

This document comprises the **case studies** submitted for the Scottish Archaeology Research Framework website, launched on 24 August 2016

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The figures appear on the online version. It should be read alongside the core text and appendices.



# Future Thinking on Carved Stones in Scotland: A Research Framework

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## Case Study 1

### Making a difference: the Govan Stones

Stephen Driscoll

[Govan Old Church](#) houses the largest collection of early medieval Scottish sculpture not in state or public ownership. These monuments date to the time of Kingdom of Strathclyde (10th–11th centuries), when St Constantine’s church was the royal cult centre and dynastic burial ground (Dalglish and Driscoll 2009). Since the 1990s the sculpture has been central to a series of efforts to sustain the church and stimulate urban regeneration.

The church occupies an ancient oval churchyard dating back to the 6th century and containing locally important post-medieval monuments. Many of the early medieval gravestones were reused in the 16th–19th centuries indicating a continuous awareness of the monuments. The scholarly community recognised the importance of the sculpture following the discovery of the sarcophagus in 1855 and over the subsequent decades the congregation curated the stones, initially in the churchyard but by the 1920s mostly within the church. In the 1990s the minister Tom Davidson Kelly rekindled interest in the sculpture explicitly to enhance the historical and spiritual stature of Govan Old (Ritchie 1994a).

The sculpture assumed a heightened value following the decision by the Church of Scotland to close Govan Old in 2007. The closure provoked concern amongst heritage professionals and the community over the future of the iconic church and its sculpture. Fortunately, through the previous promotion of the sculpture and associated archaeological works, there was a strong awareness of the cultural importance of Govan Old to the community. This awareness inspired Govan Workspace Ltd to form the Govan Heritage Advisory Group, which recognised that a healthy and functional Govan Old would provide the keystone for the social and economic regeneration of central Govan. The sculpture is central to the Heritage Advisory Group’s vision of Govan Old as a dynamic cultural centre with a living practice of worship, but aspires to cut across denominational boundaries and to champion Govan as focus of Celtic artistic creativity and historic political importance.

The first stage in this transformation was to establish Govan Old as a tourist destination. A Heritage Lottery Fund (HLF) grant (2011–13) supplemented by the Church of Scotland and Historic Scotland (HS) supported a redisplay of the sculpture by [Northlight Heritage/York Archaeological Trust](#). The sculpture—branded ‘The Govan Stones’—was the key asset used to attract visitors, a strategy which increased visitor numbers four-fold and established Govan Old as a viable visitor attraction.

As a direct consequence, the Central Govan Action Plan has placed Govan Old at the heart of its latest Townscape Heritage Initiative and committed major capital investment to Govan Old. The intention is to reconfigure the church and churchyard to make Govan Old economically sustainable, by improving visitor facilities and displays and supporting a more diverse cultural programme. An important measure of the value of Govan Old’s sculpture is the infrastructure investment in central Govan: [Water Row](#), a new riverside walkway, and a planned foot bridge. Undoubtedly this unique and evocative sculpture enabled this transformation.

**Figure 1: The Govan Sarcophagus. © Stephen Driscoll**

**Figure 2: The Sun Stone, Govan. © Tom Manley**

## Case Study 2

### Bullauns and taxonomy

Katherine Forsyth

The term bullaun (from Irish *bullán*, itself a borrowing from English 'bowl') is well established in Irish archaeology for a range of 'man-made hollows or basins cut into outcropping rock, boulders or small portable stones' (Dolan 2013). Antiquarians have applied it loosely as a blanket term for a wide range of hollowed stones ranging from prehistoric cup-marks, basin-stones, rock mortars, through to well-shaped fonts and stoups. Even though the use of the word 'has probably blurred distinctions which ought to be made' (Hamlin 2008, 144), the handy label did raise awareness of this material and since the 19th century it has been routinely recorded in Ireland. The term, though used sporadically in Scotland, does not have the same currency and Scottish 'bullauns' are under-recorded and largely over-looked (but see Lacaille 1953). More than 300 are known in Ireland, but the distribution of bullauns in Scotland is hard to establish because they have not been systematically recorded. The lack of Scottish interest in them is in part due to the difficulty of dating them, their simple form, uncertainty regarding their function, and their liminal status—not quite a monument, not exactly an artefact.

The body of basin-stones is heterogeneous: most have an artificial hollow in one face only, a smaller number are double-sided, and a few have more than one depression side-by-side. These depressions are typically circular or sub-circular and, in profile, hemispherical or conical, occasionally straight-sided. They vary in depth, but do not usually exceed c. 23 cm. More detailed recording and analysis of their morphology and dimensions is required before an effective taxonomy can be established.

It is argued that Irish bullauns are mortars used in food production and/or metallurgy (Hamlin 2008; Dolan 2013) but this explanation is insufficient to explain all types. Free-standing and rock-cut bullauns are noted at a number of Irish inauguration sites, suggesting a ritual function (cf. the rock-cut basin at the royal inauguration site of [Dunadd](#)). Recent work on the very extensive collection of bullaun stones at the major monastic centre of Glendalough has emphasized their role in the devotional rituals of pilgrims (McGuinness 2013). The Scottish material is suggestive but inconclusive: a bullaun excavated at [The Carrick](#), Loch Lomond, in association with two iron-working platforms and an enclosed cemetery, was dated to AD 690–900 (MacGregor 2009); a basin-stone at the early ecclesiastical site of [Killuradan](#), Inverness-shire, is marked with a cross. Many Irish bullauns have been incorporated into 'pattern' rounds and local pilgrimages, through attribution of healing properties to the water collected in them. While these practices are not necessarily ancient, there is evidence for the ritual turning of special stones during formal liturgical cursing by the early Church e.g. the *clocha breca* of Inishmurray. Cursing stones also occur in Scotland: Iona's *clach bràth* 'Judgement/Doom stone' were destroyed by the local minister, but the hemispherical hollow ground into the cross-base Iona no. 99 still provides evidence of the practice. The cross-base of [Kilcholman](#), Islay, retains a pear-shaped 'turning-stone' which fits snugly in its circular hollow and a cross-decorated turning-stone discovered on Canna fits perfectly into the hollow of a special slab in the churchyard.

Scotland's 'bullauns' are long overdue a modern, rigorous study. While in Ireland there has been a focus on bullauns at ecclesiastical sites leading to possible distortions in understanding, a more comprehensive approach is required in Scotland.

**Figure 1: Broken bullaun stone with two hollows, Iona. Copyright Katherine Forsyth**

**Figure 2: Early medieval cross-base with several episodes of reuse, Iona no. 99. Rounded hollow in bottom-left corner apparently the result of the repeated turning of a circular stone, perhaps as part of a formalised process of liturgical cursing, or subsequent informal personal rituals. Crown Copyright: Historic Environment Scotland**

### Case Study 3

#### Graveyard recording

Susan Buckham

The Council for Scottish Archaeology and HS Carved Stones Adviser Project ([CSAP](#)) promoted best practice in graveyard conservation, recording and research. This activity informed the work of cemetery professionals, heritage managers, community groups and members of the public. Operating between 2001 and 2006, CSAP devised and piloted a method to holistically record graveyards. Prior to the development of this methodology there was no recognised, standard means to record graveyards as a whole, unlike individual gravestones. Entries relating to historic burial grounds in Canmore, HERs and elsewhere varied widely in their level of detail and a comprehensive inventory of graveyard sites was lacking (this has subsequently been largely addressed by [SAFHS](#)). This situation limited the ability to gain an overview of graveyards as a research or heritage resource, or to understand a site's gravestones as an assemblage (as opposed to individual stones of 'interest') and their collective contribution to a graveyard's particular character.

While gravestone recording could provide detailed information on the design and condition of individual stones (CSAP adapted Yates *et al.* 1999 to record gravestone condition), little information was available to contextualise this data or to evaluate its cultural significance. This was the case even for a basic assessment of aesthetic or scientific merits measured against e.g. chronologies or geographic distribution. The volume of surviving material meant identifying and quantifying risks to gravestones was highly resource-intensive. A graveyard-recording approach offered a more rapid means to audit condition. Additionally, a detailed study of stone condition did not always match the specific interests and priorities of target community participants, notably family history societies.

The CSAP system approached graveyards as burial landscapes and sought to gather evidence allowing for the study of interrelation between different types of burial sites (e.g. churchyard, cemetery, family burial ground etc. after Rugg 2000), their physical characteristics and associated social values. A pro-forma recording form captured details of their built and natural features, along with information about a site's development and setting. The form summarised gravestones at a group level (e.g. date, forms, materials, decoration), as well as identifying any notable individual stones (e.g. rare designs, examples linked to historic events/figures, particular social groups, activity or narratives). The survey considered any previous studies carried out, condition, management and use. Recorders could include their opinion on the main conservation priorities for the site. A handbook, containing an illustrated glossary and case studies demonstrating how different graveyards evolved, accompanied the form. Following field-testing by community groups, a workshop for interested professionals and amateurs was used to gain feedback on the usability and effectiveness of the CSAP graveyard recording methodology (Buckham 2006). The recording system was subsequently adapted and expanded for the Clyde and Avon Valley Landscape Partnership's graveyard conservation strategy (Buckham and Fisher 2013).

**Figure 1: View of gravestones at St Patricks Churchyard, Dalziel Estate, North Lanarkshire, which was one of the sites surveyed as part of the Clyde and Avon Valley Landscape Partnership's graveyard conservation strategy. © Susan Buckham**

**Figure 2: View of gravestones at Stonehouse Cemetery, South Lanarkshire, which was one of the sites surveyed as part of the Clyde and Avon Valley Landscape Partnership's graveyard conservation strategy. © Susan Buckham**

## Case Study 4

### Canmore Early Medieval Sculpture Upgrade Project: example

Anna Ritchie

The Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS, now part of Historic Environment Scotland: HES) began its Early Medieval Sculpture Upgrade Project at the beginning of 2015, line-managed by Iain Fraser and using a volunteer to compile an entry for each carved stone within a time-span of AD 500 to 1100. The entries are arranged alphabetically, county by county, in a database of Microsoft Word files, and they will then be loaded individually on to the appropriate Canmore sites. This is essentially a desk-based project, but many sites have been visited in the last few years for recording purposes either by Commission staff or by the volunteer, and of course once on Canmore there is the facility for external contributions. As of April 2016, Berwickshire, Caithness, the Lothians, Roxburgh, Selkirkshire and Sutherland are complete, and large chunks of other counties are also entered on the primary database. The process of loading the entries on to Canmore has also begun.

The decision was taken not to include any art-historical discussion of the carved stones. In many cases there are additional bibliographic references already in the site record on Canmore, as well as the primary sources in the entry, which will help to point readers in the right direction. This is therefore an expanded handlist rather than a corpus, but it could be used as the basis for a corpus. The arrangement of information in each entry has been designed to be compatible with the format of entries in both the [Corpus of Anglo-Saxon Sculpture](#) and the *Corpus of Early Inscribed Stones and Stone Sculpture in Wales* (e.g. Edwards 2013).

Format of entries:

*name of site* (most commonly used name plus that used on Canmore if different), number of stone if there are multiple finds from the site (using *Early Christian Monuments of Scotland: ECMS* number first, then chronological sequence of discovery or external corpus number); church dedication if applicable

*object type* (Pictish symbol stone, cross-slab with Pictish symbols, inscribed stone, cross-slab, cross, cross-base, architectural fragment, church furniture, recumbent cross-slab, hogback monument, recumbent grave-cover, cross-incised boulder, cross-incised rock face, carved rock face, cave with carvings, carved fragment)

*measurements* height/length, width, thickness

*stone type* (basic identification, no scientific input)

*NGR* for the original place of discovery

*present location* of the stone

*evidence for its original discovery* (particular attention has been paid to monument biography using the manuscripts and early books available in the RCAHMS archive; any close relationship to burns and rivers noted)

*present condition*

*description* of the stone

*date range* (consensus of modern opinion)

*primary references* (those relating to first discovery/record, *ECMS*, major handlist or corpus)

Example of entry:

RCAHMS Archive: Canmore ID 79896; site number NO14SW 13.1

[Lethendy, Tower of Lethendy, Perthshire, Pictish cross-slab](#)

Measurements: H 1.35m, W 0.36m, D 0.13m

Stone type: sandstone

Place of discovery: NO 1405 4170

Present location: still at Tower of Lethendy but removed from the staircase and conserved in 2001. It is now freestanding and held upright on a base by metal clamps.

Evidence for discovery: first recorded by RCAHMS in 1969, when it was in use as a lintel on the stair in the late sixteenth-century tower house. It is thought to have been used for repairs in the seventeenth or eighteenth centuries, by which time it had already been in reuse for some other purpose, possibly more than once.

Present condition: there is considerable damage arising from the reuse of the stone. The lower arm and shaft of the cross are missing, removed when a shallow trough was carved into face A. A deep rectangular slot has been carved into the base of face C. The edges of the slab are damaged, and there are smooth patches from use as a whetstone for sharpening knives. There are also knife marks on face C.

