meeting.

Moving Forward

Overall, the format of the first meeting worked very well, and achieved the goals of the first meeting - to introduce participants and their understanding of methodologies in relation to the historic environment, and to facilitate discussion of key themes in this area. In particular, the themes of promoting innovation and of research users and research themes (c and d above) emerged as important issues to be explored at the second meeting.

DH, DCH and HAV 28/3/07

Desk- and Archive-Based Methods in Archaeology

Dan Hicks

This presentation introduced the various desk- and archive-methodologies utilised by archaeologists to research the historic environment. It is often imagined that archaeological methods relate only to fieldwork (excavation and survey) and the post-excavation processing of materials, but archaeologists routinely use documentary and archive sources to study the historic environment - whether as part of the planning and preparation for fieldwork, as part of the management of archaeological sites and monuments, or as the basis for regional surveys of archaeological evidence.

The presentation introduced the methods of desk-based assessment as used in professional contract archaeology, and the methods of desk-based landscape survey used in British landscape archaeology. Central among these was the use of historical cartographic and pictorial sources to present a site or landscape progression - detailed visual evidence of how the environment changed over time. Such research was discussed alongside the use of archaeological archives - grey literature, sites and monuments records, excavated materials held in museums, and the National Monuments Record (NMR). Other statutory archives such as listed buildings indexes were introduced. The combination of such sources with primary and secondary documentary sources (from estate records to letterbooks), was discussed.

Overall, the presentation explained how desk- and archive-based archaeology has developed methods of weaving together alternative, diverse sources of evidence to present detailed, chronological accounts of past changes in the historic environment.

Photography for quantitative studies in heritage science – summary

Mary J. Thornbush

There is much potential in the use of digital photography to capture cross-temporal and spatial change in weathering landscapes. Soiling and decay features can be tracked on surfaces of historical buildings and structures using new approaches and methods. Histogram-based distributions of lightness (L^*) and chroma (a^* and b^*) can be used on flat surfaces, in areas of minimal relief and architectural detail. These can also be applied to quantify decay features. Moreover, archival research can be used to extend the temporal framework of these studies using photoarchival material; for example, including postcards (cf. Sawyer and Butler, 2006).

As portrayed by Swallow et al. (2004), photography can be employed in three different ways: 1) pictorial, 2) rectified, and 3) photogrammetry. Qualitative approaches rely on the first (pictorial) use; whereas, quantitative analyses have traditionally been conducted in the latter approach. There is much potential for quantifying rectified photography and Thornbush and Viles have contributed to this niche in the literature. The integrated digital photography and image processing (IDIP) method, for instance, has been introduced (Thornbush and Viles, 2004a,

2004b) and the decay mapping in Adobe Photoshop (DMAP) approach has also been applied at the boundary wall of Worcester College (Thornbush and Viles, 2007).

Methods such as IDIP and DMAP provide a basis from which to conduct quantitative photography, drawing from repeat photography as an established methodology. This methodology itself has qualitative applications (e.g., Thornbush and Viles, in press), but it has been used to measure cross-temporal and spatial change in central Oxford from close-up photographs taken in 1997, 1999, and 2003. The standard colour system CIE L*a*b* provides a basis for such quantitative close-up rephotography, and histograms provide an output for numerical comparisons and assessments of surface change, based on the notion that surfaces darken (reduced lightness) with exposure in polluted (urban) environments.

Greyscale calibration is crucial for the comparability of this approach and a greyscale was incorporated in photographs since 1997, so that they can be 'calibrated' as accurate measurements of colour. This is still in progress and is crucial for the establishment of IDIP and DMAP – especially for the O-IDIP, or the outdoor use of the IDIP method so that outdoor photographs can be quantified under ideal conditions (e.g., of lighting). Though it has been found very difficult to quantify archival photographs – because they are often not close-up, a photoarchival study of Magdalen College, Oxford has produced some interesting findings of longer term cross-temporal change to a building façade (Thornbush and Viles, 2005).

The results from these quantitative and qualitative studies are promising. So far, it has been possible to monitor colour change in areas as opposed to point measurements taken with colorimeters. The quantitative results suggest that, with calibration, soiling (and decay) may be tracked successfully using repeat photographic surveys of walls. These results have been obtained in the laboratory and are conceivable out-of-doors through greyscale calibration. As aforementioned, it is also possible to use photoarchival records to extend the temporal record of change – e.g., back to the mid-19th century, as at Magdalen College).

Rectified photography has been used successfully not only qualitatively, but also quantitatively using histogram-based measurements. A surveying interval of repeat photography has been suggested to be around every 5 years for the buildings in central Oxford. Soiling and decay have been linked with coal consumption since the late 18th century (Viles, 1996), and more recently with traffic pollution.

References

- Sawyer, C.F. and Butler, D.R., 2006. The use of historical picture postcards as photographic sources for examining environmental change: promises and problems. *Geocarto International*, 21(3): 73-80.
- Swallow, P., Dallas, R., Jackson, S. and Watt, D., 2004. *Measurement and Recording of Historic Buildings*. Second edition. Donhead Publishing, Shaftesbury.

Thornbush, M. and Viles, H., 2004a. Integrated digital photography and image processing for the quantification of colouration on soiled surfaces in Oxford, England. *Journal of Cultural Heritage*, 5(3): 285-290.

Thornbush, M.J. and Viles, H.A., 2004b. Surface soiling pattern detected by integrated digital photography and image processing of exposed limestone in Oxford, England. In: Saiz-Jimenez, C. (ed.), *Air Pollution and Cultural Heritage*, pp. 221-224. A.A. Balkema Publishers, London.

Thornbush, M. and Viles, H., 2005. The changing façade of Magdalen College, Oxford: Reconstructing long-term soiling patterns from archival photographs and traffic records. *Journal of Architectural Conservation*, 11(2): 40-57.

Thornbush, M.J. and Viles, H.A., 2007. Photo-based decay mapping of replaced stone blocks on the boundary wall of Worcester College, Oxford. In: Prikryl, R. and Smith, B.J. (eds.), *Building Stone Decay: From Diagnosis to Conservation*, pp. 69-75. Geological Society, London, Special Publications, 271.

Thornbush, M.J. and Viles, H.A., in press. What can repeat photography tell us about soiling and decay of roadside walls over a six-year period?: A study combining qualitative comparisons and image processing techniques. *Building and Environment*.

Viles, H., 1996. "Unswept stone, besmeer'd by sluttish time": air pollution and building stone decay in Oxford, 1790–1960. *Environment and History*, 2: 359-372.

Public Art and Heritage in Urban Regeneration

James Dixon, UWE School of Art, Media and Design

I am currently undertaking a PhD between UWE School of Art, Media and Design, UoB Department of Archaeology and Anthropology and Bristol Alliance. My work is based around the commissioning of a public art programme by the developers of a central shopping area of Bristol, looking into the commissioning process itself and at public art processes as a way of understanding how people relate both to the past and to changing places. This divides broadly into two areas:

Firstly, the issue of public involvement in art and heritage stems from a popular conception of heritage as an essentially personal thing (people relate to things personally). This idea stems from a number of government documents over the last 6 years. One way to both make and see this personal connection is through art ("an activity producing relationships with the world"?- Bourriard). The idea central to my work is the possibility of public art, particularly analysis of public art processes, in historic and changing places can capture personal views/values/interpretations/'zeitgeist' that traditional archaeology cannot. There is a clear link here with oral histories as a research method. Where the 'public' are essential is that in trying to integrate multi-disciplinary approaches to the historic environment it is helpful to step away from 'us'; away from simply artists talking to archaeologists or either attempting to imitate the other. A consideration of 'results' in

the form of wider reception of and involvement in public art and public archaeology is important.

Secondly, I am looking at the place of art and heritage within developer funded projects. A number of questions arise from this direction;

1. What communities are affected by renewal and development and how?
2. How can developers usefully bring art and heritage concerns together to understand the past, present and future of sites?
3. How can these considerations usefully contribute to funding issues and changes in legislation?

In summary: Focus on public art as both research method and output.

Microbes on building stone: the ugly, the bad and the good

Eric May

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Microbes and stone: sometimes bad and often ugly

Microorganisms grow everywhere, often unseen, usually ignored. They play a crucial role in transforming minerals in natural environments, notably assisting the formation of soils from rocks and cycling elements such as nitrogen and sulphur. It is not surprising that a wide variety of micro-organisms, especially bacteria and fungi, have been isolated from the stonework of historic monuments and buildings. Microorganisms can be on the surface or inside stone, as epilithic or endolithic communities respectively. In some circumstances their long-term surface growth establishes a coloured *patina*, which may be protective to the stone. Other patinas lead to damage caused by erosion, biopitting and exfoliation.

Biodeterioration of stone is rarely associated with one group of microorganisms; weathering stone may support a balanced, mixed community whose members co-evolve with time. Damage may thus be gradual through slow growth (biogenic *drift*) or be sudden and harmful stimulated by a dramatic change in environment, moisture or nutrients (biogenic *shift*). Microbial colonisation of building stones is characterised by a biological succession. Colonisation and conditioning of fresh stone by predominantly light-dependent types (*cyanobacteria*, *algae*, *lichens*) will enrich the stone so that organic-dependent *fungi*, *bacteria* and *actinomycetes* can grow on dead cells and trapped debris. Other bacteria obtain their energy from minerals (*sulphur* and *nitrifying bacteria*) and become significant wherever inorganic nitrogen or sulphur compounds are available.

Light-dependent, phototrophic organisms (such as higher plants, lichens and mosses, together with algae and cyanobacteria) cause obvious surface growths but the impact of most bacteria and fungi is more difficult to separate from purely physical and chemical phenomena that are known threats to the integrity of building stone. Microbes contribute to stone deterioration by one or more mechanisms: their presence as undesirable *surface growths* (aesthetic), *mechanical damage* (biogeophysical change) by slimes or penetrating filaments and *corrosive effects* (biogeochemical change) due to metabolic activity. Obviously scientific investigation can present severe problems with objects of cultural value. It is often difficult to assess the precise

contribution that microorganisms might make to decay. Consequently, damage to stone by microbial mechanisms is not well understood and not widely recognised as a problem to be addressed.

Microorganisms and damage

The complex consortium of microorganisms that exists on weathered building stone at any given time is the result of ecological successions and interactions that directly relate to fluctuating nutrient availability and environmental conditions. The ability of the stone-colonising microflora to cover and even penetrate material surface layers by the excretion of organic extracellular polymeric substances (EPS) leads to the formation of complex biofilms in which the microbial cells are embedded. Stone EPS trap aerosols, dust and nutrients, minerals, and organic compound complexes and take up water from air and release it under low moisture conditions. Notably rich and homogeneous biofilms, composed mostly of bacterial rods, are often observed on weathered stone substrates from sheltered areas.

Microorganisms may degrade stone mechanically, chemically and aesthetically through metabolic activities and biomineralisation processes in biofilms. The mechanical stress induced by shrinking and swelling of slimes inside stone pores may damage stone and restrict moisture movement. Salts are very important decay agents, attacking stones mechanically as moisture and temperature changes in pore spaces. Salt efflorescences can also present a habitat for salt-loving bacterial populations, which are well-adapted to an extreme existence, and biofilm interactions with salts can enhance mechanical pressures on stone during wet/dry cycling.

Investigating stone populations

Analysis of microbial populations requires samples to be taken and maintained without contamination so that analysis can be done within 2 hours of sampling. Decisions then have to be made about what to look for. Artificial laboratory media can be used to select for particular bacteria but this gives an unrepresentative estimate of *in situ* populations. Direct observation by electron microscopy gives no indication of active cells. Light microscopy has been used to detect active cells and reveals much higher numbers than those on growth media. Culture-independent techniques based on molecular biology have been used recently for studying communities on biodegraded wall paintings, buildings and monuments. These methods are based on extraction of DNA, its amplification and characterisation covering the whole population, including the unculturable types and rare organisms. Other methods detect microbial genes involved in biodeterioration such as those needed to use hydrocarbon pollutants in air. Molecular methods show that biodiversity on stone is extensive but much work is still needed to measure microbial activities that lead to damage. We are still dependent on weathering studies in the laboratory with pure or mixed cultures of microbes. Until this can be assessed without culture using molecular methods, multi-dimensional approaches, combining traditional and molecular methods with laboratory simulation studies, provide the basis for investigating stone damage. Above all, we need to understand what is there and how damage is caused in order to control the problem.

Controlling microbial growths

Control of stone biodeterioration requires knowledge of the environment (moisture, temperature and nutrients) that determines microbial growth. Direct intervention without this can sometimes lead to new and unexpected problems. Microorganisms

are most often associated with a visual disfigurement of buildings which can be physically removed by blasting with water or grit, or chemical cleaning. Unfortunately, such interventions remove only superficial layers and may reduce microbial numbers for a short time. Eradication of established growths requires toxic biocidal action. Biocides are used before and after conservation treatments, to remove existing microbes and prevent re-growth of the restored surface but there are concerns about safety in use, environmental effects and long-term effectiveness. Toxic chemical washes, such as quaternary ammonium compounds, are used to eradicate unsightly biological growths from stone but they may be replaced by other microbes, mosses and higher plants with greater damage potential. In recent years polymers and resins have been used in preservative treatments as waterproofing, consolidant or protective coating but some may actually act as a food source for microbes and unintentionally stimulate biodeterioration.

Microbes as restorers: the good?

Atmospheric pollutants such as nitrogen oxides and sulphur dioxide can produce acid rain, which is deposited onto stone where calcium carbonate is converted into gypsum and highly soluble nitrates. Dust and organic pollutants then become trapped in a gypsum matrix with re-crystallized calcite minerals to form black crusts. Usually microbes are linked to detrimental effects on stone, but some types, such as *Pseudomonas* and *Desulfovibrio*, could be used to reverse crust formation on historic buildings and art objects and convert the harmful sulphate and nitrate salts to gases. Other bacteria deposit new calcium carbonate around their cells in a process called biocalcification and they can be used to coat exposed mineral surfaces with layers of calcite crystals. Combinations of these bioremediation processes can thus be used in conservation.

Checklist for microbial investigations

Microbes cannot necessarily be seen and any heritage material may permit their growth, especially if it can be used as a food source. All surfaces will be extensively contaminated with a complex mixture of types, and depending on the texture, this may extend below the surface. Whenever heritage materials are assessed for microbes we routinely try to establish: how many there are; what types are present; what is their distribution; and where do they get their nutrients and moisture. In addition, we ask whether their presence is a threat to the material. Often we need to do laboratory experiments to establish this but if this reveals some concerns then it is necessary to come back to the object to reassess the original evidence.

Related publications

- 1 INKPEN, R. & MAY, E. (2003). Stone. In: E. May & M Jones (eds.), Conservation Science: Heritage Materials. Royal Society of Chemistry Publishing. 376 pp. (ISBN-10:0-85404-6593).
- 2 MAY, E. & JONES, M. (Eds.) (2006). Conservation Science: Heritage Materials. Royal Society of Chemistry Publishing. 376 pp. (ISBN-10:0-85404-6593).
- 3 MAY, E., LEWIS, F. J., PEREIRA, S., TAYLER, S., SEAWARD, M. R. D. & ALLSOPP, D. A. (1993). Microbial deterioration of building stone - a review. *Biodeterioration Abstracts*: 7(2), 109-123.
- 4 MAY E., PAPIDA S. & ABDULLA H. (2003). Consequences of the microbe-biofilm-salt interaction for stone in monuments. In: R Koestler (ed.), *Art*,

Biology and Conservation: Biodeterioration of Works of Art, Metropolitan Museum of Art, New York (ISBN1-58839-107-8).

- 5 PAPIDA S., MURPHY W. & MAY E. (2000). Enhancement of physical weathering of building stones by microbial populations. *International Biodeterioration & Biodegradation* **46**(4): 305-317.
- 6 WEBSTER, A. & MAY, E. (2006). Bioremediation of weathered building stone surfaces. *Trends in Biotechnology* **24** (6), 255-260.

Social Value and the Historic Environment – the use of participant observation and qualitative interviewing

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PRESENTATION SUMMARY:

Over the last two decades emphasis has been placed on conserving the cultural significance of heritage sites in addition to their physical fabric. Furthermore, the concept of social value has gained considerable currency in heritage management, alongside historic, aesthetic and scientific values. Nevertheless, the practical means of assessing cultural significance and social value are still underdeveloped. This presentation introduced some of the ethnographic methods I have used in my own research.

Traditionally, ethnography involved detailed, long-term fieldwork in a particular community. More recently, ethnographies have become multi-sited and can engage with a wide range of individuals and communities associated with locales such as hospitals, museums, financial institutions, heritage sites and so forth. The emphasis is on studying people's activities, social interaction, and discourse in such everyday settings. One of the primary methods is participant observation where the researcher immerses him/herself in the ongoing social life of particular localities. The participation element allows the researcher to take part in the richness and diversity of everyday practice and social interaction. The observing part involves critically viewing and exploring the values, dynamics, relationships, structures and conflicts that play out in and between communities. Particular attention is often devoted to exploring how people create and negotiate meanings, values, identities and power relationships.

Ethnography can also be broken down into more specific research practices that the researcher may employ in a given setting. Here I have illustrated each with an example of how the technique might be used in relationship to the historic environment.

- Unobtrusive direct observation (for instance observing people's movement and practices at heritage sites and museums)
- Participant observation (for instance, in coach tours or in communities associated with specific heritage sites)
- Conversing with people in more or less focused ways (for instance with people residing in the vicinity of specific monuments, or with heritage professionals within national heritage institutions)

- Semi-structured interviews focusing on specific topics (for instance with visitors to museums and heritage sites)
- Detailed work with key research participants (for instance with tour guides at heritage sites)
- Analysis of public events, texts, and audio-visual records.

The ‘data’ created takes various forms including: extensive fieldnotes; time/space maps of specific localities; audiotape recordings; transcriptions; interview sheets; photographs; newspaper cuttings, letters, memoirs, books and so forth. Analysis involves interpreting and synthesising this material, focusing on meanings, values, practices, modes of interaction, engagement with the material world, landscape and so forth. The aim is to produce a rich (‘thick’) description of social life that uses the local and the specific to draw more general arguments and conclusions. These methods are not intended to produce statistical measures of opinion and value, of the kind that can be derived from questionnaire surveys. But, importantly, they can provide an in-depth *understanding* of a given social setting; something which opinion polls and surveys rarely offer.

The potential of these methodologies was explored in the presentation with reference to my own work (sponsored by Historic Scotland) focusing on the conservation of early medieval sculpture and the social values surrounding such monuments. Early medieval crosses and cross-slabs generate specific conservation and management issues. Being carved stone they are at risk from weathering, storm damage, and human activity such as graffiti, rubbings and general handling. Various strategies have been used to aid physical preservation, such as removal to museums, local historic buildings, and preservation *in situ*, using purpose-built shelters. However, these strategies frequently invoke substantial resistance and criticism, from local communities, visitors and special interest groups. My research revealed that to gain insight into these responses it is necessary to understand the wider social, economic and historic context of the activities and debates surrounding the historic environment. Frequently, people’s responses are a product of other prominent issues affecting their current lives, or which are prominent in terms of social memory, such as economic disadvantage or cultural or political marginalisation. The research also showed that particular monuments in specific localities may have a complex set of meanings and values attached to them; some of which are symbolic or metaphorical in nature. These allow monuments and historic places to play an important role in mediating social relationships and informing the production of social identities. However they are not necessarily obvious in the fabric of the place or evident to the disinterested or uninitiated observer. They may for instance have little relationship to the historical or even aesthetic values attached to the historic environment by heritage professionals. Consequently, if we wish to conserve social value we need to develop and apply appropriate methodologies in the context of routine heritage management. I finished the presentation by highlighting possible models from elsewhere, in particular the use of ‘rapid ethnographic assessment’ by the National Parks Service in the USA.