Description: This is an interesting stone with detailed carving, though the standard of carving is not high. The slab has a naturally tapering base and a dressed rounded top, and it is carved in relief on both broad faces and the narrow faces, where traces of ornament continue over the rounded top. Within a flatband moulding, face A bears the upper part of a cross-head with rectangular terminals, square centre panel and double-square armpits. The background either side of the upper arm appears to be plain, but there was clearly ornament on either side of the missing shaft. This included a panel of diagonal key pattern at the top of the shaft, separated from the lower panels by a roll moulding. On the left the lower panel contains the remains of a human figure in profile facing the shaft, with curled hair. On the right there is first a double knot of cord with a median line, and below there is an animal placed upright facing the shaft, with a corrugated snout, fangs, a pricked ear and a short curled tail, wearing a collar. Face C is almost intact and the layout of its design is clear. At the top is a frontal angel with half-open wings, apparently with a short feathered body and three-toed feet. Immediately beneath are two seated frontal figures, wearing elaborately draped robes to the ankle, where each has a decorative border of interlace, from beneath which protrude bare feet. The left-hand figure holds in the right hand a rectangular object, perhaps a book or a reliquary, while the right-hand figure appears to hold a chalice in the left hand and an oval object in the right. The right-hand end of the bench on which they are seated has a knobbed terminal (the left-hand end is damaged). Below these figures and separated from them by a roll moulding are two musicians shown in profile. They wear similarly draped and belted calf-length robes, and they have bearded faces with large oval eyes and prominent ears. The right-hand musician plays the triple pipes, while his partner plays a triangular harp. Between them in the background is a possible drum and in the foreground a small pig-like animal with curled tail.

Date: ninth or tenth century.

References: Fisher & Greenhill 1972; RCAHMS 1994, 97.

**Figure1: Detail of carved face C, taken when the stone was in use as a stair lintel. *Crown Copyright: Historic Environment Scotland***

## Case Study 5

### The tomb of Robert the Bruce

Iain Fraser

As part of the commemorations of the 700th anniversary of the Battle of Bannockburn in 1314 RCAHMS and HS (now united as HES) worked with partners from across the heritage sector to research and reconstruct the lost tomb of Robert the Bruce.

In 1329 King Robert was buried in the choir of [Dunfermline Abbey](#). His grave was marked by a monument, known to have been imported from Paris. This monument was subsequently destroyed, however, in 1818, during the building of the present parish church a skeleton, believed to be that of the king, was discovered. Whether or not the skeleton is that of Bruce or one of the other kings remains unclear. However, between about 1790 and 1818, excavation in the graveyard discovered fragments of carved and gilded white marble, identified as pieces of Bruce's monument. Six pieces are now preserved in the Hunterian, eleven in the National Museums of Scotland (NMS), and one in Dunfermline Museum. These fragments were little studied and had never been brought together for study in one location, resulting in uncertainty as to whether they were truly from Bruce's tomb. Together the museums, RCAHMS and HS set out to answer these questions and the original form of the monument was identified as following the model of French royal tombs of the period: an arcaded tomb-chest surmounted by an effigy of the king and canopy, in black and white marble.

Supported by the Society of Antiquaries of Scotland research of comparable material in Paris and New York confirmed the pieces as being French work of the first part of the 14th century. With the pieces of the tomb dispersed in three different collections, it was hoped that the project might uncover further fragments. One likely location was Sir Walter Scott's collection of antiquities at Abbotsford House. Checking of undocumented collections by the Abbotsford Trust resulted in the discovery of an additional piece, hitherto unrecognised. This piece also fitted into, and confirmed, the accuracy of the reconstruction of the tomb-chest arcading.

Using reconstruction drawings and detailed photography by RCAHMS and a 3D scan by HS, the Digital Design Studio, Glasgow School of Art, created a 3D digital model of the monument as it would once have looked. This research, imagery and model will allow all four to reinterpret their own fragments of the monument, and to display them more visually, showing how they would have fitted into the intact tomb.

The digital model, together with a selection of the fragments, was the focus of a display, The Lost Tomb of Robert the Bruce, displayed in The Hunterian, Glasgow, 2014–15, Abbotsford House and Dunfermline Abbey Parish Church in 2016.

The advent of digital printing has opened the possibility of access both to physical surrogates of the fragments and to a physical manifestation of the reconstruction. The first proved an invaluable tool in allowing comparison of 3D prints of the Dunfermline fragments with parallels in the Metropolitan Museum, New York, without the complexity of moving the original pieces; the second opens the possibility of furnishing Dunfermline Abbey with a physical representation of the lost tomb.

**Figure 1: Composite image of fragments identified as from Bruce's tomb. Crown Copyright: Historic Environment Scotland**

**Figure 2: Digital reconstruction of how Bruce's tomb may have appeared (detail). © The Centre for Digital Documentation and Visualisation**

**Figure 3: Digital reconstruction of how Bruce's tomb may have appeared. © The Centre for Digital Documentation and Visualisation**

## Case Study 6

### The ACCORD project, community co-production

Stuart Jeffrey

There have been over two decades of research and development of digital visualisation technologies in archaeology and heritage. Approaches that utilise photogrammetry, laser scanning and 3D modelling have become standard practice in the academic archaeology, commercial archaeology and cultural heritage management. However, there is still little community engagement with digital visualisation technologies, despite community interest in the technologies themselves. Expert forms of knowledge and professional priorities, rather than community ones, invariably inform digital visualisations and the results, when seen from the outside the profession, can seem disconnected, clinical, and irrelevant. Furthermore, digital visualisations commissioned in these expert sectors rarely integrate forms of community-based social value relating to the historic environment into the recording exercise. Consequently, the resulting digital objects can fail to engage communities as a means of researching and representing their heritage.

The Archaeological Co-design and Co-production or Research Data (ACCORD) project was funded via the [AHRC Digital Transformations programme](#) as a Connected Communities project and ran from 2013-2015. The project was led by the [Glasgow School of Art](#) in partnership with [Archaeology Scotland](#), the [University of Manchester](#) and the [RCAHMS](#) (Jeffrey *et al.* 2015). The ACCORD project researched the opportunities and implications of digitally modelling heritage places and objects with 10 different communities across Scotland. Core to ACCORD was the notion that the growing accessibility and ubiquity of easy to use digital technology means that 3D recording can be deployed as a co-production methodology on projects involving both community groups and heritage professionals. In keeping with this, the choice of heritage sites to be recorded was entirely community defined and in practice ranged from rock art to rock-climbing sites. However, carved stone, whether modern, early medieval or prehistoric featured highly in the site selection process. Working together with visualisation technologists, researchers and practitioners in community engagement, community groups designed and produced their own records of heritage using techniques such as photogrammetry and Reflectance Transformation Imaging. The results are permanently archived with the Archaeology Data Service and are freely reusable by all. As a research project ACCORD addressed multiple questions addressing co-production, value and the experience of authenticity in relation to these new heritage records. The project clearly demonstrated the value of the technology as a means of rapid ethnographic intervention, the benefits of capturing contemporary social value using this approach and also the ways in which value and forms of authenticity can accrue to the digital record and also the original site via the recording process (full results and analysis in prep.)

The [ACCORD blog](#) contains reports and information on each sub-project with articles from project partners and community participants.

**Figure1: Community RTI in [Kirkcudbright graveyard](#). ©CC-NC-BY the ACCORD project**

**Figure2: Photography for 3D modelling by photogrammetry at the [Crawstane](#), Rhynie. © CC-NC-BY the ACCORD project**

## Case Study 7

### Imaging techniques: the 'Making a Mark' project.

Andrew Meirion Jones and Marta Díaz Guardamino

The 'Making a Mark' project aims to build a greater understanding of the mark-making practices associated with a suite of Neolithic decorated artefacts from across Britain and Ireland. It does so by utilising a suite of digital technologies, including RTI, photogrammetry (using Agisoft Photoscan) and digital microscopy (using a Firefly GT200 at up to x230 magnification). Theoretically its aim is not to produce more accurate images of artefacts, but to use digital technologies as a means of imaging processes of working and reworking associated with these artefacts: to understand sequences of marking. Comparisons are then made between communities of practice within three main regions:

1. Southern England (from Cornwall in the west to East Anglia, and as far north as the Thames Valley) to examine the working of chalk artefacts (see Figure 1)
2. The Irish Sea region (including Wales, Isle of Man and eastern Ireland) to examine artefacts from passage tomb contexts and settlements (see Figure 2)
3. Northern Isles and Northeastern Scotland (including Orkney, Aberdeenshire, Kincardineshire, Perthshire and Fife) to examine carved stone balls and the rich artefacts from Orcadian settlements.

The carved stone balls of Scotland form the 'centrepiece' of the project as the aim of the project is to provide a context for understanding these poorly contextualised, but intriguing, Neolithic artefacts.

Results from the project (mainly using RTI) have been excellent. We have identified evidence for erased motifs on the remarkable decorated chalk cylinders known as the Folkton Drums, Yorkshire (Jones *et al.* 2015), evidence of reworking on antler maceheads, such as the decorated example from Garboldisham, Norfolk (see Figure 2) and reworking on the decorated portable stones from the great passage tomb Knowth. Probably the most remarkable results of the project so far have been from the decorated slate plaques from the Isle of Man where detailed RTI analysis shows clear evidence for the repeated decoration and revision of marks on these delicate slate artefacts; the plaques are in fact palimpsests of activity.

At the time of writing the project is just beginning to examine the Scottish carved stone balls. The results of RTI data capture on carved stone balls from Marischal College Museum, Aberdeen are presently being processed (April 2016), but preliminary results look extremely promising and we suspect similar practices of revision and reworking probably occur in Scotland.

Methodologically the project has dealt with the data capture of marks on the surfaces of a variety of different materials, including chalk, bone, antler and a variety of stone. Chalk proved extremely difficult (but not impossible) to record due to its reflectant properties, while the dark non-reflective surfaces of slates have proved extremely amenable. Finally, it is hoped that the project will provide a benchmark for the analysis of this suite of different materials, and for combining new digital technologies with fresh theoretical perspectives.

**Figure 1: The Monkton Up Wimborne, Dorset chalk block exhibiting carved surface. Courtesy Martin Green RTI Image. © Andrew Meirion Jones/Marta Díaz Guardamino**

**Figure 2: Slate plaque 'd' from Ronaldsway, Isle of Man recorded using RTI. A1 shows detail of design at centre of obverse of plaque. B1 and B2 show evidence for polishing/erasure marks at tip of plaque on reverse side, while B2 shows designs beneath these erasure marks. B3 shows detail of marks at centre of the reverse of the plaque. Image courtesy The Manx Museum. RTI Image. © Andrew Meirion Jones/Marta Díaz Guardamino**

**Figure 3: One of the spiral designs from the Garboldisham antler macehead recorded using RTI. The image exhibits a clear stratigraphic relationship between the carved spiral and polishing striations on the surface of the artefact suggesting two phases of carving events. Courtesy Moyses's Hall Museum/West Stow Anglo-Saxon Village. RTI Image. © Andrew Meirion Jones/Marta Díaz Guardamino.**

## Case Study 8

### Materiality, Authenticity and Value: the wider implications of science-based conservation of carved stone

John Hughes and Siân Jones

Stone deteriorates under the influence of a variety of physical and chemical agencies. 'Weathering', biofilms, and climatic variability have a significant impact on preservation. The cut and inscribed surfaces of carved stone create additional vulnerabilities. In recent decades, conservation-driven research has focused on the development of scientific methods and materials for measuring change, analysing materials, protecting them and consolidating vulnerable components. As a result, the deterioration of carved stone can be arrested to some degree.

Science-based modification of processes of material transformation can help to maintain the historic and evidential values associated with carved stone surfaces. Yet deterioration contributes to the experience of authenticity, providing a tangible mark of age and 'the real'. As Alois Riegl recognised in 1902, visible decay and disintegration of material fabric embodies the passage of time, creating 'age value', whereupon 'time' becomes tangibly and aesthetically accessible. This begs the question of how the use of science-based conservation impacts upon these values and qualities. Despite long-standing recognition of the values surrounding aging, decay, patina and ruination, there has been little research in this specific area.

The AHRC-funded *Materiality, Authenticity and Value Project* (grant ref. AH/K006002/1, 2013-15), examined the values associated with material transformation and the impact of science-based conservation on these values. The research team combined expertise in heritage science (John Hughes), cultural heritage (Siân Jones) and social anthropology (Rachel Douglas-Jones and Thomas Yarrow). In partnership with the National Trust for Scotland and Historic Scotland (now Historic Environment Scotland), the project focused on three case studies: Charles Rennie Mackintosh's [Hill House](#), [Dryburgh Abbey](#) and [Skelmorlie Aisle](#). The latter two monuments contain significant quantities of carved stone (Figures 1 and 2). At each of the sites, qualitative social research methods were used to gain insights into values, including interviews with heritage professionals and visitors and participant observation.

The research results showed that values associated with material transformation emerge in particular contexts, informed by differing combinations of materials, processes, practices, visitor expectations, use patterns, building types and forms of expertise (Douglas-Jones *et al.* 2016). In some contexts, weathering and decay of stone can accrue 'age value', marking the passage of time, contributing to the experience of authenticity, and creating aesthetically pleasing 'patina' and 'ruination'. In other cases, material transformation and decay is associated with a loss of value and authenticity. As the values associated with material transformation emerge in particular contexts, so does the application of science to understanding, controlling and arresting material transformation. It is not just a case of identifying pre-existing values that then inform how 'problems' are framed, and when and how heritage science is applied. Rather, the application of science in heritage contexts is embedded in dynamic modes of valuation.