Questions:

1. What is social value? The concept is used liberally in heritage management and conservation policy documents and reports, as well as by government bodies, but it is rarely interrogated in depth.

2. What are the most appropriate methodologies for gaining insight into the contemporary meanings and values attached to specific sites? I have examined some methodologies in my presentation but this is an area that needs much more work.
3. How much weight should be placed on social value in the conservation of the historic environment? In terms of policy 'rhetoric' it is a very prominent concern but in practice historic, aesthetic and scientific value are privileged by heritage professionals.
4. How can we weigh up different kinds of value – social, historic, aesthetic, scientific, economic, etc? This becomes especially problematic when these values conflict with one another or logically imply different conservation strategies.
5. How can new methodologies for gaining a good *understanding* of social value be integrated into routine heritage management? Presently research focusing on social value in the heritage sector is largely confined to pilot projects and one-off initiatives. Methodologies for researching social value are not effectively integrated, for instance, into the production of conservation plans or the scheduling of ancient monuments.

Further reading:

- Avrami, E. and R. Mason (eds) 2000. *Values and Heritage Conservation*. Los Angeles: Getty Conservation Institute.
- Bernard, H.R. 1994. *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. Thousand Oaks, CA: Sage.
- Byrne, D. et al. 2003. *Social Significance: a discussion paper*. Hurstville: NSW National Parks and Wildlife Service.
- De la Torre, M. (ed.) 2002. *Assessing the Values of Cultural Heritage*, pp. 3-4. Los Angeles: The Getty Conservation Institute.
- Foster, S.M. 2001. *Place, space and odyssey: exploring the future of early medieval sculpture*. Inverness: Groam House Trust.
- ICOMOS Australia 1979. [1999] *Charter for the Conservation of Places of Cultural Significance (The Burra Charter)*, revised 1999.
- Johnston, C. 1994. *What is Social Value? A discussion paper*. Australian Heritage Commission Technical Publications, Series No. 3. Canberra: Australian Government Publishing Service.
- Low, S.M. 2002. Anthropological-ethnographic methods for the assessment of cultural values in heritage conservation. In M. de la Torre (ed.) *Assessing the Values of Cultural Heritage*, pp. 31-49. Los Angeles: The Getty Conservation Institute.
- Peña, A.H. 2001. Fazendeville: highlighting invisible pasts and dignifying present identities. *Cultural Resource Management* 24(5): 24-27.
- Taplin, D.H., S. Scheld, and S.M. Low 2002. Rapid ethnographic assessment in urban parks: a case study of Independence National Historic Park. *Human Organization* 61(1): 80-93.
- Walderhaug Saetersdal, E.M. 2000. Ethics, politics and practices in rock art conservation. *Public Archaeology* 1: 163-80.

Rock-art recording in Australia, Northumberland and Durham using digital photogrammetry- (Methods for studying the historic environment- digital photogrammetry)

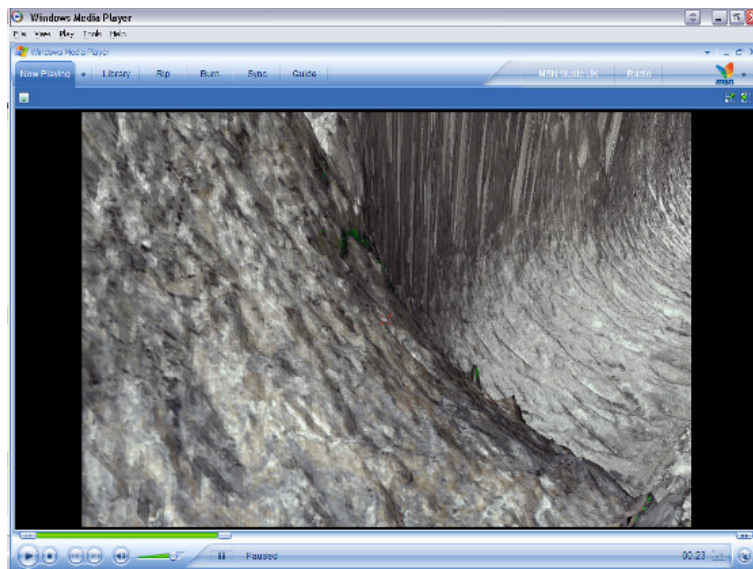
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Jim Chandler reported upon a simple methodology for recording rock art, which was recently developed in Australia and tested on aboriginal rock art, including both petroglyphs and pictographs (engraved and painted images respectively). The approach was based upon commercial photogrammetric software and consumer-grade digital cameras, because it was believed that archaeologists, conservators and site managers need simple and

cost-effective methods to record and document rock art. This methodology has been adopted subsequently by the Northumberland and Durham Rock Art Project working in conjunction with English Heritage, to assist in recording 1500 prehistoric engraved panels located across the north-east of England. Significantly, the field work is carried out by enthusiastic volunteers, willing to sacrifice their weekends to capture imagery suitable for digital photogrammetry.

It is believed that this approach is significant because it allows volunteers to carry out data acquisition and, perhaps surprisingly, also the photogrammetry. This demonstrates the value of mobilising the voluntary sector for heritage recording, which is feasible only if recording methodologies are based on cheap and simple instrumentation.



This work has been, or is about to be published in a variety of journals, many of which can be accessed electronically:

- CHANDLER, J.H. and FRYER, J.G., 2005. Recording aboriginal rock art using cheap digital cameras and digital photogrammetry. *CIPA XX International Symposium*, Torino. Pages: 193-8. <http://cipa.icomos.org/fileadmin/papers/Torino2005/193.pdf>
- CHANDLER, J. H., FRYER, J. G. and KNIEST, H. T., 2005b. Non-invasive three-dimensional recording of Aboriginal rock art using cost-effective digital photogrammetry. *Rock Art Research*, 22(2): 119-130. http://www-staff.lboro.ac.uk/~cvjhc/JC_Papers/RARPaper22-2%20Chandler.pdf
- CHANDLER, J. H., BRYAN, P, and FRYER, J. G., 2007. The development and application of a simple methodology for recording rock art using consumer-grade digital cameras. *Photogrammetric Record*, (March 2007). <http://www.blackwell-synergy.com/loi/PHOR>

Talking Points: Oral History and the Preservation of Heritage'

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The popularity of oral history is expanding. However, although oral histories are being conducted a great deal these days, we need to ask the question about what this oral history is actually *used* for? Some policy statements, such as that by the HLF (below), suggest that 'the past' is not stable. Indeed, this prompts some important issues about the ontology of the historic environment. I feel that oral history can have an input.

Heritage Lottery Fund (HLF) has a mission to "encourage more people to be involved in and make decisions about their heritage", and in "widening participation among people of all ages and backgrounds - especially people from communities who have not been involved in heritage before" (HLF Website)

The HLF also have a mission to "listen carefully to the changing ways in which an evolving society values the past" (HLF 2002, p. 1).

Taking a step back, **I see oral history as making a contribution in three basic ways:**

1. Through animating and augmenting what is already known from other methodological practices.
2. Through challenging more traditional methodological practices, reconsidering and contextualising what is known.
3. Through destabilising other methodological approaches from an epistemological standpoint – perhaps completely undermining what is supposedly *known*.

[See publications by David Harvey and Mark Riley]

Oral history has made us more aware of other voices, other feelings, other stories, and other interpretations of the historical landscape. It forces us to reconsider how knowledge is constructed and to look at landscapes in their relational context.

The example of hedgerows:

Hedgerows, symbolically speaking, are very powerful. The ‘essence of England’ is popularly seen through notions of a green countryside, with its patchwork of fields and hedges – the countryside is one of the most important landscapes in the national environmental ideology. This is also recognised through policy initiatives such as the Countryside Stewardship Scheme for instance, where “farmers are paid grants to follow more traditional farming methods that enhance the landscape, encourage wildlife and protect historic features” (DEFRA 2003, p. 2). With respect to policies on hedgerow conservation however, what are we actually preserving? What does the ‘protection of historic features’ entail? What are ‘traditional farming methods’?

Dr. David Harvey was the Principal Investigator on an AHRC-funded project (Innovation Award: R15611) that involved the collection and analysis of oral histories of agricultural practice and views of the landscape in Devon, mostly within the context of the Second World War.

Excerpts from the oral history project

[Farmer, aged 74]. “Oh yes, at the end of the war, father had a blitz and we went round and cut them all, but a lot of the hedges were like trees, all the way around...some of those trees had enough rings to be more than 70 years old [...] When I was a child I can’t hardly remember any hedges that were topped....we just hadn’t got the labour to do it”.

[Farmer, aged 79]. “Father and grandfather said hedging didn’t pay, so they just left them, so when I took over they had 70 or 80 years growth on....They are definitely in better order than they have been for a hundred years, more than a hundred and fifty I expect”.

[Farmer, north Devon, aged 80] “The hedges would be trimmed and faggots would be used for kindling. Then the trimmings would be gathered up and thrown under the ricks. It all tied in you see? You cleared the field and then trimmed the hedges to lay under the ricks as you built them. It kept the rick up off the floor you see? Stopped it from getting damp”

[Farmer, mid-Devon, aged 78]. “They’d got their certain field which they knew would grow good wheat, good barley, good oats...and it was all done on a seven year system. If you said you were going to plough a certain field on your farm, starting say from October, whatever wood that was on the hedges would be cut and used for firing, the hedge would be reinstated as a Devon hedge because there would be turf in the field wouldn’t there? And you was allowed to use any turf out of that field because it was going to ploughed see? And you reinstated your banks. Then the field would be ploughed before boxing day that autumn, and in January, if they wanted spring wheat, he was tilled in January. If not, he was tilled late February, early March for oats and Barley and then the following year he would go into winter wheat, which would be tilled in November. ...The winter wheat would come off in early July, but then he would be reploughed and put to what we call “sheep’s meat”, which is kale, swedes, turnips. Then you’d have two years of Barley – that’s five years. The sixth year would be oats, and the last year again would be barley with grass seeds under sown on it. In that seven years your hedge would have chance to re-grow from where it was laid and that. He would be nice and thick wouldn’t he? And you’d get a

nice stockproof hedge out of that...You also had a crop for firing. So the hedge would be managed with the field in the rotation...On a farm of say 150 acres, there would be two or three fields done each year... It was kept as manageable, an ordinary man could do the job all yourself.”

Are we preserving an aesthetic object that is devoid of meaning? A focus on aesthetics, in heritage terms, often reifies and stabilises the presence of the nation, and its singular historical narrative, but at a deeper level it tends to essentialize objects; it suggests a primordial ontology; it suppresses temporality and historical contingency; it denies the relevance of agency. “An aesthetic attitude towards a picturesque landscape, for example, tends to give its visual appearance a value in its own right, and, ... has the effect that the necessary interdependence of its very existence with other processes (economic, political or social) is often mystified” (Germundsson, 2006, p 24, drawing from Duncan and Duncan, 2001).

Indeed, although oral histories do not reach back 200 years, making space for them brooches subjects that do. They highlight the contingency of the historic environment; they underline alternative narratives; they say that things might not have been like this; they suggest that things do not have to be like this. I would argue that many opinions regarding heritage preservation (scholarly and exact as they often are) “end up referring exclusively to natural phenomena, aesthetic values and prospective museum artefacts, all stripped of their actual cultural, social and political meanings and neatly placed into an already existing administrative context” (Kraus 2006, p. 45 – also a link to the work of Setten 2006).

Farmers get asked to carry on making an maintaining a landscape in order to support the construction of, and underscore the authority of, policy makers and the scientific agendas of biodiversity etc.. On some cases, the meaning of hedgerows involves a story of dispossession; oppression; peasant resistance; cultural alienation; migration and emigration. This is a landscape that is laden with power and ideology. Oral history does not allow us to get to ‘first hand’ accounts of the processes of Parliamentary enclosure for instance, but they DO remind us that the historic environment is **contingent** – that there are **many narratives**. I think that Oral histories remind us that we should acknowledge the importance of subjective, local and complex variety and diversity in meaning and practice, lest we end up producing a uniformly sterile museum to posterity – the countryside ‘as a living monument to its own demise’ (Harvey and Riley 2005).

Bibliography:

NB: The oral history project from which some quotes have been extracted from above was entitled: *Landscape Archaeology and the Community in Devon; An Oral History Approach* (AHRC Innovation Award: R15611). The full oral history database is stored with the AHRC’s Archaeological Data Service (ADS), held at the University of York. The project website can be accessed at:

http://ads.ahds.ac.uk/catalogue/archive/harvey_ahrb_2004/index.cfm

DEFRA (2003) *The Countryside Stewardship Scheme: Information and How to Apply*, (London, DEFRA).

Duncan, J.S and Duncan, N. (2001) ‘The aestheticization of the politics of landscape preservation’, *Annals of the Association of American Geographers*, 91 (2), pp. 387-409.

Germundsson, T. (2006) 'Regional cultural heritage versus national cultural heritage in Scania's disputed national landscape', in K.R. Olwig and D. Lowenthal (eds) *The Nature of Cultural Heritage and the Culture of Natural Heritage*, (London; Routledge), pp. 19-35.

Harvey, D.C. and Riley, M. (2005) 'Country stories: the use of oral histories of the countryside to challenge the sciences of the past and future', *Interdisciplinary Science Reviews*, 30 (1), pp. 19-32.

Heritage Lottery Fund (2002) *Broadening the Horizons of Heritage: The Heritage Lottery Fund Strategic Plan 2002-2007*,

Krauss, W. (2006) 'The natural and cultural landscape heritage of northern Friesland, in K.R. Olwig and D. Lowenthal (eds) *The Nature of Cultural Heritage and the Culture of Natural Heritage*, (London; Routledge), pp. 36-50.

Riley, M. and Harvey D.C. (2007 in press) 'Landscape conservation, farm practice and the meaning of the countryside: An Oral History approach', for *Social and Cultural Geography*, Volume 8 (5).

Riley, M. and Harvey, D.C. (2005) 'Landscape archaeology, heritage and the community in Devon; an oral history approach', *International Journal of Heritage Studies*, 11 (4), 2005, pp. 269-288.

Riley, M. and Harvey D.C. (2005) 'Narrating landscape: the potential of oral history for landscape archaeology', *Public Archaeology*, 4 (1), pp. 15-26.

Setten, G. (2004) 'The habitus, the rule and the moral landscape', *Cultural Geographies*, 11 (4), pp. 389-415.

The influence of foundation stresses on weak artefacts

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Summary

An ever increasing need for urban regeneration and political pressure to use brownfield sites in the UK has led to development projects in areas which have a long history of human settlement and thus a higher probability of damage to buried archaeological artefacts. Currently the Government is "committed to preferring the development of land within urban areas, particularly on previously-developed sites", and aims to have 60% of additional housing constructed on previously developed land by 2008. Current guidance prioritises the preservation of nationally important archaeological remains in situ, buried in their original position, and therefore safeguarded for future generations. The weight of structures has dramatically increased since the end of the 19th century presenting new concerns to archaeologists and engineers wishing to preserve archaeological resources. These concerns frequently lead to conservative designs using beams spanning between deep piles which may themselves result in a loss of 10% -20% of the archaeological material. In certain situations the use of simple pad foundations bearing directly on the stratum containing artefacts may actually result in less damage.

The best way to approach this is to consider an artefact as an inclusion in a sedimentary matrix and recognise that the probability of a given level of damage occurring will depend on the magnitude and direction of the applied stresses, the composition of the sedimentary matrix and the strength of the inclusion. Tests have therefore been carried out on low strength model artefacts (cornflakes) buried in a sand matrix and subjected to compression and shear stresses.

The series of shear box tests showed that:

- Artefacts subjected to simple compressive stresses of **5 times the maximum bearing stress** in sandy soil are unlikely to suffer any damage
- Artefacts suffer damage only under a combination of shear and normal stresses
- Weak artefacts subjected to **shear strains** above a threshold of 30% (0.3) can fracture
- The probability of damage increases with magnitudes of shear strain and normal stress
- The orientation of the axis of the artefact relative to the plane of shearing was shown to be an important parameter. Artefacts parallel to plane of maximum shear suffered minimal damage

Numerical modelling of a typical foundation indicated that:

- Shear zones extend downwards beneath edges of foundations
- Shear zones extend to a depth between 1 and 2 times foundation width
- Zones with shear strains above 30% (0.3) are very limited in extent at normal allowable bearing pressures

Phenomenology and the Perception of the Historic Environment

Dr. Angela McClanahan

There has recently been widespread recognition across disciplines in the arts, social sciences and sciences, that the material objects that constitute the historic environment- buildings, portable artefacts, ancient monuments, landscapes – are imbued with multiple meanings and values by different groups in society. International heritage guidelines, for example, the *Burra Charter* (ICOMOS 1999), emphasise and legitimate this view. In light of this, academics and heritage managers have become interested in identifying methodologies that can help take these values into account within the heritage management process in respectful, positive ways.

Qualitative methods, particularly ethnography and interview-based research, have been successfully used in the United States, Australia, and more recently in Britain, to gain insight into the social values surrounding heritage sites (Johnson 1994; Jones 2004; McClanahan 2004; Taplin, Scheld and Low 2001). Another ‘approach’ which can be of particular value in examining how people experience and understand the historic environment, I believe, lies in ‘phenomenology’, or the ‘interpretive study of human experience, in which the aim is to ‘examine and clarify human situations, events, meanings and experiences’ (Seamon 2000: 1).

The use of phenomenology, a philosophical approach rooted in traditions of continental philosophy, has been used with varying degrees of, often contested, ‘success’ in archaeology. Often a controversial approach or ‘method’ to use, it has been employed perhaps most notably by scholars of the Neolithic of Northwest

Europe to understand how people understand and view the world as embodied beings (Tilley 1993).

More recently (and perhaps less controversially), phenomenological approaches have been used by cultural geographers and architects in urban planning contexts, to explore how people perceive the built environment. Rishbeth (2006), for example, examines first-generation British immigrants' walking patterns and physical engagements with the built environment in order to explore how best to implement urban design to fit the needs of local communities in Sheffield. I would argue that a similar approaches in heritage research can fruitfully be used to understand how people perceive and understand the historic environment in contemporary society. Insights gleaned from recent heritage research conducted in the Orkney Islands (McClanahan 2006), for example, has shown that examining visitor's 'embodied' experience at heritage sites can reveal much about how and why they engage with sites in the way they do. Behaviour mapping and transect walks, for example, in which researchers observe physical movement and activities in a particular environment and record it on a map, often followed by an interview, is an important way of gaining an understanding of the culturally rich chasm that often occurs between what people *do*, what they *say* and *perceive* they do, and most importantly, *why*. Gaining this kind of nuanced understanding of people's behaviour provides a much more insightful, informed understanding of how and why people value the historic environment. Far from being 'abstract', this approach, whilst 'empirical', offers qualitative, sophisticated, layered, and nuanced accounts of behaviour than more statistically based 'methods' or 'approaches' would allow in the context of heritage research.