The use of scientific techniques to measure, understand and control material transformation is informed by these values, but these very processes also have the potential to change those values. Integrated qualitative research methods can increase our understanding of these important, site-specific conditions and processes, and contribute to more nuanced and productive applications of conservation science, sensitive to the values associated with heritage sites in general, and carved stone monuments in particular.

**Figure 1: View of the north transept of Dryburgh Abbey illustrating deterioration of carved stone. Crown Copyright: Historic Environment Scotland**

**Figure 2: The elaborately carved loft of the Montgomery Tomb at Skelmorlie Aisle. Crown Copyright: Historic Environment Scotland**

## Case Study 9

### Magnetic susceptibility: a non-destructive geological technique used in provenancing carved stones

Nigel A Ruckley

Most igneous and metamorphic rock types contain varying amounts of ferromagnetic minerals such as magnetite. To a lesser extent sedimentary rocks, especially where they have been formed from the decay of igneous and metamorphic material, also contain limited amounts of ferromagnetic material. Measurements of magnetic susceptibility are closely related to the content of magnetite and other iron minerals and can be used in characterizing rock outcrops. By comparing the physical properties of the rock outcrop and its magnetic susceptibility to those of a carved stone it is possible to evaluate the source(s) of the carved stones. This technique was initially used in the provenancing of igneous rocks e.g. Roman granite columns (Williams-Thorpe and Thorpe 1993), greenstone axes (Markham 1997) and Charlemagne's 'black stones' (Peacock 1997).

My attention was brought to this technique by scientists working for the National Museum of Scotland where it was evaluated using a KT-5 Kappameter at the Finlaggan excavation on Islay in the late 1990s. I decided to take this further by purchasing an Exploranium KT-9 Kappameter. Initial magnetic susceptibility evaluation at the Portmahomack excavations in 2000 led to working with the geologist Dr Suzanne Miller (formerly NMS), where this non-destructive geological technique helped to evaluate the carved stones at St Vigeans, Angus. A macroscopic petrological evaluation of the stones and evaluation of thin sections from local quarries allowed us to produce the first detailed geological report on these stones and their sources for HS in 2001 (Miller and Ruckley 2005). A step forward was taken at Whithorn in 2003, where results proved promising as it highlighted the Petrus Stone (No. 2) as being unique (dolerite) amongst the collection of mainly greywackes.

It became clear that sandstones and limestones of the Carboniferous to Permo-Trias age did not provide good subjects for this technique due to their low or lack of any ferromagnetic material. Dalradian metabasites, chlorite schists, slates and some Devonian sandstones have proved to be more promising. Carved Pictish stones, West Highland carved stones and material from quarries on the west coast of Scotland have provided over the years a plethora of data, but data from quarry sources and thin sections is always in short supply.

In 2012 the NMS undertook a trial evaluation of XRF techniques on carved stones at [Iona Abbey](#). The results when linked to previous geological and magnetic susceptibility data were very encouraging. In 2013 a more detailed analysis of all the carved stones at [Oronsay Priory](#) was undertaken using these three techniques.(Caldwell *et al.* 2015). Initial results clearly showed how magnetic susceptibility data complemented the more expensive but more detailed XRF data.

The way forward for non-destructive testing of carved stones lies with this triple pronged approach. Material that becomes available during restoration work on carved stones could be used either for geological thin sections or XRF analysis and the results retained for any future study.

A mechanism whereby a register of both published and unpublished geological analysis of carved stones is created would be invaluable for researchers. Perhaps an initial step would be the creation of a list of current researchers with a geological interest.

**Figure 1: A KT-9 Kappameter NAR at use on the Isle of Oronsay 2013. Copyright David Caldwell**

## Case Study 10

### STONE Project, Edinburgh College of Art

Katherine Forsyth

STONE project was a three-year project (2007–2011) based at Edinburgh College of Art (ECA) and funded by the AHRC. It sought to re-appraise the use of stone in art and the contemporary environment and to gather together ‘the many perspectives, attitudes and processes that we have observed in those who work directly, or share a conscious connection, with stone.’ Specifically the project sought to document endangered stone working techniques and craft skills in order to conserve them and transfer them to future generations. The project placed particular emphasis on the distinctive modes of thought associated with stone-working, including ‘haptic thought’ (thinking through touching) and ‘reductive’ or ‘subtractive thinking’ (in contrast with the more frequently encountered additive mode of thinking, i.e. modelling up).

The stated aims of STONE project were:

- to collect information about stone through the eyes of artists, masons, quarry-workers, anthropologists, and cultural and literary thinkers
- to discover differences in how stone is understood and worked throughout the world
- to understand both the ‘physical processes’ and the ‘thinking approaches’ when working with stone
- to show these modes of understanding in ways that are broadly applicable and transferable

Lead by Jake Harvey, Professor of Sculpture, the project also involved film-maker Professor Noe Mendelle, and the sculptor Joel Fisher, plus research assistant Laura Black and PhD student Jessica Harrison.

Members of the team visited stone-working locations worldwide (including India, China, Japan, USA, Mexico, Brazil and a number of European countries) to document traditional stone-craft skills and attitudes. They interviewed craftsmen and artists and generated a research archive which consists of over 14,000 individual images and 150 hours of film footage. This material is available via the project’s [website](#), together with essays on diverse aspects of stone and stone-working. A collection of stone-working tools and samples of stones was created and this is available via the ECA.

In 2009 ten artist-sculptors from around the world participated in a multi-disciplinary colloquy and subsequently in ‘MILESTONE’, a live carving event and exhibition as part of the 2009 Edinburgh International Arts Festival. This event/performance enabled carvers to work alongside each other and allowed the public to see, not just the final product, but also the stages of the process. The finished sculptures were subsequently exhibited at Yorkshire Sculpture Park, the Pier Arts Centre, Kirkwall, Orkney, and the CASS Foundation, Sussex. Another major output was the richly illustrated book about stone and stone-carving by Harvey, Fisher and Harrison, *Stone: A Legacy and Inspiration for Art* (2011).

Although the focus of the project was solely on contemporary stone-working it nonetheless constitutes a rich resource for those investigating historic carved stones. The traditional nature of many of the practices documented makes it of direct relevance to the study of Scotland’s historic carved stones, especially for material or biographical approaches. The extensive interviews give insight, not only into practical matters and techniques, but also into thought-processes and attitudes, for instance, to carving as religious devotion, a carver’s sense of belonging to a lineage of carvers, the nature of the creative process, and the feeling of intimate connection with a material that can seem almost animate. The theoretical perspectives deriving from contemporary art practice offer engaging and thought-provoking meditations on the fundamentals of human responses to and interactions with stone.

**Figure 1: Versaillesque Sheep by Gerard Mas, one of the artists involved in the STONE project. © Gerard Mas**

## Case Study 11

### Donside: early medieval carved stones in a landscape context

Iain Fraser and Strat Halliday

One of the reasons the RCAHMS chose Donside in Aberdeenshire for a detailed landscape survey (1995–2001) was the concentration of Pictish symbol stones along the banks of the lower Don, Urie and Gadie Burn. A rich vein of medieval documentation offered the possibility of reconstructing parts of the later landscape in detail and comparing this to the original findspots of 41 symbol stones, three Pictish cross-slabs and a number of early cross-incised stones. Issues of definition, dating and survival precluded analysing this pattern in relation to settlement evidence, including forts, or place-name evidence (RCAHMS 2007a; Fraser and Halliday 2011).

Before attempting to place the monuments in some kind of landscape setting, the stones, including several new discoveries, were meticulously drawn and photographed. Observations were then made about the topographical situation of their original location, where this could be established: with so few still *in situ*, this usually involved documentary research into the biographies of each stone. The final step was a comparison of the relationship of the first recorded locations to the reconstructed boundaries of the later medieval parishes as first introduced in the 12th-century, which appear to reflect earlier secular land divisions.

Many of the stones' findspots were between 50–250 m OD. While topographic features varied, a recurring theme was that the stones had originally been erected along certain stretches of rivers and their lesser tributaries, which had subsequently been adopted as parish boundaries. This agrees with observations made elsewhere in north-east Scotland (Inglis 1987). With the notable exception of the concentration of stones at Rhynie, where a Pictish cult centre and cemetery have been identified through excavation (The Rhynie Stones: Case Study 23), it was difficult to establish what sorts of place the carved stones might be associated with, although it is notable how many of them were found at or near later church sites. A preliminary comparison of early medieval burial sites south of the Mounth in eastern Scotland, including both square-barrow cemeteries and long-cist cemeteries, suggests that many of these were placed in similar locations in the landscape.

The hypothesis is that Pictish symbol stones were deliberately sited on the edge of territories; this helps to explain the very selective reuse of earlier prehistoric standing stones. Accepting that the ogham inscriptions and, most likely, symbols represent names, the interpretation is that these stones were statements of identity sited at important places on boundaries where people would have crossed between territories, perhaps indicating places of hosting or assembly. Such an interpretation lends itself to the idea that the creation of these visibly distinctive landmarks signalled a dramatic social or political change in society, perhaps the arrival of Christianity.

It would be useful to now revisit this exercise taking into account the findings of Alasdair Ross' 2015 work on *dabhachs*, which are likely to have their origins in earlier units of land assessment and secular power.

**Figure 1: Maps showing the distributions of Pictish symbol stones, cross-slabs, crosses and ogham inscriptions in Donside. Crown Copyright: Historic Environment Scotland**

## Case Study 12

### Faith in Cowal: a pilgrimage project and an early medieval cross

Gilbert Márkus

The Cowal peninsula in southern Argyll suffers from a struggling economy and a declining and ageing population. This demographic is reflected in the life of the church: membership of the Church of Scotland is declining by about 5% per year, and this decline is set to accelerate in the near future. This means that parish churches will close (Inverchaolain and Sandbank churches will go soon), with consequences for associated historic carved stones. What will happen to them? How will they be preserved and made available to local people and visitors?

The Church's Presbytery of Argyll has responded creatively to this rather bleak reality with a decision to explore new ways of 'being church'. They realise that the landscape of Cowal has a rich early Christian and medieval history and archaeology, including carved stones at many sites. They also realise that some of their churches (which are generally kept unlocked) have many more visitors during the week than they have in their congregations on Sunday mornings. So they decided to promote 'faith tourism' or pilgrimage in the Cowal landscape, to attract visitors to the area and to help these visitors engage with the local communities and their churches.

In 2015 the Church of Scotland employed Gilbert Márkus for one year to research and exploit this landscape with a view to attracting such visitors, creating a website ([www.faithincowal.org](http://www.faithincowal.org)) and a series of leaflets help people find their way around the attractions and understand them. It is hoped to make [St Munn's Church, Kilmun](#) (*Cill Mhunnu*) the hub of the wider and dispersed pilgrimage landscape. It is a 19th-century church with a 15th-century tower but in its cemetery lies an early medieval carved cross-slab, neglected and to a great extent unknown even to members of the parish. This shows that the church is centuries older than its earliest historical record (a charter of the 1230s or 1240s).

At the timing of writing in April 2016, this carved stone will shortly be brought into the church and mounted in a plinth in the sanctuary, some pews rearranged around it and a raking spotlight mounted nearby to pick out the detail of the carving. Booklets will be placed on adjacent pews inviting reflection on its history and its meaning.

A drawing of the stone has become the logo for the whole Faith in Cowal project. The same image has been printed as a large vinyl transparency and mounted on the glass door in the entrance to Kilmun church. So this particular stone, of all the many carved stones in Cowal, represents a pilgrimage landscape, and somehow embodies and expresses the hopes of the Cowal communities as they face an uncertain future.

**Figure 1: Kilmun early mediaeval cross-slab. © Gilbert Márkus**

**Figure 2: The Faith in Cowal logo. © Gilbert Márkus**

**Figure 3: The transparency displayed in the interior of Kilmun church. © Gilbert Márkus**

## Case Study 13

### The craft of carved stone replicas

Sally Foster

From the earliest years of the Victorian period, replicas of early medieval carved stones in Scotland were made for display in newly founded museums, and for exhibition to antiquarians at their meetings. Such copies were a sought-after commodity.

The earliest known Scottish plaster casts of early medieval carved stones were made of the [St Andrews Sarcophagus](#) in 1839. The Fifeshire Literary, Science and Philosophical Society commissioned Mr Ross, a Cupar-based plasterer, to make copies for their new museum, and it appears that he subsequently made further copies for museums in Edinburgh, Newcastle-upon-Tyne and Dublin. George Buist, who arranged the 1839 manufacture, wanted the Sarcophagus to be displayed as a box. Being a composite and fragmentary monument, this meant that the craftsman had to make some compromises in terms of how he created the plaster cast reconstruction. These can be established by close comparison of the surviving plaster casts with the original, and are also important because of the legacy of what the craftsman did (Foster *et al.* 2014; Foster 2016 forthcoming).

Replicas are still made today, often as an open-air substitute for a monument that has been moved inside for its protection. The St John's Cross replica on Iona will be 50 years old in 2020. Its replication in concrete was a technically accomplished feat that involved a team of artists, craftsmen, conservators and many others in its production in Edinburgh and transportation to Iona, and before that in the idea of creating it, and getting the funds for this. Carefully thought-out decisions were made at the time about how to create a reconstruction from the fragmentary surviving remains. This enterprising story is not yet presented to the visitors to Iona.