References Cited

ICOMOS 1999 *The Burra Charter*. Australia ICOMOS.

Johnston, C. 1994 *What is Social Value? A Discussion Paper*. Canberra: Australian Government Publishing Service.

Jones, S. 2004 *Early Medieval Sculture and the production of meaning, value and place: the case of Hilton of Cadboll*. Edinburgh: Historic Scotland.

McClanahan, A. 2004 *The Heart of Neolithic Orkney in its Contemporary Contexts: a case study in heritage management and community values*. Report prepared for Historic Scotland.

McClanahan, A. 2006 *Monuments in Practice: the Heart of Neolithic Orkney in its Contemporary Contexts*. Unpublished PhD thesis: University of Manchester.

Rishbeth C. 2006 Rwanda in Sheffield; the local/global distinctiveness of greenspace, in: Mcdonald, S. and Symonds, J. (Eds), *Materializing Sheffield: Place, Culture, Identity*. (Sheffield, Humanities Research Institute). E-book: <http://www.hrionline.ac.uk/matshef/>

Seamon, D. 2000 'A Way of Seeing People and Place: Phenomenology in Environment-Behaviour Research'. In S. Wapner, J. Demick, T. Yamamoto and H. Minami (eds), *Theoretical Perspectives in Environment-Behaviour Research*, pps. 157-78. New York: Plenum.

Taplin, D, S. Scheld and S. Low 2002 Rapid Ethnographic Assessment in Urban Parks: A Case Study of Independence National Historical Park. *Human Organization*, 61 (1): pp. 80-93.

Tilley, C. 1994 *A phenomenology of Landscape: places, paths and monuments*. Oxford: Berg.

Sourcing indigenous building materials by bringing together materials and historical research.

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Stuart Nisbet (historical documentary and on-site research and conservation engineering)

Alan Hall (materials in archaeology) University of Glasgow

Chares McKean (architectural history) University of Dundee

As a group (ACM Centre) we are concerned with studying the structure-property relationships of construction materials, including concrete (a heritage material as well), stone, artificial geopolymers and lime-based mortars. This is mainly to facilitate the control of durability and mechanical properties, including in extreme environments, such as in fire. We also focus on the properties of natural building stone, the development of new lime mortars for conservation and new build and the process of traditional lime burning. The presentation mainly described a current, interdisciplinary project which is looking at the history of the lime industry (mostly in Scotland) and the technical possibilities for tracing the provenance of lime source through the analysis of historic mortars.

Conservation and repair often (though not always) works to ensure that repairs are made on a like-for-like basis. For many materials, for example stone or brick, it can be easy to determine what the material is and where it came from, and therefore to obtain a suitable replacement, especially if the original source can still supply. There are competing demands from the need for a compatible repair (one that does not damage the original fabric) opposed to one that is *distinguishable* from the original fabric, therefore avoiding confusion in the future over what is primary. For stone, this approach of like-for-like is often aggressively promoted, not least because it ensures the best aesthetic match, as well as faultless physical (porosity, permability) and mechanical (strength, plasticity) matching, at least in principle.

However, for lime, this is more difficult. This is because mortars are a processed material, that has an at least partially scrambled provenance signature.

It is useful to be able to trace the provenance of lime in historic mortars in order to understand better the characteristics of historic buildings that they are found within. This should improve efforts at conservation and perhaps permit better choices of repair materials, even if this is with *similar*, not *identical* materials. There is also a special argument that this is useful in historical and archaeological studies, in order to trace the supply of building materials and relate it to the social and economic background to industry, construction and other issues (should we have an economist in the group, either historical or modern?) However, to fully understand the situation,

technical characterisation efforts need to be effectively combined with historical, documentary and field-based studies.

Looking at the situation in Scotland, knowledge of the geology suggests that lime is available in many areas of the country and that there is some pronounced regionality to the types of material available. Previous writing about the subject suggests that there are only a few prominent sources that supplied the majority of construction in Scotland, particularly during the 18th and 19th Centuries. However, documentary and fieldwork has, for example, expanded the number of documented sources of lime in one Scottish county from one to over one hundred.

To examine the system and combine historical and materials research we have decided to focus on specific sites of historic lime production. These are often recognised by an association of elements, a quarry, kilns, a range of storage and dwelling buildings and in some cases waste heaps and access roads and quaysides. If possible the site also needs to be recorded historically (in documentary sources) and preferably figure in the records of the landowners. The physical existence and scale of the lime production sites, and the development of them (including the style of kiln and state of preservation) that can be inferred from the remains assists in putting some context on their importance in the lime supply in Scotland.

The structures at the site are surveyed (not in detail, though in one case this has been performed by others, who we are now working with) with a view to taking samples, particularly of the mortars used to construct the kiln and the other buildings, as well as the limestone from the quarry. The mortar samples are used then to test the hypothesis that they have their origin in the limestone quarried at the site. In this way they can provide information on a highly constrained provenance system, that could in principle be used as a reference for the characterisation and provenance recognition in mortars from buildings of unknown lime provenance. The methods used to date focus on microscopy, using a geological technique of making thin-sections (down to 30microns) and looking for mineralogical and textural similarities between fragments of limestone preserved in the mortars (that have not been completely burnt-through and altered in the lime production process) and the limestones from the accompanying quarries. This can be demonstrated to be the case for these examples but also for some mortars sampled from structures where the lime source is less well constrained.

The historical investigations surrounding the production of lime have revealed routes and means of supply of stone, fuel and lime, and also the uses and markets for material. Most lime was not produced for construction but for agriculture and industries such as steel manufacture. Fieldwork has also allowed the beginnings of a recognition of the typologies of lime kilns and the easy recognition of clamp kilns, often overlooked in past studies. Documentary sources also allow the tracking of lime from building back to source, providing a basis for corroboration by materials analysis.

Historic Spaces and Places: Tools to Widen Participation in Urban Design

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This contribution is about techniques for community involvement in the planning and design of public spaces with a past: the 'public realm' of historic urban areas. The emphasis is on disadvantaged areas that are rich in built (and intangible) heritage, but poor in most other respects. It draws from the methodologies currently being tested and developed in an EPSRC-funded scoping study that the author is co-ordinating, and it is therefore still 'work in progress' (initial project reports will be available from 15.02.07, please contact: s.shaw@londonmet.ac.uk).

A decade ago, in their influential Demos publication *Freedom of the City*, Walpole and Greenhalgh (1996:14-15) defined the 'public realm' (rather loosely) as spaces such as streets, marketplaces, town squares and parks, along with some buildings that are open to all. In UK cities and towns, such as Burslem the public realm has a considerable 'time-depth'. For local communities, it is a network of spaces that may have social and symbolic significance as well as functional use. To particular social groups, the public realm may be rich in associations that are not apparent to visitors

The authors regretted (op cit. 33-4) that in many UK cities, the public realm had deteriorated into a disconnected set of neglected, leftover spaces. They gave a cautious welcome to the more recent recognition of the role of good quality public space in re-imagining the centres of many former industrial cities such as Glasgow, Cardiff, Belfast, Leeds and Newcastle. However, they concluded that the new 'café society' vision of urbanity was more generally defined by the specific requirements of consumption, shopping and service industries - especially leisure and tourism - rather than by any desire to nurture a more equitable and inclusive civic society.

The new Millennium brought new hope, following two decades characterised by 'private affluence, public squalor', shopping malls and gated communities. In *Towards an Urban Renaissance*, the Urban Task Force chaired by Lord Rogers (1999) argued the imperative of securing a network of accessible, safe and attractive public spaces. This became an explicit feature of urban policy, enshrined in the *Urban White Paper* (DETR 2000). Optimistically, *State of the English Cities* reports 'early signs that the Government's recent focus on "liveability" is beginning to reverse the long-term deterioration in the quality of urban public spaces' (ODPM 2006: 27).

The Urban Task Force is, however, profoundly disappointed with the lack of progress so far. According to Lord Rogers (2005: 6), many UK cities '[u]rban streets are over-engineered to maximise traffic flow, pedestrians and cyclists are still treated as second- or third-class citizens'. A fundamental failing is that so few schemes involve local communities:

'Too often, design is imposed on communities rather than involving them.

Community groups and local representatives are still excluded from the decision-making process and are not adequately supported by professional facilitators' (op cit: 7).

It could also be argued that there are sound, practical reasons to broaden and deepen 'civic engagement'. As Tim Kitchen, former Chief Planner, City of Manchester (2007: 72) comments:

'Local people often have a great knowledge about, and "feel" for an area, much more so than an individual planner could develop other than through protracted study, and thus quite apart from arguments about people's rights in a democratic society there is a clear pragmatic argument for planning services to try to find ways of tapping into this base of knowledge and concern'.

Many UK Authorities have a deep commitment to public participation in processes that Sir Michael Lyons (2006: 39) calls 'place shaping': 'maintaining the cohesiveness of the community and supporting debate within it, ensuring smaller voices are heard'. However, this has often proved difficult. There remain significant populations that are considered 'hard-to-reach': people who tend not respond to established techniques, such as questionnaire surveys, exhibitions and public meetings.

The purpose of *Inclusive and Sustainable Infrastructure for Tourism and Urban Regeneration* (InSITU) is to support urban designers, conservation officers and others who are working to improve historic public spaces and walking routes with the active participation of local communities. By adapting and developing use of Geographic Information Systems for Participation (GIS-P), 'lay' participants with in-depth local knowledge have contributed to the design of schemes on an equal footing - with each other - and with the practitioners who can deliver significant improvements to the public realm.

The InSITU project is designed to inform decision-making by the Project Partners, including the 'host authorities': City of York, City of Salford and LB Hackney. Representatives of the InSITU Partners have advised the research team throughout the project, and have played a leading role in the critical evaluation of the outcomes with reference to a range of initiatives to:

- Accommodate markets, concerts and other events in two historic public squares (City of York);
- Refurbish and convert the former Terry's chocolate factory site, including new paths for walking and cycling (City of York);
- Establish a riverside 'health walk', including interpretation of local histories (City of Salford);
- Upgrade a pedestrian link between a hospital and local railway station (LB Hackney);
- Create a 'family trail' around a historic house owned by the National Trust (LB Hackney).

GIS-P applied to historic public spaces has the following features:

1. Workshop discussion through ‘local panels’ is expressed by the participants on paper maps (points, lines, areas);
2. Participants’ views, preferences and suggested solutions are then digitised with ‘speech bubbles’ (GIS-P mapping); where possible panels are re-convened a few days later, so that maps can be re-presented and checked;
3. The plans produced by different panels (e.g. age groups) can be superimposed so the points of consensus or conflict can be identified;
4. The participation data can then be fed directly into the process of planning and design as a preliminary to the generation of solutions;
5. The results can be presented in a format that can be readily interpreted by urban designers, planners, conservation officers, heritage attraction managers and others that have responsibility for implementing the proposals. Ideally, the process is on-going and re-iterative, progressing from strategic design principles through to detailed, site-specific issues.

To take one example, the City of York City Centre Management Team and the City Events Coordinator were interested in drawing up plans on how to improve some of the historic squares in the city centre for the benefit of local users as well as visitors to its internationally renowned heritage attractions. They were interested in drawing up plans to be taken to the City Planning Department for how events and the physical infrastructure might best work together for locals and visitors.

The first activity piloted by the InSITU facilitators from Stockholm Environment Institute at the University of York was an on-street consultation designed to allow anyone in the vicinity to participate; primarily residents responded to the opportunity to discuss their use of the city centre but one visitor did take part. This approach also captured the views of ten younger adults under 18 (about 30% of the respondees), a group that is traditionally regarded as hard to reach. The second activity took the form of a guided walk that followed by a discussion group and mapping-exercise involving eleven residents drawn from the ‘York Talk About’ standing panel.

In both cases, participants responded to open-ended themes that included:

- What are the benefits of existing spaces?
- What would they change in the city centre?
- How would these changes alter the way the space is used?

The digitised maps produced by the two panels were presented to City officers with ‘speech bubbles’ annotated to the locations identified and discussed by the participants. Detailed views, preferences and suggested solutions were thus communicated on design issues that included facilities (seating/ other street furniture, cycle parking, toilets); amenities (trees and fountain; al fresco dining); use of space (events, cars and pedestrians).

The City Centre Management Team was very positive about both the method used and the results produced. The Planning Team felt that, combined with other consultations including quantitative surveys of more representative samples, the method would be suitable for us in such an area and for such a topic where much will change over the coming years. One caveat is that the (the Planning Department) felt that they would have liked to have more input into the design of the questions; if this were the case the outputs could readily feed this into the draft Area Action Plan as well as the Event Reviews.

By superimposing the comments of different groups of participants, points of consensus as well as potential conflict could be mapped. For example, the young adults identified a small enclave off the main street where they liked to 'sit here for food and meeting friends – it's a bit more private'. Their presence did not raise any critical comments from the adult participants; thus, it seemed to be an important place to protect for this purpose as the public spaces are upgraded. Elsewhere, however, some conflicts were identified: al fresco dining was considered appealing by many, but conflicted with the desired movement of pedestrians at specific 'pinch points' – especially parents with small children in pushchairs, mobility impaired people and cyclists.

To summarise, the aim of InSITU is to allow all participants - regardless of their expertise - to frame the issues, problems and suggested solutions in their own terms. Thus, the project team have tried to avoid imposing a pre-determined agenda. Valuable insights, opinions and preferences have been articulated through 'local panels', and represented on high quality digitised maps. The use of GIS-P has enabled these annotated maps produced by local panels to be interpreted with clarity and acted upon by practitioners who have responsibility for carrying out the improvements.

The GIS-P methodologies have been developed and tested in collaboration with our 'host' Authorities, RDAs, Groundwork Trust and National Trust. All the InSITU Partners give a high priority to securing more accessible, safe and attractive public spaces and walking routes in areas that are often rich in cultural heritage, but poor in many other respects. They have a strong belief that initiatives should benefit local users as well as visitors, but acknowledge that this is often difficult to put into practice. The InSITU project team has tried to avoid the 'top down' approach. However, we do not advocate one that is completely 'bottom up'. Presenting members of local communities with a blank map may stimulate the imagination, but would soon lose credibility if they have aspirations that are impossible to deliver.

Our approach is to meet people somewhere 'in the middle'. We selected initiatives that had the potential to deliver significant improvements to the historic public realm, and which there was a where we felt there was a strong 'political will' and resources for implementation. The ability to deliver local benefits for diverse communities will depend, not only on the vision and skills of 'outsiders' with specialist expertise (such as urban designers and conservation officers), but on the ability of the latter to tap the expertise of 'insiders' who have the necessary insights and knowledge of how public spaces work for them. Perhaps this may not be as instrumental or manipulative as it may first appear!

In the past few years, there has been an increasing recognition that the public realm as an integrating feature of historic environments. As English Heritage (2004) have observed, public spaces and walking routes may confer a 'sense of place' and are often 'heritage assets in their own right'. As demonstrated in the new Oxford Castle development, leisure, tourism and retail-led regeneration can lever impressive improvements that expand and integrate as well as upgrade the public realm of historic environments, but these will not be sustainable if they become 'tourist bubbles' isolated from the real life of the city.

In the context of the site-specific approach to integrating methodologies for the historic environment, the public realm is at the macro-level of historic features that scale down in size to small objects of material culture. A number of important questions arise that have particular significance for the proposed study area of Burslem, City of Stoke-on-Trent:

- How to extend the 'Urban Renaissance' beyond spectacular 'flagship' urban spaces in city centres to smaller towns and neighbourhoods that are disadvantaged, yet rich in historic associations?
- How to engage diverse local communities - especially those who are regarded as 'hard to reach' - and tap their local expertise in the design of public spaces?
- How to communicate such insights and local knowledge effectively to policy makers and practitioners who can deliver the desired improvements?

References:

English Heritage (2004) *Transport and the Historic Environment*, London: EH;

Kitchen, T. (2007) *Skills for Planning Practice*, Basingstoke: Palgrave MacMillan;

Lyons, M. (2006) *The Lyons Inquiry into Local Government, National prosperity, local choice and civic engagement*, London: ODPM;

Office of the Deputy Prime Minister (2006) *State of the English Cities, Volume 1*, London: ODPM;

Urban Task Force (1999) *Towards an Urban Renaissance*, Final Report of the Urban Task Force, Chaired by Lord Rivers of Riverside, Urban Task Force, London: E and FN Spon;

Urban Task Force (2005) *Towards a Strong Urban Renaissance*, London: Urban Task Force;

Walpole, K. and Greenhalgh, L. (1996) *Freedom of the City*, London: Demos.

The Circus at Bath: A case-study in historical method

Peter Borsay

Historians are rarely asked to talk about their methodology, and this probably reflects a reluctance to do so. ‘Methodology’ would seem to reduce the practice of history to a series of hard techniques, rather than an informal intuitive process; for many it would appear to turn the subject into a science rather than a craft. So the very fact that I am participating in a workshop discussing methods is something unusual, and may represent a difference in disciplinary perspectives that needs examining. Nonetheless, historians clearly do have methods. Traditionally these have focused upon the techniques that should be deployed in examining historical sources, primarily documents. Effective as such techniques are in handling records for a subject such as Tudor government or Hanoverian diplomatic policy they are less obviously suited to investigating buildings, though it must be said that Howard Colvin and others have played a crucial role in shifting architectural history from its heavy dependence on stylistic association to a more document-based approach. Nonetheless, historians in general have not displayed any great interest in the material past, leaving this primarily to the art historian and archaeologist, and have consequently not developed sophisticated techniques to interpret physical heritage. I want to illustrate my own methodology, if that is the right word by focusing on one particular building that has become a heritage icon, the Circus in Bath. I will be isolating two approaches that reflect the progression of my own research. The first is to recover the meaning and significance of the building in the period in which it was built; the second is to examine its post-construction meaning and status, i.e. its history, value and function to later generations. Both are relevant to heritage. In the first case one frequently cited measure of heritage value, and one embodied in listing criteria, is historic significance; in the second instance, there is pressing need to understand the history of heritage, so that judgements as to historic value are understood to be changing rather than static, relative rather than absolute.

The Circus, or King’s Circus as it was originally called, was designed by John Wood the Elder, who laid the foundation stone in 1754. This was also the year in which he died, so the project was executed largely by his son, also called John, and not completed until a decade later in 1766. Today it is seen as part of a sequence of linked urban units comprising of Queen Square (1728-36), the Circus and The Royal Crescent (1767-75) designed and built across half a century by Wood father and son. The Circus, as its name implies, is circular in form, is ornamented by a triple tier of columns of the Doric, Ionic and Corinthian orders, and comprises of three segments, divided by three roads, with a total of 33 houses.

To recover its contemporary meaning what may be called a multi-layered or multi-faceted approach is taken. This involves interrogating the building from a series of different angles, which may be crudely characterized as economic, social, cultural and political. The Circus was at its most basic an economic project. However beautiful it appeared it had to be paid for; and because it was a commercial project, it was expected to make money for those engaged in financing, planning and constructing it. Understanding the building then is in part about unravelling the web of financial transactions, underpinned by legal instruments that made possible the construction process. Methodologically this involves investigating and cross-referencing such

sources as property, banking and financial records. What emerges is paradigmatic of the highly entrepreneurial yet fragmented and devolved construction process in eighteenth-century towns. To that extent the Circus can be taken to symbolize this process, and the capitalist market of 'absolute property and absolute self-interest' (as Ron Neale characterizes it) that supported its creation. To put it bluntly, the building embodies and reveals, in conjunction with the appropriate documentation, the economic forces of its age.