**Figure 1: A section of the plaster cast of the St Andrews Sarcophagus now in the St Andrews Museum. © Doug Simpson**

**Figure 2: A cross-section through the 1849 plaster cast of the St Andrews Sarcophagus in the NMS shows how the craftsman reinforced it with iron rods. The cast was presumably cut up because the NMS, as it then was, wanted to correct Mr Ross's cast, which had reversed the arrangement of the monument's corner slabs. © Doug Simpson**

**Figure 3: The 1971 cover of *Coracle* shows Mr Alastair MacKenzie (second from left) and three of the employees of Murdoch MacKenzie Ltd—Joe Findlay, Jock Logan and Remo Tonietti—who assisted with the erection of the St John's Cross replica in June 1970. © Murdo MacKenzie and Iona Community**

## Case Study 14

### Early medieval sculptured stone and the production of social value

Siân Jones

The historic, evidential and aesthetic values of early medieval sculptured stones are well-established and these contribute to the national and international significance they are accorded. Yet issues surrounding their conservation and display frequently arouse strong public opinion, suggesting that these monuments are also associated with contemporary social and communal values. This case study focuses on the [Hilton of Cadboll](#) Pictish symbol-bearing cross-slab (hereafter HoC), which was the focus of a detailed ethnographic study in 2001–2003 (Jones 2004). The aim of the research was to increase understanding of the meanings surrounding such monuments, and gain insights into their role in the production of memory, identity and place. Qualitative research methodologies were used, including participant observation and in-depth semi-structured interviews with local residents.

The large upper section of the HoC cross-slab is on display in the Museum of Scotland (NMS), but the discovery and excavation of the lower section at the HoC chapel in 2001 ignited public protest and ownership claims (Figure 1). Certain aspects of the cross-slab's local social value were already known to the heritage professionals, archaeologists and art historians involved. These included a body of oral historical and folk narratives. However, the ethnographic research revealed that the cross-slab is imbued with deep metaphorical and symbolic significance in local contexts. It is often conceived as a living thing; indeed even an ancient member of the village. In interviews, people talked of it being 'born', 'living', 'breathing', 'dying', and even having a 'soul' and 'charisma'. Furthermore, just as people are traditionally seen as 'belonging' to both community and place by virtue of kinship and birth in this part of Scotland, the cross-slab 'belongs' in similar ways. The research shows that the cross-slab's metaphorical and symbolic associations are key to its role in the production of community identities and sense of place. Here the monument provides a means to make Hilton a place of significance, set against economic decline and strong sense of marginality. At the same time, against the historic backdrop of the Highland Clearances and large-scale emigration, the biography of the monument provides a metaphor for processes of displacement and loss that remain a powerful focus of social memory.

The HoC study suggests that carved stones are likely to be embedded in a complex and dynamic body of social meanings, identities and memories. These may not be evident in their fabric, or accessible to the distanced observer, but they underpin their important role in the production of community and place. The research therefore has significant implications for how we understand these carved stone monuments, as well as how they are conserved and displayed. However, the HoC study also shows that social values may diverge from, and even conflict with, historical, evidential and aesthetic values. There is a pressing need for further studies into the social value of early medieval and other kinds of carved stone. The HoC research demonstrates that in-depth ethnographic research is well suited to eliciting insights into social and communal values. However, there is also a strong case for incorporating focused qualitative methods into routine heritage management contexts, so that social and communal values can be taken into account in conservation decision-making alongside other values.

**Figure 1: The lower section of the Hilton of Cadboll cross-slab shortly after excavation in 2001. © Siân Jones**

## Case Study 15

### Celtic Revival gravemarkers in Scotland

**Murdo Macdonald**

There was a proliferation of gravemarkers throughout Scotland (and elsewhere) in the 19th and 20th centuries that drew on work originating in the Celtic cultures of Scotland and related areas from (usually) the 8th and 9th centuries. These include works designed by artists of the first rank such as Charles Rennie Mackintosh, James Drummond, William Bell Scott and Archibald Knox. Celtic Revival gravemarkers from the 1860s onwards acted as a form of 'validation' by being seen as appropriate ways to mark the passing of prominent Scottish artists: e.g. Alexander Nasmyth (St Cuthbert's), David Scott (Dean); Horatio McCulloch (Warriston) and Joseph Noel Paton (Dean), to name four Edinburgh examples. In addition, these monuments generally display high quality of production and design, which speaks volumes for the firms involved, such as Mossman in Glasgow and McGlashan in Edinburgh.

In the context of carved stone research Celtic Revival motifs, often appearing independent of crosses, should also be considered. In particular, the clarsach, which appears frequently: e.g. on memorials to James Hogg (Ettrick); Mary MacKellar (Kilmallie); Alexander Smith (Warriston); Mary Macpherson (Inverness). Celtic Cross war memorials have been of importance from the time of Robert Rowand Anderson's pioneering monument to the 78th Highlanders (1861, Edinburgh Castle). In addition markers based on the West Highland School of Sculpture (14/15th century), deserve specific notice (e.g. Caroline Campbell's memorial, [St Conan's](#), Loch Awe, 1900).

A number of these memorials bring Celtic Revival design back to their Gaelic speaking culture of origin (and the Scottish Diaspora in places such as Nova Scotia), such as the memorial to the Gaelic poet Mary MacKellar at Kilmallie near Fort William, c. 1890. That also applies in Hebridean graveyards, e.g. Father Allan McDonald's memorial, Eriskay, c. 1905, or that of the ethnologist Calum MacLean, South Uist, c. 1960. One can also see such reappropriation in the graveyard at [Cille Choirill](#), Roy Bridge, Lochaber. In this aspect of Celtic Revival work a visual culture dating back well over a millennium (i.e. to the time of the [Kildalton Cross](#) in Islay and the Book of Kells in Iona) is reintegrated with the wider Highland Gaelic culture of the late 19th and early 20th century.

As with earlier carved stones, these stones are exposed to environmental risks. These works are mainly sited outside, they are subject to damage, weather, vandalism, over-enthusiastic health and safety measures, etc., which makes the case for research all the more pressing. Celtic Revival carved stones in Scotland are a major cultural achievement. Research should cast an illuminating light on the entire body of carved stone research, both 'revival' and 'original', within Scotland and further afield. For example The 'Celts: Art and Identity' exhibition held at the British Museum in London and the National Museum of Scotland in Edinburgh in 2015–16, integrated Celtic Revival and earlier material to very good effect (Fowle 2015).

**Figure 1: The Mackintosh cross in Glasgow Necropolis. © Murdo Macdonald**

**Figure 2: The memorial to Mary MacKellar, Kilmallie. © Murdo Macdonald**

## Case Study 16

### The Hilton of Cadboll cross-slab: a complex and fragmented biography

Siân Jones and Sally Foster

[T]he greatest glory of a building is not in its stones, nor in its gold. Its glory is in its Age, and in that deep sense of voicefulness, [...] which we feel in walls that have long been washed by the passing waves of humanity (Ruskin 1849, 233–4)

All too often in archaeology, art history and heritage management the original meaning and use of objects, images, buildings or monuments is privileged. Yet if we follow Ruskin, it is the effects of human engagement over time that produces their 'voicefulness' or sense of authenticity. The Hilton of Cadboll cross-slab has a complex and fragmented history (Figure 1), on a par with other fragmented and displaced monuments like the Parthenon and the contested 'Elgin Marbles'. Following excavations in 1998 and 2001 (James *et al.* 2008), a detailed study of its cultural biography shed light on its rich social life and explored the wider social interactions and processes in which it has been entangled (Foster and Jones 2008).

Excavation revealed that the cross-slab had been erected twice at the Hilton chapel site. The cross-face may have been deliberately damaged during the 16th century. Subsequently the upper portion was broken off in a storm and reworked into a gravestone dated 1676, creating thousands of small fragments. Following its 'rediscovery' by antiquarians, this upper portion was taken by the laird to Invergordon Castle in the 1860s. His son sent it to the British Museum in 1921, resulting in widespread protest and it was quickly re-donated to the National Museum of Antiquities (NMA) in Edinburgh. It now features prominently in the 'Early People' exhibition in the Museum of Scotland. In 2000, a full-scale reconstruction was commissioned and erected adjacent to the Hilton chapel. The excavations of 2001 recovered the missing lower portion and thousands of fragments from the cross-face. While the latter are stored at the NMA the lower portion became entangled in conflicting claims of ownership and belonging and remains in the village community hall.

The biographical study of the monument highlights the myriad ways it contributed to the production of meaning, identity and place. In Pictish times it was involved in the expression and negotiation of religious and political identities, as well as possible regional or ethnic ones. In the Reformation it became tied up with new forms of religious and political identities, but from the late 18th century onwards its significance for religious identity waned in contrast to its part in negotiating the personal identities of the landowning elite and 'polite' classes. During the 19th century it played an increasing role in the production and expression of national identity. This became fully realised in the 20th century with the incorporation of the upper portion into the collection of the NMA. Meanwhile, in Hilton itself, the recently excavated lower portion acts as a medium for the production of community identities and processes of place-making, specifically in the construction of Hilton as a place of significance. The biography of this monument highlights potent themes of faith, identity, power and place-making, which lie at the heart of people's relationships with one another and with the material world. The powerful nature of these themes contributes to the contestation surrounding the monument, but it is also the reason why it has such a compelling aura, or sense of 'voicefulness'.

**Figure 1: Composite image depicting different stages of the life of the Hilton of Cadboll cross-slab. © Richard Easson, photographer unknown; Siân Jones ©National Museums Scotland; Siân Jones; GUARD; and Crown Copyright: Historic Environment Scotland**

## Case Study 17

### Glazed monument shelters

Colin Muir

The development of monument shelters in Scotland dates back to the 1890s. By the 1940s some of these were partially glazed, and by the late 1980s the first fully glazed structures were being developed (Foster 2001; Maxwell 2005).

There were various concerns about the concept of enclosing ancient monuments within glazed 'containers'. Some were tangible, and remain controversial; these mainly being related to site aesthetics, lack of physical access, and reflections affecting photography. Others were conjectural: that stones would crack, spall or suffer efflorescence as they dried out; or that they would act as 'wicks', drawing moisture and soluble salts up from the ground. 'Greenhouse' magnification of diurnal or seasonal temperature fluctuations also raised concerns of material-stressing of the stone. The impact of such interventions on the perceived value of carved stones is also gaining currency (see Science value and material decay: Case Study 8).

Analysis of environmental data recorded internally and externally at [Sueno's](#) and [Shandwick Stone](#) enclosures from 1992–2000 showed that the internal temperature fluctuations rapidly followed those outside, with internal nocturnal readings being around + 4 °C warmer than outside, while in the summer months solar-gain increased this insulating effect to +20 °C at Suenos and +30 °C at Shandwick. This resulted in some high internal temperatures, the highest being 58.5 °C recorded at Shandwick during June 1995. Predictably relative-humidity inversely-mirrored temperature, dropping during hotter weather. Internal humidity was always lower than outside, ranging from around 20% lower at midday to 40% lower by 9pm. Although the diurnal and seasonal patterns found at both sites were closely comparable, there were notable differences too. These were primarily due to their differences in internal air volumes and the efficacy of their ventilation measures. Temperature and humidity fluctuations were found to be more frequent and extreme at the Shandwick enclosure where solar-gain was found to be significantly higher due to the smaller internal air volume (approx. 46m<sup>3</sup>) and less efficient ventilation. Conversely Sueno's shelter (internal volume 237m<sup>3</sup>) took longer to heat up and did not reach as high temperatures, while retaining its temperature longer (Muir 2005).

The study showed that while wide temperature ranges were indeed created within the structures, the stones showed no detrimental results from this; no spalling, disaggregation or salt crystallisation was observed during the drying-out process, nor did temperature variance appear to adversely affect the stones.

From a conservation point of view the shelter concept has proven very successful, if using a bespoke design and properly maintained. At Sueno's Stone, a monument in the care of HES, it has effectively halted the detrimental effects of wind, water and frost action, minimised annual conservation costs, and extended the monument's existence, while maintaining it in its original location. Conversely at Shandwick, the condition of the monument has declined for over a decade. This is the outcome of using a re-purposed shelter, defective building design, and the challenges for a local trust of actively caring for the monument, including access to funds. There the flooring is breaking up resulting in water ingress, salt contamination and severe disaggregation to the monument's collar stone.

The glazed shelter concept is still considered a valid one within HES, and has been proposed for the [Aberlemno](#) stones in recent years, and indeed is planned for the [St Orland's Stone](#) in due course.

**Figure 1: The Shandwick Stone enclosure. © Colin Muir**

**Figure 2: The Sueno's Stone enclosure. © Colin Muir**

## Case Study 18

### Strength in disciplinary collaboration: early medieval examples

Sally Foster

Not only are there pros and cons to different types of disciplinary co-working, but carved stones from different periods have different traditions of research that reflect different disciplinary cultures. In Scotland, work on early medieval sculptured monuments offers the most sustained examples of the power and potential of disciplinary collaboration to date. It is no coincidence that these are the type of carved stones that have, since the early 2000s (Hall *et al.* 2000), been subject to biographical studies, approaches which have their roots in the wide enthusiasm for this type of monument in Scotland.

The loan of the [St Andrews Sarcophagus](#) to the British Museum for the 1997 *Heirs of Rome* exhibition prompted HS to encourage new scholarship—in recognition of the fact that, although well known and highly significant, the Sarcophagus was not well researched. HS, together with the Society of Antiquaries of Scotland organized a conference about the Sarcophagus, and a number of additional papers were commissioned (Foster 1998a). The monument was also recorded in detail by Ian G Scott and Isabel Henderson added a detailed description of the monument. Many people spent time individually or in groups examining the monument afresh. While this is primarily an example of multi- rather than inter-disciplinary working, the cumulative effect of these papers was a substantially different understanding and perception of the Sarcophagus. In addition this work prompted renewed international interest in its significance (notable in its first loan abroad for the *Il Futuro dei Longobardi* exhibition in Via Musei, Breccia, Italy, from 14 June to 20 November 2000) and laid the ground for other studies of a similar nature (Welander *et al.* 2003).

*Able Minds and Practised Hands* (Foster and Cross 2005) is a landmark in the sense that it illuminated for the first time just how many different disciplines could come together at a conference and offer a new perspective on a body of carved stones, whether contributing to understanding their cultural significance, conservation needs or interpretive potential. Advances included essays on context, biography, social value, geology and 3D scanning, while years of curatorial experience were distilled in essays relating to heritage issues and opportunities. Some of the essays were explicitly interdisciplinary (e.g. Hall *et al.* 2005) but many still applied a singular yet still valuable disciplinary lens to explore particular issues.

The [Hilton of Cadboll](#) project is an example of a more sustained attempt at interdisciplinary working to understand the cultural significance of a single carved stone monument (James *et al.* 2008). Multiple contributors worked from their own disciplinary perspectives (notably Henderson's art-historical analysis) and more interdisciplinary perspectives (the archaeological elements), but it is the biography chapter that best reflects the outcomes of the project's interdisciplinary perspective (Foster and Jones 2008). Jones' use of ethnographic survey techniques in her exploration of social value at Hilton of Cadboll (see also Jones 2004; Contemporary social value: Case Study 16) is a good example of transdisciplinarity.

**Figure 1: *The St Andrews Sarcophagus. A Pictish Masterpiece and its International Connections* was the study of a single monument and its context by scholars working in different disciplinary and professional contexts. Crown Copyright: Historic Environment Scotland**

**Figure 2: *A Fragmented Masterpiece: Recovering the Biography of the Hilton of Cadboll Cross-slab* shows just how much there is to learn from an interdisciplinary approach to a single carved stone monument, but also offers insights into the practical challenges of such approaches. © Society of Antiquaries of Scotland**

## Case Study 19

### Cradle of Scotland exhibition

#### Stephen Driscoll

Sculpture remains the most substantial legacy of the Pictish royal palace of [Forteviot](#), the site of Kenneth mac Alpine's death in AD 858, but the collection is dilapidated and widely dispersed. It consists of the arch built into the Museum of Scotland (NMS), Edinburgh; the [Dupplin Cross](#) housed in St Serf's, Dunning; and miscellaneous fragments curated by the Forteviot Kirk Session. Until recently the fragments were stored loose in the parish: uninterpreted, prone to accidental damage, in truth little more than clutter.

The sculpture featured prominently in the 2015 'Cradle of Scotland' exhibition staged at the Hunterian Museum and the Perth Museum and Art Gallery. The exhibit presented the results of the Strathearn Environs & Royal Forteviot (SERF) archaeological research project to an international audience at the European Association of Archaeologists' Annual Meeting and to the public. This not only provided a context for the sculpture, but also served as an opportunity to bring together the dispersed sculptural elements. By good fortune, the SERF project and the Cradle exhibition coincided with the Tayside Landscape Partnership, funded by the HLF, which financially supported the sculpture display and provided the opportunity to create a permanent legacy for Forteviot.

The central challenge posed by the sculpture was to convey the importance of the original monuments based upon the damaged fragments. Benefiting from a strong research platform provided by Mark Hall and Ian G Scott, it was possible to reimagine the original form of the sculptures with confidence. This understanding guided the creation of the display mounts and lighting scheme by Richard West, which allow the fine qualities of the sculpture to be appreciated. In the exhibition the fragments were displayed alongside life-size 'cardboard cut-outs' produced from blown-up Scott drawings. These allowed the non-specialist to appreciate the monumentality of the original work and better understand the fragments.

The two most impressive Forteviot stones, the arch and the Dupplin Cross, were unavailable for the exhibition, so they were displayed virtually using animated 3D visualisations. The Digital Design Studio (Glasgow School of Art)/CDDV had previously scanned the Dupplin Cross for HS at a high resolution, which allowed the absent cross to be projected at life-size and to command the gallery. The digital format allowed the design team to experiment with how the sculpture might have looked if originally painted. A rotating animation of the cross highlighted particular details and provided a dynamic interpretative presentation.

Currently the Forteviot arch occupies an inaccessible, unsympathetic position in the Museum of Scotland. Using digital technology it was possible to bring out hidden sculptural detail and to recover its original architectural character. Photogrammetry was used to create a 3D model, which was also 'painted' to highlight key features and the 3D model was placed in an animation showing its likely position in an early medieval church.

The exhibitions has transformed the public appreciation of the fragments by making them attractive and intelligible, it has enhanced academic understanding, and has created a tangible legacy in the form of a permanent sculpture display in Forteviot church.

**Figure 1: The Cradle of Scotland exhibition at The Hunterian Gallery. © Stephen Driscoll**

**Figure 2: A screenshot of the Dupplin Cross animation. Created by the Centre for Digital Documentation and Visualisation LLP and Steve Driscoll**

## Case Study 20

### Edinburgh Graveyards Scoping Report

Susan Buckham

The Edinburgh World Heritage Site includes five local authority-owned burial sites, [Greyfriars](#), [Canongate](#), [St Cuthbert's](#) Kirkyards and [Old Calton](#) and [New Calton](#) Burial Grounds. Together these form an important component of the City's rich and varied urban landscape and chart its development from a medieval burgh to a European Enlightenment City. In 2010, the graveyards were placed on the World Monuments Fund (WMF) watch list, which draws attention to cultural heritage sites around the world threatened by neglect, vandalism, development and natural disasters. Through the World Monuments Watch, WMF fosters community support for the protection of these endangered sites. In 2011, Edinburgh World Heritage and the WMF commissioned research to identify the strategic priorities for the future care and enjoyment of the graveyards, focusing on understanding, future use, practical care and community involvement. While drawing on existing information about the history and management of the Edinburgh sites, the scoping study also surveyed over 20 graveyard trusts and 'friends of' groups across the UK to draw upon their experience of managing historic sites. These community groups had successfully led projects transforming neglected urban cemeteries into tranquil spaces and family-friendly places for learning and leisure. This work identified opportunities to improve the care and promotion of the five graveyards and developed a business model for an Edinburgh graveyard trust and friends groups.

As part of this research, a community survey focusing on perceptions of the five Edinburgh sites revealed how they were currently used and the public's attitudes towards them. Survey participants clearly valued the sites' history and gravestones, but also the amenity roles the graveyards played as green open space. Intangible and abstract qualities, 'mysterious', 'sacred', 'unusual' and 'secret places', also featured in survey responses. However, the survey also identified several areas that the public felt could be improved, notably maintenance, on-site interpretation, seating and anti-social behaviour. Over 75% of survey respondents described themselves as regular graveyard users and over 90% stated they were able to identify at least one item that would increase their frequency of visits e.g. 'added value' features such as graveyard tours, talks, leaflets, on-site interpretation and special activities and events.

One of the key recommendations of this work was the creation of graveyard 'friends of' groups for the Edinburgh sites. Accordingly, since April 2013, a part-time Graveyards Development Officer has been appointed at Edinburgh World Heritage to help grow and support local community engagement with the graveyards. A local 'friends of' group is now flourishing at Canongate and similar groups for New Calton and Old Calton Burial Grounds are planned. A long-term future for the graveyards can envisaged through the collective actions of existing community groups and 'friends of' groups, who together are already beginning to deliver interpretation, education and conservation projects.

The scoping study report can be downloaded from the [Edinburgh World Heritage website](#).

**Figure 1: Opening the lower gate to New Calton Burial Ground on Calton Road after an Edinburgh Art Festival event has resulted in increased footfall and a much greater sense of visitor welcome. © S Buckham**

**Figure 2: Looking at the gravestone symbols during the Old Calton Burial Ground graveyard i-spy trail. During a Doors Open Day this site received over 1,000 visitors including many who only felt comfortable visiting as part of an organised event. © S Buckham**

## Case Study 21

### Elgin Cathedral redisplay project

Hugh Morrison

[Elgin Cathedral](#) has one of the finest and best-preserved collections of *ex situ* medieval architectural carved stones in Scotland. Among the 480 pieces are superbly carved vault bosses, corbels and column capitals, impressive monuments and effigies, and a substantial amount of window tracery from a 13th-century rose window. In April 2016, after many years in storage, Historic Environment Scotland completed a project to return this collection to the cathedral where it now features as a major part of its interpretation.

The first task of the project was to understand and assess the collection. Dr Mary Márkus, who catalogued it, classified the stones by date, style and function, and she highlighted carvings of high significance. New research was also commissioned. The window tracery fragments were examined to determine how the rose window would have been constructed. Pigment analysis was carried out on traces of polychrome from a 14th-century bishop's effigy. Heraldic devices carved on some of the memorials were investigated to identify the individuals and families they represented. The stones were also examined to identify their geological provenance.

The main challenge of the project was finding the best way of displaying such a rich collection within the constraints of cathedral. Ultimately, spaces in the north and south towers offered the logical location for the primary displays and the Bishop's House offered an accessible storage solution for the remainder of the collection.

Research was used to select and group the stones into logical display themes to fit the spaces in the towers. The most accessible ground floor spaces were used to give visitors a sample and overview of the collection. An interactive kiosk allows visitors to browse a catalogue of the entire collection, see 360° views of displays on the upper floors, and panoramic views from the top of the tower.

Three upper spaces in the tower were used to explore recurrent themes in the carvings: animals, faces, mystical beasts, trees and foliage. An additional three spaces were used to explain how the cathedral was built, the work of the mason, and the function of different stones in its construction.

The new displays have brought together new ways of presenting collections of this kind. Mounting and illuminating the stones in both natural and light controlled spaces has allowed the carvings to be seen clearly and vividly. Working with Napier University an innovative method of projecting coloured light on the bishop's effigy has also allowed it to be seen as richly as the pigment analysis has indicated. New mounting techniques also allowed a segment from the rose window to be displayed alongside fragments of medieval window glass from the cathedral, on loan from the Moray Society. Planning publicly accessible storage spaces in the Bishop's House as part of the project has meant that all of this collection has now been displayed within a meaningful historical context.

**Figure 1: Elgin Cathedral vault bosses display. Crown Copyright: Historic Environment Scotland**

**Figure 2: Detail of vault boss. Crown Copyright: Historic Environment Scotland**

**Figure 3: Elgin Cathedral bishop's effigy. Crown Copyright: Historic Environment Scotland**

**Figure 4: Elgin Cathedral bishop's effigy with projected lighting. Crown Copyright: Historic Environment Scotland**

**Figure 5: Reconstruction of the rose window at Elgin Cathedral. Crown Copyright: Historic Environment Scotland**

**Figure 6: Graveslabs on display at Elgin Cathedral. Crown Copyright: Historic Environment Scotland**

## Case Study 22

### Crail Kirkyard, Fife: histories in wood and stone

Kelsey Jackson Williams

What can carved objects tell us about the culture of early modern Scotland? A significant part of the country's artistic output during that period consisted of carvings in both stone and wood which could be found in kirkyards, above doors, on gentlemen's fireplaces, set into the walls of public buildings, and in many other locations throughout Scotland's human landscape. Studying these carvings in context can help us understand the way a community perceived itself, its past, and the relationships of individuals within it, as in the case of the kirk and [kirkyard at Crail](#), near the tip of the East Neuk of Fife.

The Crail kirkyard contains 16 funeral monuments built between 1598 and 1723. These, together with eight carved pews within the kirk (1594 and 1605), reflect the wealth and tastes of the merchants and lairds of east Fife, as elaborate neo-classical monuments jostle for space with baroque architectures carved in newly-imported continental styles. They also map out the power of the burgh elite; parishioners entering at the edge of the kirkyard would pass through a gauntlet of monuments inscribed with laudatory inscriptions to previous generations of burgesses, baillies and town clerks. This patrician elite perpetuated their status by creating a physical space which both memorialised their forebears and quite literally herded the burgh's more humble inhabitants into the kirk like watchful grey sheepdogs.

There is a conspicuous absence of gentry amongst these ranks of monuments, only one of the leading landowning families in the parish is represented here; the rest are commemorated in richly carved armorial pews which were erected inside the church a generation after the Reformation. The Scottish Kirk put pressure on parishes to forbid the erection of artefacts of gentry aggrandisement within kirks, but were not always successful; indeed, the Crail kirk session reported gloomily in 1611 'that the abuse of burial in the kirk was again creeping in'. This offers a window onto a rich material culture of gentry self-representation that thrived even in the iconoclastic decades after John Knox.