However, it also a social construct. It is abundantly clear that the Circus is not just any old Georgian building; it is high status, high prestige building. In part this can be derived from examining the Rate Books for late-eighteenth century Bath which place the Circus amongst those streets (including Queen Square, the Royal Crescent and Milsom Street) with the highest rateable value per house. But it is the architecture, and not the rateable value, which gives the property and its occupants status. Here we have to understand something about the reception of classical architecture in early modern Britain, and its widespread usage in towns from the late 17th century as a social marker. Classicism associated those who could afford to deploy it with a 'great tradition' of architecture that emphasized the intellectual, theoretical and international over the physical, practical and local, as expressed in the 'small tradition' of vernacular styles. As such classicism was the ideal property vehicle in the period for social advancement. The Circus at Bath was at the grandest end of the classical spectrum. In one sense it was a unique building – there was no obvious precedent for a circular residential structure of this character in Britain. This in itself gave it kudos (and subsequently historical significance). However, since the 1630s up-market enclosed residential spaces in the form of classical squares had been built in London, and were considered among the most prestigious form of urban accommodation. Of more immediate significance, John Wood had built Queen Square in Bath in the late 1720s and early 1730s with a north side that pioneered the use of a palace façade in square design. Though a multi-dwelling unit, with interior and rear designs that varied considerably, this gave the impression that the inhabitants occupied a grand Palladian country house or palace. Whereas in Queen Square the palatial façade was confined to the north side, the Circus, like the Crescent which followed it, was all palatial façade – so that every occupant could gain the social kudos that this conferred. John Wood had written of Queen Square, in his guide to Bath first published in the 1740s, 'the intention of a square in a city is for people to assemble together: and the spot whereon they meet, ought to be separated from the ground common to men and beasts, and even to mankind in general, if decency and good order are necessary to be observed in such places of assembly; of which, I think, there can be no doubt.' With its tight circular form the Circus even more than Queen Square fulfilled this role of keeping the riff-raff out and the gentry in. It was pure prestige space. Its circular and confined form also made it akin to an auditorium or theatre, and as such it constituted a form of social space that was highly performative, in which the elite visitors could perambulate, and alight from and enter their carriages and sedan chairs, aware that all eyes would be upon them from the surrounding windows. In this context it is important to note that outside London, Bath was the most important marriage market in Britain, and marriage was the key to elite formation in the period. Spaces like the Circus were a crucial part of the process by which the nature and value of the goods available in the Bath market were established.

To those contemporaries at all familiar with the Grand Tour, or indeed with the Roman tradition of classical architecture in general, there would have been no doubt as to the architectural model for the Circus – it was, of course, the Colosseum in

Rome, down-sized and domesticated. The well off visitors and residents would have enjoyed the cultural allusions to the capital of the antique world, and the sense of superiority this gave them. Bath was a cultural experience – in some respects a theme park in which to indulge in classical fantasies - and the Circus was an important part of the props and stage set. However, though Wood was undoubtedly pandering to the sensibilities of the Grand Tourist set in designing the Circus in the way he did, he may also have had his own personal cultural agenda. Historians have taken two approaches to this. One is to suggest that all the references to three – i.e. three segments of building, three entrances, 33 houses, three stories, the three classical orders – and the circular form are a symbolic affirmation by Wood of Christian values and specifically of the Trinity (against the prevailing anti-Trinitarian heresy embodied in Socinianism, Arianism and Unitarianism). Another approach sees the model for the Circus not in the Roman past, but in the British heritage that preceded this. Wood believed that Bath was founded not by the Romans but by King Bladud, one of the ancient line of British kings delineated in Geoffrey of Monmouth's twelfth-century *History of the Kings of Britain*. Mythical this may have been, but the story probably had a strong local following including Wood, who was a Bathonian by birth. Bladud was a priest-king like figure, and was considered the leader of the ancient Druids (a group whose history was attracting much attention in the 18th century). Such was Wood's interest in the Druids that at one stage he had drawn a plan of Stonehenge, and it is argued that it was this monument, and the henge-like monument at nearby Stanton Drew - and not the Colosseum - that provided Wood with his real model. The number of houses and diameter of the Circus are said to conform to the number of stones and diameter at the two prehistoric monuments.

Modelling the Circus on ancient British monuments, and tracing back the origins of the city to British rather than Roman roots may be seen as a patriotic gesture on Wood's part. Naming it the 'King's' Circus reinforced the patriotic and loyalist message. Nomenclature was not just a matter of routine. The Hanoverian succession had been a hugely controversial issue in the early eighteenth century and the second Jacobite rising of 1745 was a recent memory, so that self-consciously calling the Circus the 'King's Circus' was a clear political gesture. Bath in fact played an important role in the wider project of uniting a nation whose parts – England, Wales, Scotland and Ireland – were still only loosely and recently joined. Because such a high proportion of the ruling elites from the four national parts gathered for the season at Bath, and there socialized and inter-married, then the spa helped to weld together this potentially disparate group into the cohesive ruling order that underpinned the British project. That said, it is unlikely that many of the visitors would have bought into the Bladud myth, with its patriotic associations. Most would probably have considered the whole story, to the extent that they were aware of it, curious and amusing. It was the Colosseum and its Roman associations that would have struck those who viewed the Circus. However, it is unlikely that this would have been seen as unpatriotic. Rather it would have emphasized the developing image of Britain and its Empire in the eighteenth century as the new Rome, thereby reinforcing the central role of the imperial project in establishing a British identity.

The Circus's 'contemporary' position lasted for perhaps half a century from the date of its construction. At some point it would no longer have been considered a 'modern' building, and have begun the transformation into a piece of Bath's heritage. This process was not automatic. Many Georgian buildings were inherited by the Victorians – just as many medieval and early modern structures were inherited by the Georgians – that were considered of no great importance, and were vulnerable to

alteration or demolition. From what one can see, there was never any serious threat that the Circus would be dismantled or subjected to major remodelling. The 19th and 20th century guides to and histories of the city show that its importance and significance – unlike much of Bath’s Georgian architecture - was continuously recognized. Nonetheless, significant alterations were certainly made to the exterior and interior structure, as they were to the space enclosed by the building. Moreover, even if the importance of the Circus was appreciated throughout the post-Georgian eras, this does not mean that its status and meaning remained unaltered. The Victorians lavished most attention and praise on Bath’s medieval heritage, of which the only significant survival – due in part to the Georgians destructive tendencies - was the Abbey, and on their own buildings. The moral lassitude of the 18th century, and to some extent this was felt to be reflected in its architecture, came under searching criticism. The Circus’s relative status therefore declined. This was accentuated by the tendency for Bath’s most prestigious residents to vacate the city centre for new Italianate or gothic villas in the suburbs. Corporate living in large multi-dwelling units became unfashionable. The tide began to turn from about 1900, as Bath rediscovered and fought to protect its Georgian architectural heritage. However, initially buildings were valued largely more for their human associations – the ultimate accolade for which was the placing of a bronze plaque on the relevant building recording these associations - than their architectural qualities. The Circus scored high in this context because of the plethora of Georgian celebrities who had resided there. It was only during the inter-war years that the aesthetic qualities of 18th century architecture came to be appreciated in their own right, and in the case of the Circus this was primarily as a piece of Palladian town planning, where it was seen as the hub of the important Queen Square, Circus and Royal Crescent sequence. This status protected it from the destructive threat posed by the post Second World War re-planning schemes and the so-called ‘Sack of Bath’. In the late 20th century the Circus’s kudos soared fuelled by a general growth in interest in the Georgian past and heritage-based tourism – in 1987 Bath was designated a World Heritage Site - and an increasingly wealthy and numerous service class whose primary form of social investment was property, and who were willing to pay a hefty premium for historic fabric. As in the eighteenth century, the Circus again became one of the swankiest addresses to occupy not only in Bath but in Britain. If it lagged a little behind the Royal Crescent and even Lansdowne Crescent, it was because its enclosed form and rigorously defined proportions left little space for the romantic, and smacked a little too much of formal planning in an era in which town planning was becoming discredited. That said, the reinterpretation of John Wood as a romantic architect, available from the 1970s, and the Circus itself as a Druidical temple, did much to appeal to the post-modern passion for the zaney and exotic.

I am not sure that what I have described is so much a methodology as an approach. What it does make a case for is understanding buildings in their historic context, and doing so in two phases. First, the period of original construction and reception, which might last for several decades, when the building was regarded as modern. I have suggested that so as to assess its full contemporary significance a multi-faceted approach should be taken, examining aspects such as economic, social, cultural and political context. Second, there is the post-construction phase when the building enters the ‘heritage zone’. During this period its value and meaning might fluctuate and alter considerably, due not to any inherent aesthetic qualities it may or may not possess, but to the changing conditions and values of succeeding eras. In this

sense heritage is a mirror not of the past but of the society which creates and cherishes it.

Select Bibliography

P. Borsay, 'New approaches to social history. Myth, memory and place: Monmouth and Bath 1750-1900', *Journal of Social History*, 39 (2006), 867-89.

P. Borsay, *The Image of Georgian Bath, 1700-2000: Towns, Heritage and History* (Oxford: Oxford University Press, 2000).

M. Forsyth, *Bath*, Pevsner Architectural Guides (New Haven and London: Yale University Press, 2003).

T. Mowl and B. Earnshaw, *John Wood: Architect of Obsession* (Bath: Millstream Books, 1988).

R.S. Neale, *Bath 1680-1850: or a Valley of Pleasure yet a Sink of Iniquity* (London: Routledge and Kegan Paul, 1981).