It is notable that there are two separate spheres delineated here: the gentry within the kirk, the merchants in the kirkyard. Their segregation highlights the conflicting interests of social groups during this period, as traditional gentry families found their longstanding privileges challenged by *nouveau riche* shipmasters whose vessels full of Riga hemp, Gothenburg timber and Bordeaux wine once rode at anchor outside the harbour of Crail. In Crail, at least, they made an uneasy truce, dividing up the spiritual heart of the burgh into separate camps, and leaving the rest of its inhabitants to make their way through that fraught iconographic landscape as best they could. The remains of that landscape—the carvings which still survive—tell us a rich and fascinating story about the life of this community 400 years ago.

**Figure 1. The imposing baroque funeral monument of Patrick Hunter, Bailie of Crail (1649). © Dawn Hollis**

**Figure 2. Gentry luxury at Crail: the carved pew of the Cunninghams of Barns as photographed by Erskine Beveridge, c.1890. Crown Copyright: Historic Environment Scotland**

## Case Study 23

### Rhynie Woman and community engagement

Gordon Noble

Pictish carved stones are among the most iconic images we have from early Scotland. At Rhynie, Aberdeenshire, the University of Aberdeen in collaboration with the University of Chester and University of Glasgow have been working with the local community to understand the context of a series of Pictish Class I symbol stones found around the modern village. The most dramatic of the Rhynie images is the so-called [Rhynie Man](#) found by farmer Kevin Alston in 1978. Since 2011, excavations have shown that the findspot of the Rhynie Man is the location of a high-status enclosure complex and settlement dating to AD 450–550 with evidence of Mediterranean and continental imports, high-status metalwork and buildings within a complex series of boundary features.

In 2013, a local community group, 'Rhynie Woman', was formed supported by the Huntly Cultural Fund and Creative Scotland. The original impetus came from local artists Daisy Williamson and Debbi Beeson who ran a Pictish pop-up museum and café alongside the excavations that year. Rhynie Woman became a constituted community engagement group and received HLF support for a community dig in 2014 and since then has worked on a variety of community and artistic projects. The imagery of the Rhynie stones has been a constant source of inspiration for Rhynie Woman, and they have attracted thousands of people to events associated with the group. Their work, part of a King's Museum exhibition on the Northern Picts in 2015, was seen by over 3000 people. One of the most spectacular Rhynie Woman events was an equinox celebration in March 2015 when they organized a reimagining of the Pictish centre at Rhynie and a walk up nearby [Tap O'Noth](#) hillfort along with artists and musicians. Rhynie Man was the centrepiece, recreated in lights on a metal framework, his image displayed at night against the dramatic backdrop of Tap O'Noth.

The local community have long campaigned for the return of Rhynie Man, who is currently housed at Aberdeenshire Council headquarters. There remains a desire to see Rhynie Man and the other symbols stones better represented in the community, but Rhynie Woman has also explored other ways of bringing the stones and their images alive. This has included working with Glasgow School of Art to create 3D/RTI records of some of the symbol stones. More recently the University of Aberdeen, Aberdeenshire Council and Rhynie Woman have also been working with Revolv3D, a local 3D printing company, to use photogrammetry and 3D print the results. Local artist Anne Murray has also run various projects, including working with school children to write Valentine's Day cards to Rhynie Man, and setting up Twitter and Facebook feeds for him, as well as creating a film surrounding his discovery and his role in village life in the past and present. Through initiatives of this kind, the community at Rhynie preserves these monuments as an active part of their contemporary lives and ensures the images retain a vibrant role within modern life.

**Figure 1: Rhynie Man recreated in lights on Tap O'Noth hillfort in 2015. © Gordon Noble**

## Case Study 24

### Creative archaeological visualization of the rock art at Ballochmyle

Matt Ritchie

The spectacular Neolithic rock art at [Ballochmyle](#) extends over three vertical panels on a cliff face overlooking a tributary stream of the River Ayr. The cup-and-ring marks were recorded by RCAHMS in 1986 as a series of detailed pencil drawings and by AOC Archaeology using a combination of terrestrial laser scanning and photogrammetry (Stevenson 1993; AOC Archaeology Group 2015).

The resulting visualizations capture the carvings in exceptional detail. The survey was undertaken to inform conservation management and to contribute to the development of the survey and visualization methodology of prehistoric rock art. The resulting datasets were processed into high-resolution geometric meshes for visualization under simulated raking light conditions. They were prepared for processing in GIS, allowing visualization techniques more usually applied to the interpretation of terrain and surface models generated by aerial laser scanning.

Visualising the geometric meshes under simulated raking light allows the accentuation of shallow carvings under lighting conditions that could never be replicated in the field through photography, with the added advantage of being able to remove the real colour from the rock face (meaning that colour and contrast variations do not distract from the observer's reading of the carvings).

Analytical hill-shading, slope and local-relief techniques were also used to interrogate and present the geometric meshes. Analytical shading techniques such as these can identify very slight undulations in the rock surface and can provide a complementary source of information to traditional drawn interpretation. They can also provide evidence of more carvings than can easily be detected with the naked eye. Like the simulated raking light applied to non-textured geometric meshes, analytical shading removes the distraction of colour and contrast, relying on differentiation in relief alone to distinguish incised markings.

Forestry Commission Scotland (FCS) commissioned the integrated (or mixed mode) archaeological measured survey at Ballochmyle to help further develop the survey and visualization methodology of prehistoric rock art using a particularly significant and fragile site. This site-specific approach to archaeological measured survey lends itself to clear and concise reporting with an emphasis on creative archaeological visualization. The layout of the resulting has been specifically designed to accentuate the visual elements of the survey—and the ethos of creative archaeological visualization is evident throughout, most obviously in the experimental combination of geometric mesh overlain by pencil drawing.

**Figure 1: The Neolithic rock art at Ballochmyle extends over three vertical panels on a cliff face overlooking a tributary stream of the River Ayr. © Forestry Commission Scotland by AOC Archaeology**

**Figure 2: The detailed and comprehensive pencil drawing prepared by the RCAHMS (Ian G Scott and John Stevenson 1986). Crown Copyright: Historic Environment Scotland**

**Figure 3: This oblique visualization of the third panel (which measures about 9 m in length) shows the high resolution geometric mesh (created using both laser scanning and photogrammetry) overlain with the RCAHMS pencil drawing. The technique provides enhanced visual depth to the traditional illustration. Copyright Forestry Commission Scotland by AOC Archaeology and Historic Environment Scotland**

**Figure 4: This rectified high resolution geometric mesh of the third panel at Ballochmyle presents the objective record visualised with simulated raking light. Copyright Forestry Commission Scotland by AOC Archaeology**

**Figure 5: This local relief model of the third panel uses a red-white colour ramp (above), with the same data presented with the colour ramp inverted (below). Copyright Forestry Commission Scotland by AOC Archaeology**

**Case Study 25**  
**The Kelsae Stane**  
**Katherine Forsyth**

The 'Kelsae Stane' is a massive 33-tonne block of worked Indian basalt which was installed in a prime location in the historic square of Kelso, Roxburghshire, in July 2014 (Sutherland 2014). It is the work of local sculptor, Jake Harvey, Emeritus Professor of Sculpture at Edinburgh College of Art, winner of the competition to design a piece of public art which reflects what the word 'Kelso' epitomizes for local residents. Harvey spent several months quarrying and shaping the very hard stone, working with itinerant stone-carvers in Mamallapuram (Tamil Nadu, India), an ancient port with a tradition of stone quarrying and sculpture, dating back to the 7th century. The form of the block mimics that of the cobblestone setts with which Kelso's square is paved. The rough vertical faces of the block are incised with a map of nearly 200 local place names reproducing the handwriting in which local inhabitants wrote the name of their village or farm. Harvey has a particular interest in traditions of hand-carving stone around the world ([Stone Project](#)) and hand tools were an important part of the project. The traces left by such tools, are 'indexical marks' of the sculptors and masons who used them (in patterns as distinctive as handwriting). The simple, yet striking monument speaks to this and a number of other themes, including materiality, place, memory, language, identity, individuality and community.

**Figure 1: The Kelsae Stane © Simon Taylor**

## Case Study 26

### Iona Abbey and Kirkmadrine

Adrián Maldonado

HS recently redisplayed two collections of early medieval carved stones, at the major ticketed site of [Iona Abbey](#) and the smaller site of [Kirkmadrine](#) in Galloway. In advance of this, Katherine Forsyth and Adrián Maldonado (University of Glasgow) were commissioned to produce a research report for each site. Despite the differences between the two sites, there are some key themes that emerged from this research.

The first is the importance of documenting the biography of each stone. On Iona, this was extremely difficult given the size of the collection (108 stones) and the amount of unrecorded antiquarian activity on the site. However, it was clear the vast majority of the stones came from three main clusters: [St Columba's Shrine](#), the [Relig Odhráin cemetery](#) and [St Ronan's Church](#). This is interesting as there are several known burial grounds on the island, and it seems most of these had little or no early sculpture. It shows that only a privileged few could expect to be commemorated with an individual grave marker, and the presence of early sculpture is instead strongly linked to the presence of a church.

At Kirkmadrine, only two of 13 stones were certainly found off-site, but the biography of the collection as a whole shows the importance of conservation *in situ*. Three 6th-century Latin-inscribed stones were reused as gateposts as late as 1840 after residing there for over 1000 years, while several others were used in the 19th-century enclosure wall and field dykes in the vicinity. Once their significance was recognized, they were sought out and gathered into a purpose-built porch attached to the west end of the kirk by architect William Galloway in 1890, making this one of the earliest public displays of early medieval sculpture in Scotland.

Another important theme which emerged from this research is attention to materials and materiality. The sourcing of stone may have been as significant as its ultimate destination. On Iona, we were able to match several stones from distant sources—including the Western Isles, Colonsay, Lismore and the Isle of Man—to a Viking-Age context, revealing a distinctive practice of 'gifting' stone to Iona from a period when the monastery was supposedly in decline due to Viking raids.

At Kirkmadrine, all the stones seem to be from local sources, but the three large Latin-inscribed stones stand out as being smooth, water-worn pillars while the later sculpture is carved from rough and ready blocks. It is possible the early stones had been chosen for their specific look and feel. Similarly, on Iona, the most commonly used stones are mica schists and granites, despite the availability of sandstone from Mull which is easier to carve. On closer inspection it is highly likely these obstinate geologies were chosen for their glittering, almost metallic appearance.

This research has shown that the importance of carved stones is not always in their artistic form, but in the way people in the past engaged with them, and how this could change over time.

**Figure 1: Individual chisel marks still visible on Kirkmadrine 8 (Ardwell House). © Adrián Maldonado**

**Figure 2: Displayed to best advantage: the new display of early medieval and later medieval sculpture at Iona Abbey museum won an industry award for its innovative lighting which reveals to the viewer not only fine details of the carving but also the colour and other qualities of the stone itself. Crown Copyright: Historic Environment Scotland**

## Case Study 27

### Investigating our carved stone heritage: resources to support learning and engagement

Fiona Davidson

Historic Environment Scotland (HES) cares for some of the most important carved and sculptured stones in Scotland ranging from the later Neolithic and Early Bronze Age rock art of [Achnabreck](#) in Argyll and Bute to the 16th-century tomb in [St Clements](#) Church on Harris. They include the Pictish collections at [Meigle](#) and [St Vigean's](#) Museums, early Christian stones and high crosses on [Iona](#), the later medieval carved stone fragments at [Elgin Cathedral](#) and many more individual stones across Scotland (Figure 1).

These stones represent a valuable learning resource that can support Curriculum for Excellence in schools. Carved stones can be used for the study of relevant past societies such as the Picts in Angus or Christianity on Iona as part of Social Studies. But there are also opportunities for a cross-curricular approach that supports learning outcomes in e.g. Religious and Moral Education, Literacy, Expressive Arts and Technologies while also delivering on overarching themes such as Outdoor Learning and Creativity. The potential links between the techniques used to create carved stones and the traditional skills required by HES in the conservation of sites supports learning about the World of Work (Figure 2).

The HES Learning Team provides support materials and resources to encourage the use of carved stones as a learning resource. *Investigating Early Carved Stones*, available in PDF form, aims to help teachers make the most of carved stones as a way of finding out about the societies who created them. Covering the prehistoric, Pictish and early Christian periods, with background information and questions to encourage investigation of the stones, it allows planning for self-directed visits to sites with suggested activities to try before, during and after the visit (Figure 3).

*Investigating* PDFs are also available for a range of individual stones including [St John's Cross, Iona](#) and [Sueno's Stone](#), Moray.

In addition, object handling boxes have been developed to support learners visiting the collections at Meigle and St Vigean's Museums. These provide an opportunity for a hands-on experience—holding a replica of a 'Pictish mirror', a symbol commonly found on stones, can create a link between modern-day life and a society from the past that may seem too distant to relate to. Support materials to accompany the boxes, *Investigating Objects from the Past: Pictish Life*, are available in PDF form (Figure 4).

The latest addition to the suite of handling boxes provides learners with a more modern hands-on experience. *Faces of the Past* is being developed to complement the recent redisplay and interpretation of the medieval carved stones at Elgin Cathedral. Using 3D technology, 11 3D prints and three full-sized casts of specific stones have been created to allow groups to handle actual size versions of the stones while also finding out about the technologies used by HES to record, conserve and interpret the carved stones being cared for (Figure 5).