Geoelectrical methods for monitoring moisture in porous heritage materials

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Presentation summary

Moisture causes many problems in historic buildings and structures, as it encourages deterioration of many materials both directly (through aiding chemical reactions and playing a role in frost damage) and indirectly (through its contribution to salt and biological weathering processes). Many buildings and monuments suffer from moisture ingress from groundwater, rainfall and runoff. For example, the whole cityscape of Venice is at risk from moisture brought in along canals and during flood events. Despite the severe problems posed by moisture in historic building materials scientists still do not possess good, non-invasive and field-portable methods of monitoring moisture levels accurately. Electrical resistivity methods provide a potentially powerful method of monitoring moisture within walls, as the electrical resistivity of porous materials varies in response to changing moisture levels. However, several issues remain to be tackled – as resistivity is also influenced by porosity, soluble salt contents and temperature – which requires further calibration and checking of the method.

Our presentation reports on our adaptation of standard geoelectrical methods (in the form of 2D resistivity surveys to the scale of buildings and monuments). Resistivity surveys have long been used in geoarchaeological and geomorphological to investigate subsurface conditions within soils and sedimentary bodies at a large (10s of metres) scale, often alongside a suite of geophysical techniques. Our modifications involve (a) downscaling the technique to cover a transect of 2m or so across a wall and (b) making the method non-invasive through the use of medical electrodes stuck onto the wall surface, rather than metal pins hammered into the wall.

A pilot study of moisture conditions within a limestone ashlar wall at Worcester College, Oxford, carried out as part of a larger EPSRC-funded project on catastrophic limestone decay, illustrates the potential strengths of the technique. We gained information on moisture distribution along a 2 m vertical transect with penetration up to 40cm into the wall. Experimental wetting of the surface, to represent realistic driving rain conditions, resulted in a clearly visible wetting front which gradually dried out after 12 or so hours.

Further studies are now being carried out at the University of Oxford to calibrate the technique, using a test wall, and to investigate the confounding influences of salt contents, porosity and temperature in more detail. We are confident that such geoelectrical methods will provide a tool which will enhance our knowledge of moisture distributions, and the threat they pose, within historic materials. The use of such methods illustrates clearly the highly interdisciplinary nature of research on materials deterioration – involving in this case the convergence of geomorphological and geophysical investigations.

References

The Limestone Project:

<http://www.qub.ac.uk/geog/documents/research/geomaterials/epsrc/index.htm>

Sass, O. 2003 Moisture distribution in rockwalls derived from 2D resistivity measurements, In: Geophysical applications in geomorphology, Zeitschrift für Geomorphologie Supplement Band 132, 51-69.

Sass, O. 2005 Rock moisture measurements: techniques, results, and applications for weathering. Earth Surface Processes and Landforms 30, 347-359.

Sass, O and Viles, HA 2007 How wet are these walls? Testing a novel technique for measuring moisture in ruined walls. Journal of Cultural Heritage. 7, 257-263

Viles, HA and Wood, C. 2007 Green walls? Integrated laboratory and field testing of the effectiveness of soft wall capping in conserving ruins. In: Prikryl, R and Smith, BJ (eds) Building stone decay: from diagnosis to conservation. Geological Society of London Special Publication no. 271, 309-322.

GLOSSARY

Ashlar: cut stone blocks used in construction of flat masonry walls. [Heather Viles]

Autotrophic (chemo-lithotrophic) activity: biological processes that use inorganic chemical to provide energy e.g. some bacteria as well as photosynthetic algae, plants and bacteria. [Eric May]

Biocalcification: production of calcium carbonate crystals such as calcite by living organisms e.g. bacteria. [Eric May]

Biofilms: microbial communities or colonies encased in slime adhesive and attached to surface or embedded in a substratum. [Eric May]

Biogeochemical: chemical reactions caused by microbes involving changes in minerals. [Eric May]

Biogeophysical: mechanical change caused by biological activity with geological consequences. [Eric May]

Biominalisation: deposition or transformation of minerals due to biological activity. [Eric May]

Bio-pitting: corrosion effects on stone substrates caused by biological activity. [Eric May]

Bioremediation: use of microorganisms to remove or detoxify unwanted chemicals in an environment. [Eric May]

Calcite: type of mineral made of calcium carbonate. [Eric May]

Calibration: correlating readings from an instrument with known standards. A method of checking the accuracy and precision of results from a technique. [Heather Viles]

Consortium: a mixture of microbes in nature or the laboratory which are mutually interdependent. [Eric May]

Culture: microbes grown artificially in the laboratory as one type (pure) or a mixture. [Eric May]

Digital elevation model (DEM): a dense set of XYZ coordinates representing the surface of an object, normally in the form of a regular grid of datapoints. [Jim Chandler]

Digital photogrammetry: a spatial measurement tool which allows spatial coordinates to be derived from overlapping pairs of photographic images. The combination of digital sensors and software allows this procedure to be automated and digital throughout. If sensors are calibrated accurate data can be obtained, even using consumer-grade digital camera technology. [Jim Chandler]

Ecosystem: a community of organisms and their environment. [Eric May]

Efflorescence: salt migration to the surface of stone. [Eric May]

Electrical resistivity: measures the degree to which a substance resists the passing of an electrical current through itself. [Heather Viles]

Electrode: a conductor through which electricity enters a substance. [Heather Viles]

Endolithic: existing below the surface of a stone substratum. [Eric May]

Epilithic: attached to the surface of rocks e.g. algae or lichens. [Eric May]

Ethnographic research: involves in-depth first-hand study of one or more social contexts or localities. Traditionally the focus was on small-scale communities, but research now focuses on a wide range of contexts, including urban neighbourhoods, hospitals, financial institutions, museums, heritage sites, to name but a few. Although it is often considered synonymous with participant observation, ethnography can incorporate observation, situated listening, interviews and even questionnaires. [Siân Jones]

Fly-thru visualization: an animated sequence of images providing the impression of the viewer moving in and around a 3D object. Can be created using appropriate visualization software by merging a DEM and orthophotograph. [Jim Chandler]

Geoelectrical methods: a subset of geophysical techniques using applied voltages to probe materials. [Heather Viles]

Geomorphology: the study of earth surface processes and landforms. Many geomorphologists have become involved in the study of the historic environment through studying weathering. [Heather Viles]

Geophysical methods: physics-based techniques which provide information about the structure of the earth, including the use of magnetic, seismic, electric and radioactive methods. [Heather Viles]

Heritage: [historic environment baseline] plus value. [James Dixon]

Heterotrophic (chemo-organotrophic) activity: biological processes that use organic matter to provide energy and biosynthesis e.g. animals, fungi and some bacteria. [Eric May]

Historic environment baseline: objective list of historic environment features: buildings, below-ground archaeology, conservation areas, historic views, area characterisations etc., both legislative and non-legislative. [James Dixon]

Isolation medium: containing particular nutrients or selective chemicals and used in the laboratory to separate or isolate one type of microorganism from mixed communities found in the environment. [Eric May]

Medium (*pl. media*): a liquid or solidified solution of food nutrients to support the growth of microorganisms in the laboratory as *cultures*. [Eric May]

Metabolic: concerned with the biochemical reactions occurring in the cells of microbes. [Eric May]

Method: a technique or approach used to find out specific information. [Heather Viles]

Methodology: the collection of methods used within a particular discipline or based on a particular philosophical approach to a subject. [Heather Viles]

NOTE THAT THERE ARE MANY DIFFERENT WAYS OF CONCEPTUALISING METHODOLOGY, METHOD AND TECHNIQUE!

Microbe(s): any microorganism(s), often bacteria but also used for other microscopic types. [Eric May]

Microbial: caused by microorganisms. [Eric May]

Microflora: the totality of microbes associated with a particular location or environment. [Eric May]

Microorganism(s): any microscopic organism(s) consisting of a single cell or cluster that cannot be seen with the naked eye. Includes bacteria, viruses, some microscopic fungi, unicellular algae and protozoa. [Eric May]

Molecular biology: branch of biology concerned with the study of molecules, especially DNA. [Eric May]

Molecular methods: techniques based on isolation of DNA and studying its composition. [Eric May]

Oligotrophic: describes a habitat that has low levels of nutrients. [Eric May]

Orthophotograph: a photograph which has the spatial qualities of a map. Derived by removing the distortions due to varying topography and obliquity of an original photograph. [Jim Chandler]

Participant observation: an ethnographic technique usually traced back to the work of Malinowski. It involves lengthy periods of research in which the researcher attempts to immerse him/herself in the social contexts that they are studying. It involves situated listening and observing as well as active participation in the activities taking place in these social contexts. [Siân Jones]

Photosynthetic: activities dependent on the use of light energy to fix carbon dioxide from the atmosphere and form organic material. [Eric May]

Phototrophic organisms: those that obtain their energy from light. [Eric May]

Public (from artist): those without professional involvement in the development. [James Dixon]

Public (from council): local (voting) people with particular, known interests in development site including residents, tourists, shoppers etc. [James Dixon]

Public (from developer): current and projected users/occupants of development site. [James Dixon]

Social value: this concept is generally used to refer to the meanings and qualities that make heritage places the focus of spiritual, political, or cultural sentiments. These meanings and qualities are in addition to other values, such as historic, economic and aesthetic values, and they may not be obvious in the fabric of the place. The social value of heritage is generally regarded as enabling and facilitating social connections and relationships, but it is clear that heritage places can also be sites of contestation and conflict. [Siân Jones]

Weathering: the chemical decomposition and physical breakdown of rocks and minerals. Such processes also affect building materials including natural stone (in which case the term ‘deterioration’ is often used instead of weathering). Weathering and deterioration are often mediated by organisms, especially micro-organisms. [Heather Viles]