HES materials related to carved stones in Scotland are available to download for free from the <https://www.historicenvironment.scot/learn>.

**Figure 1: Replica of St John's Cross, and St Martin's Cross, Iona. Crown Copyright: Historic Environment Scotland**

**Figure 2: Pupils discover the skills involved in stone carving. Crown Copyright: Historic Environment Scotland**

**Figure 3: Investigating Early Carved Stones resource. Crown Copyright: Historic Environment Scotland**

**Figure 4: Replica of Pictish mirror from *Investigating Objects from the Past: Pictish life* handling box. Crown Copyright: Historic Environment Scotland**

**Figure 5: 3D prints and casts of the carved stone fragments at Elgin Cathedral. Crown Copyright: Historic Environment Scotland**

## Case Study 28

### Information management and online discovery

Peter McKeague

Carved stones are recorded by a range of bodies across Scotland each assigning their own identifiers for individual stones or collections of stones. Ideally each stone should have a persistent unique reference in online portals, with managed links to related resources, allowing researchers to move seamlessly between museum catalogues, Historic Environment Records and Canmore.

#### *Terminologies*

Nationally agreed definitions for monument or object types enable users of online resources to search and discover information about the sites, objects and collections published online. Users can discover how many records are classified as a CROSS, an OGHAM INSCRIBED STONE or as a PICTISH SYMBOL STONE based on nationally agreed terminologies. However this has limitations, while a user may be able to find 352 PICTISH SYMBOL STONES, they cannot discover how many are classified as CLASS I or CLASS II or have a particular type of symbol. There is a need for better and more flexible indexing.

Each of the terms has been defined and published online through <http://heritagedata.org>, establishing persistent web addresses (URIs) for each concept so that it is explicitly defined. The approach offers greater flexibility than simply defining the term as in a dictionary. It allows users to map local terms to a *concept* and even manage multi-lingual expressions of the same concept. For instance <http://heritagedata.org/live/schemes/1/concepts/1558.html> expresses the concept for 'A stone bearing an inscription in the ogham alphabet, in which the letters are represented by lines or notches along an edge or angle'. This may be labelled in English as 'OGHAM INSCRIBED STONE' and expressed in Scots Gaelic as 'CLACH OGHAM'. The concept may then be mapped to other persistent online URIs including the DBpedia: <http://live.dbpedia.org/page/Ogham> to construct a network of machine-readable resources.

With internationally agreed terminologies, and appropriate web services and protocols in place, cross-searching online resources offers new opportunities to search seamlessly across institutional resources and effortlessly integrate the results into other systems. For example, it should be possible to produce a distribution map of all ogham stones in the British Isles sourced from national and local inventories, regardless of the variation in classification terms (Figure 1). At present, however, assuming the data is online and indexed, a researcher must search each data provider individually and either copy or download the relevant details for reuse.

The aspiration is clear: information needs to be more detailed, in more accessible, machine-readable formats to enable researchers to explore connections between resources and develop new insights and narratives into the common heritage of Europe, whether it is Neolithic monumentality between Scotland and Ireland, or common early medieval themes such as the spread of Christianity and the impact of the Vikings

**Figure 1: Distribution map of early medieval ogham stones based on searches of online national databases in Ireland, Northern Ireland, Scotland, England and Wales (McKeague and Thomas forthcoming. Sampled 18 December 2015). Data is derived from multiple sources: © Historic Environment Scotland; © Crown Copyright RCAHMW; © Historic England; © NIEA; © Copyright Government of Ireland**

## Case Study 29

### Community engagement with rock art: the Northumberland and Durham Rock Art Project

Tertia Barnett

Prehistoric carvings (cup-and-ring markings) are believed to date mainly to the late Neolithic and early Bronze Age (c. 2900–2000 BC). Over 6000 examples of this type of carved stone are known, of which over a third are found in Scotland. Although the carvings have endured for several thousand years, they are continually eroding. Many have also disappeared through human agency, and those that survive are threatened by human impact on the landscape. Public awareness of the carvings is low, and only a small number are legally protected. Capturing and sharing detailed information about the carvings and their setting is crucial for future understanding, research and conservation management.

In 1999, English Heritage (EH) commissioned the Rock Art Pilot Project (RAPP) to assess the state of the carvings. The RAPP concluded that rock art is poorly understood and undervalued, and made recommendations for future improvements. This led to the launch, in 2004, of the Northumberland and Durham Rock Art Project (NADRAP). NADRAP aimed to work in partnership with local people to develop a standardised recording methodology, and establish a comprehensive and consistent digital database. The project presented an exciting opportunity for community co-production of a resource that would benefit future research and heritage management, while raising public awareness.

Over 50 volunteers were recruited through local publicity. Following extensive training, participants were split into teams, each covering a specific geographical area. Teams were tasked with testing recording methods, including techniques such as low-cost 3D data capture (photogrammetry), and compiling data for all the 1400 carved panels in Northumberland and County Durham. Teams were also responsible for data management and upload to the digital archive.

Through their dedication and enthusiasm, NADRAP participants generated a consistent recording methodology, a detailed database for all the known sites in the region, and a national rock art website with online access to the England's Rock Art archive ([ERA](#)). A key component of the recording methodology was to assess current condition and potential threats to each rock art panel for informing conservation management strategies. Consequently, a number of high-risk sites were added to the list of scheduled monuments, and land managers were advised on best practice. Although no formal long-term monitoring scheme was instigated, several participants took on the role of checking sites. The project also had an important intangible legacy. Many participants became self-appointed rock-art 'ambassadors', raising awareness locally through guided walks, talks, publications and exhibitions.

NADRAP was pioneering in several respects: forging a new dynamic between communities and heritage institutions in which local people assumed a pro-active role in research and awareness-raising; trialling the use of specialist techniques by communities; focussing public and institutional attention on the rock art; and establishing a national archive for public access, research and heritage management. The work of NADRAP has since been extended through initiatives such as Carved Stones Investigation: [Rombalds Moor \(CSI\)](#).

**Figure 1: NADRAP recording at Gled Law. © Tertia Barnett**

**Figure 2: NADRAP Team 2 at work at Glantlees. © Tertia Barnett**

## Case Study 30

### HES Canmore Early Medieval Sculpture Upgrade Project

Iain Fraser

Records of early medieval sculpture in the online Canmore database comprise locational information, textual information derived from field survey, published and manuscript sources, and a range of archival material in both physical and digital format, including field notes, sketches, measured drawings, photography and rubbings.

Derived from many sources, the records for early medieval sculpture take a variety of forms. These range from individual site records for single stones, such as the [Picardy Stone](#), to complex sites, such as [St Vigean's](#) and [Meigle](#), where each individual stone is sub-numbered from a main site. In each case, each site or sub-site is linked to the appropriate archival material. In contrast to these are some sites, where a large collection of stones, such as [St Andrews Cathedral](#) Museum, is attached, undifferentiated, to a single site. This lack of standardisation forms an impediment to navigation of the record, and the retrieval of appropriate information. Equally, the text attached to sites can be of variable quality, ranging from a detailed description of a stone's physical appearance to a lack of any text.

Aware of the shortcomings of its records, in 2012 RCAHMS (now HES) moved to set its house in order by standardising and upgrading its records for early medieval stones. The first stage comprised a comparison of Canmore with the basic listing of early medieval sculpture compiled by Mike Spearman of the NMS, with the aim of ensuring that an entry for all stones existed in the database. This involved the standardisation of individual existing site records, and the creation of new, individual records for stones where individual records did not yet exist. As of March 2016, this phase of work is 56% complete.

The second phase of the project involves the upgrade of all appropriate archival material, and its migration, where necessary, to the new individual sites records. The third phase comprises the creation of a basic, standardised, descriptive text for each stone, based upon the model of the *Corpus of Anglo-Saxon Sculpture*, written by Anna Ritchie (see Canmore upgrade example: Case Study 4).

In parallel, field recording by RCAHMS, and now HES, continues, providing high-quality imagery: currently some 46% of stones have been recorded by side-lit photography and 75% by measured stipple drawings.

Externally generated material is also being added constantly to the record and, where possible, is digitised and made available online. Together, this digital resource can provide an information hub: this can take the form of a portal dedicated to early medieval sculpture, upon which other specialists and communities can build, adding their own specialist knowledge, resource and interpretation.

## Case Study 31

### The value of metric drawing

Ian G Scott

The [Ballochmyle](#) study of cup- and ring-marked rocks by AOC Archaeology group in 2015 for Forestry Commission Scotland at last provides us with an excellent demonstration of the comparative values of drawing, 3D laser scanning and photogrammetry (see Ballochmyle: Case Study 24). However, even if we can afford to develop the results of laser scanning further, we must still concentrate resources on the training of personnel skilled in the interpretation of observations and in the methods of recording. As with botany, surgery and architecture these observations are expressed most readily by drawing, in the first instance using pencil and pen. One particular use of drawing can be demonstrated by reminding ourselves how this method of recording carved stone fragments is not only academically useful, but encourages the reconstruction of easily understood representations of how fragments would have worked together in the past.

Trained draughtspersons can combine information from many sources to record what has been observed. These sources include written notes and comparisons with other carved stones. As a result new conclusions can be reasonably based on this graphic record, which I have called a visual index or inventory. I would suggest that the first priority of research on medieval carved stones should consist of comprehensive scaled, measured drawings of elevations of all fragments supported by photographs and 3D scans, where these are available. Below I give some examples of where closely observed metric drawings in pencil and pen has led to new discoveries or changed interpretations.

Examples of drawn reconstruction:

- [St John's Cross, Iona](#): While most fragments had already been identified, two new ones were added because they were recorded using a consistent technique during a comprehensive review (RCAHMS 1982). One of these was the cross's central boss, previously disregarded.
- [St Matthew's Cross, Iona](#): A previously unnoticed fragment was drawn and subsequently seen to be the arm of this cross through comparison with an early engraving.
- [St Oran's Cross, Iona](#): Fragments were already identified, but now have been drawn together. These three crosses now form an impressive centrepiece of HES's site museum.
- [Nigg](#) cross-slab: A new fragment was incorporated in a drawing used to reconstruct the slab, and from a newly found drawing of 1822 we should be able to add more detail to the drawing in the future.
- [Hilton of Cadboll](#) cross-slab: I had already drawn the upper portion housed in the NMS when the lower portion was excavated along with its many thousands of fragments. These, if drawn in detail, could be added to the original drawing to define as much as could be reconstructed of the whole.
- [Forteviot](#) fragments: After the collection on site was recorded and drawn they were re-interpreted as belonging to three crosses, one using an existing cross-base. Subsequently the SERF project has instigated their display (see Cradle of the Scots: Case Study 19).

**Figure 1: The front face of the Hilton of Cadboll cross-slab, reconstructed from some of its many fragments by Ian G Scott. Crown Copyright: Historic Environment Scotland**

**Figure 2: Ian G Scott working on the Nigg cross-slab. Crown Copyright: Historic Environment Scotland**

## Case Study 32

### The Stone of Scone

David H Caldwell

As part of a programme aimed at improving the exhibition of the Stone of Scone in Edinburgh Castle the writer was invited in 2015 to review what is known about it. It is an object that has been much written about, especially since its recent return to Scotland, but there are surprising gaps in our understanding, some of which can be attributed to a lack of accessibility to the Stone itself. Here we will focus on what the actual Stone itself can tell us. The writer has been assisted in this process by a new report on the Stone by Peter Hill, a stone and historic buildings consultant, updating the original survey he contributed to the Society of Antiquaries of Scotland monograph on *The Stone of Destiny, Artefact & Icon* (Welander *et al.* 2003).

There can be no reasonable doubt that the Stone now displayed in Edinburgh Castle is the Stone used in inauguration ceremonies of Scottish kings that Edward I of England had removed from [Scone](#) in 1296 and taken to Westminster Abbey as a trophy of war. It is also clear that it is of a type of sandstone that comes from the vicinity of Scone. That still leaves major questions that we might hope that a detailed study of the object itself might solve:

- how old is it?
- how was it used?
- has it always been used in the same way?
- has it been altered since it was taken from Scone?

At the time of writing in March 2016 the author is not sure what his final answers to these questions will be but hopefully the following comments will help explain how research on this iconic option can be advanced.

Unfortunately, there are no options for scientific dating of the Stone. Possible prehistoric cup-marks on its front face appeared to suggest that its ritualistic credibility was grounded in very ancient times, but after careful analysis and advice from an expert on prehistoric carvings it seems probable that these cups should be interpreted as the result of medieval and later vandalism. When and why the Stone was first cut from the living rock will remain unknown.

The Stone was used as a ceremonial seat for kings of Scots. Documentary evidence suggests that it could have been incorporated in an actual throne, and that is surely what should be deduced from its thickness. With a height of only about 26.5 cm it would have had to have been positioned well off the ground for the king to sit on it with any dignity.

The way it was placed or incorporated in a throne for royal inaugurations in Scotland may have changed with time, and there are areas of damage and wear which may relate to changing use and how it was extracted and carried off to Westminster. There are cut marks made with a sharp blade which may relate to ritual events.

A key area of difficulty is identifying to what extent the Stone has been altered since its removal from Scone. Has it been cut down by the English from a larger stone in order to fit in a predetermined space in the chair commissioned for it by Edward I? Do the iron staples and rings at both ends relate entirely to efforts by Westminster Abbey to prevent the Stone being removed in the 1320s or were they already features of the Stone when it left Scotland? There are compelling arguments both ways.

**Figure 1: The Stone of Destiny in the Coronation Chair in Westminster Abbey, 1875. A.D. White Architectural Photographs, Cornell University Library, Accession Number: 15/5/3090.00976, Creative Commons**

### Case Study 33

#### Rodney's Stone, Brodie Castle: weaving together conservation, art and education

Shannon Fraser

[Rodney's Stone](#) is a Pictish cross-slab in the grounds of [Brodie Castle](#), Moray, in the care of the NTS. The monument's original site is unknown, but at various times since its creation it has occupied at least four different locations, picking up along the way a commemorative function connected to the 18th-century naval hero, Admiral Sir George Rodney. Its placement in its current position in the 1830s, alongside one of the estate's new, picturesque entrance drives, fit into a wider, contemporary phenomenon in which antiquities were introduced into landscaping schemes as contemplative foci, embodying Romantic philosophical conceptions of the historical past and its relationship to place and landscape.

In 2005, a severe winter storm blew down a spruce plantation which had been planted to within 10 m of the monument; it also destroyed a timber shelter which had covered the stone since the 1970s. This provided an opportunity to revisit the monument's conservation, presentation and interpretation strategies. Due to the particularly resilient nature of the sandstone the monument can remain in its current location without a replacement shelter providing there is no change in climatic conditions. However, given concerns about climate change, 3D laser scanning was undertaken to create an accurate record of the carvings and to act as a baseline for monitoring erosion into the future.

Replanting using native broadleaved trees, at a greater distance from the cross-slab, allowed it more space to breathe and greatly improved both aesthetics and conservation conditions. Since the new woodland would take some 15 years to give renewed protection against the prevailing wind, the potential for increased erosion was mitigated by providing a temporary windbreak. A dried willow screen was chosen for this: among other positive considerations, the textures and colours of natural materials blend in well with the surrounding countryside, and the screen will degrade naturally over time. Created by artist Jon Warnes, the sinuous form of the windbreak mimics the curlicues of the Pictish beasts and sea monsters depicted on the stone; the latter are also reflected in the openwork designs woven into the screen, which permit glimpses of the cross-slab from the woodland trails approaching the site. Pleasingly, the withy-weaving craft technique used would be entirely familiar to the communities for whom the monument was created. So as not to overwhelm the monument, the height of the windbreak decreases at either end, with the area immediately behind the stone deliberately plain.

The screen has been a catalyst for a wide-ranging programme of activities using art as a medium for educating and involving people in heritage conservation. Local primary school pupils wove 50 willow 'Pictish beasts' to lead visitors along the woodland path to Rodney's Stone—as a result, the school chose to centre a full term's curriculum on a Pictish theme. The intimate, yet theatrical space created by the screen has been utilized for storytelling and for the première of a traditional fiddle composition inspired by the monument's biography; in turn a Scottish country dance is being choreographed to this new music, adding yet more layers to the meaning of Rodney's Stone.

**Figure 1: Rodney's Stone with sculptural willow screen. © S M Fraser/The National Trust for Scotland**

**Figure 2: Traditional fiddlers perform new music composed for Rodney's Stone by Paul Anderson. © S Morrison/The National Trust for Scotland**

## Case Study 34

### Graffiti: meaning and value in the context of carved stones

Mark Hall

Graffiti (singular, 'graffito') covers a wide range of inscribing and incising techniques whereby inscriptions, symbols and pictures are scratched into a surface; the meaning has been extended to cover surface marking, through paint, chalk etc where the intent is informal and unofficial. Until comparatively recently it has been regarded as a marginal, defacing act, coloured by perceptions of vandalism in recent centuries, rather than the many more centuries when graffiti were accepted as a legitimate means of public expression, comment and even supernatural invocation. Thus graffiti's value in adding layers of biographical meaning has been neglected. There are notable studies of specific sites with historical graffiti (Anderson 1900; Pritchard 1967; Barnes 1994; Lowe 2008) but latterly more systematic surveys and theoretically informed studies have begun to be undertaken (Blindheim 1985; Bushnell 1990; Fleming 2001; Oliver and Neal 2010; Kupfer 2011; Hall 2012c; Champion 2015). There remains a perceptible, conservative boundary between the value ascribed to what is considered historical graffiti and that ascribed to modern graffiti on historical monuments and contexts (such as at [Fowlis Wester](#), Perth and Kinross, Figures 1 and 2). This split between historical and modern graffiti is problematic: all graffiti is of its moment and historical. The popularity of graffiti-artist Banksy, and the 2016 decision by English Heritage to list graffiti made by the Sex Pistols, show that a more holistic view is gaining ground.

There is no comprehensive and systematic study of the Scottish evidence. Existing studies to date include early medieval sculpture bearing modern graffiti (Hall *et al.* 2011; Hall 2012a; Hall 2015a; Hall and Scott forthcoming). Some of these graffiti are of amorous intent and such incisions of intention and desire have parallels with much older graffiti, including for example the early medieval corpus at the Neolithic tomb of Knowth, Ireland (Byrne 2008, 90; Swift 2008, 123) and the mid-12th century Norse graffiti at the Neolithic tomb of [Maeshowe](#), Orkney (Barnes 1994). Several of these are sexually explicit. Graffiti express the idea that something is important, sufficiently so to be written down or otherwise depicted. It acts as a testimony of bodily presence in a place; as a memorialization of an event, a feeling or an idea and, in devotional circumstances, as a ritualized incision of devotion. Holy or sacred objects and spaces can be incised with graffiti about everyday life, thus appropriating that sacredness in support of one's secular life (Plesch 2002, 181).

In Scotland, for example, early medieval sculptures at [Upper Manbean](#), [Over Kirkhope](#) and [Govan](#), for example, were reused as modern graveslabs. Characterised in *ECMS* as simply defacement, they signal much more (Allen and Anderson, 128–9, 431–2, 467–72). It is possible that even those marked only with initials indicate appropriation for commemoration by members of the community unable to afford more than a pauper's grave for their kith and kin. Such graffiti have been more or less ignored as unwarranted interference with their respective monuments. But more recent archaeological approaches to graffiti (Fleming 2001; Oliver and Neal 2010) have both confirmed its wide temporal range (almost as old as 'writing' itself) and its social value in articulating non-mainstream voices and how they both inscribe against the cultural 'norm' and use that norm to endorse their counter-cultural statements.

**Figure 1: Fowlis Wester standing stone with left to right, medieval cross and modern inscriptions (centre and right).  
Copyright Mark Hall**

**Figure 2: Fowlis Wester standing stone with neat panel of modern graffiti. Copyright Mark Hall**

## Case Study 35

### Buried tombstones

Susan Buckham

The Moray Burial Ground Research Group's (MBGRG) [project to record buried gravestones](#) illustrates how collaboration between amateurs and professionals can find ways to safeguard stones that simultaneously optimise benefits for understanding, accessing and engaging with them.

Between 2002 and 2006, volunteers from the MBGRG worked with the Carved Stones Adviser (see Graveyard recording, Case Study 3) and conservation specialists at HS to create a method to locate and record subsurface gravestones in graveyards in a manner sensitive to conservation and heritage management needs. This included designing and building special equipment to locate stones without causing damage to stonework. MBGRG's aim was to create the fullest possible record of the genealogical information contained in Morayshire graveyards. Previously the Group had completed buried stone recording at several undesignated burial sites but were initially refused permission by HS to carry out work in a churchyard with scheduled monument status.

The Carved Stones Adviser's fundamental role was to enable better access to historic graveyards for communities while raising awareness of conservation issues and good practice. The wider work of the Carved Stones Adviser encountered several examples of tensions between the priorities and interests of local groups and national heritage organisations. These included communities' perception that engagement by heritage professions was tokenistic and did not appropriately recognise the skills and knowledge of amateurs (Buckham and Dakin 2007, 25, 29). There was a sense that little active conservation was taking place yet gravestones were decaying rapidly and the efforts of family history societies and other local groups to preserve information by record were being thwarted by recommended good conservation practice, which for example, advised against cleaning stones.

Several members of staff at HS saw collaboration with MBGRG as a positive opportunity to encourage and approve good practice in the course of legitimate research and to limit the potential risks to historic stonework and archaeology. Equally it was acknowledged that while HS had a locus of authority over amateur work, this was limited to scheduled monuments and the vast majority of graveyards were not scheduled sites. At the same time, however, at an organisational level HS was influenced by the legacy of an institutional culture that hesitated to support non-professionals to undertake work involving ground disturbance, without supervision, at nationally important archaeological sites.

In this instance, collaboration resulted in agreed protocols that allowed volunteers to retrieve information from gravestones buried beneath a shallow layer of turf (approximately 15 cms) in a manner than mitigated against damage to stonework and archaeology. Heritage professionals were additionally reassured by the consensus that a buried tombstone project should be considered as an 'one-off opportunity' at any given site. Once a complete and accurate record was made stones would be re-turfed for their protection. Results would be published and publicly archived to contribute to wider knowledge. This approach established new guidance but also adopted existing good practice, for example for securing appropriate permissions, safe working practices and legal responsibilities. MBGRG shared their expertise with others through a published handbook and peer training. In 2005 the MBGRG were granted permission to carry out buried tombstone research at a scheduled graveyard site ([Birnie Churchyard](#)), where they had previously been refused access (Figures 1–4).

**Figure 1: Birnie churchyard, General view of buried tombstone work showing probes and plastic tools. Copyright Bruce Bishop**

**Figure 2: Birnie churchyard, stone dated 1604 after very careful cleaning. Copyright Bruce Bishop**

**Figure 3: Birnie churchyard, recumbent tombstone commemorating the Russel family (major farmers in the area) dating from 1691, depth 12 cm, required very careful and extensive cleaning. Copyright Bruce Bishop**

**Figure 4: Birnie churchyard, line of worn 17th-century tombstones near to the foundations of the old church before detailed cleaning. Some partially visible inscriptions. Almost on the limit of permitted excavation depth at 15 cm. Copyright Bruce Bishop**

## Case Study 36

### Wemyss Caves

#### Marcus Abbott

The Wemyss Caves heritage site in Fife is a stretch of coastline of approximately 800 metres running NE from the village of East Wemyss to the village of Buckhaven. Among the many sea caves along this part of the coastline, the caves at Wemyss are unique because they contain the highest concentration of Pictish cave carvings in Scotland. These caves and the rock art within them are very vulnerable to erosion from the encroaching sea, but also from human damage, which over the years has ranged from air gun target practice, general graffiti modification and even fire damage caused by two burnt-out cars.

In 1986 the Save Wemyss Ancient Caves Society (SWACS) was formed to raise the profile of this heritage site on a national and international stage and to provide information and educational experiences for visitors and local people in the area. SWACS teamed up with Scottish Coastal Archaeology and the Problem of Erosion (SCAPE) project, and together they commissioned York Archaeological Trust (YAT) to work with them to realise their vision of utilising new and emerging technologies to record the carvings within the context of the caves and shoreline.

In 2013 a pilot project recorded the carvings within [Jonathan's Cave](#). YAT laser scanned its external and internal structure and undertook more detailed surveys of the carvings using a structured light scanner, which recorded surface details at a sub-millimetre level. Convergence photogrammetry was also employed to record the carvings at a sub-millimetre level and Reflectance Transformation Imaging (RTI) was utilised to help visualise and analyse the carvings in detail. The use of multiple techniques and technologies on the same subject provided a sound data set for comparing the relative effectiveness of each technology.

Equally as important as the survey was the concept of taking these rich 3D data and creating a new online database and interactive virtual reality (VR) website. The interface for this was developed specifically to allow an online visitor to explore the cave and interact with the 3D data directly. An online RTI viewer embedded within the web pages allows users to 'shine a virtual torch' on the rock surface and use the raking light to help reveal the carvings in unprecedented detail. Users of the website can also access videos of local stories about the caves as told by local people as well as videos detailing the techniques and technology utilised in the project.

As a result of the successful pilot, YAT was commissioned to fulfil the grand vision of recording all of the Wemyss caves. As part of this vision, local volunteers were taught how to collect RTI data and they proceeded to collect all of the data for the remaining carvings. An enhanced website will host the complete dataset and a VR portal will be available free online to anyone who wishes to discover the caves of East Wemyss: <[www.4dwemysscaves.org](http://www.4dwemysscaves.org)>.

This project was funded from multiple sources which include Historic Scotland, Fife Council and the Heritage Lottery Fund.

**Figure 1: 3D Digital mesh model of Court Cave. © York Archaeological Trust**

**Figure 2: The online explore interface for Jonathan's Cave. © York Archaeological Trust**

## Case Study 37

### Condition monitoring at the rock art at Ormaig

Matt Ritchie

The well-preserved Neolithic rock art at [Ormaig](#) in Argyll and Bute was recorded by high resolution sub-millimetre terrestrial laser scanning in both 2007 and in 2014. The survey and recording programme was undertaken by AOC Archaeology and aimed to investigate the potential for comparison analysis between datasets collected several years apart, in order to allow stone weathering and erosion to be detected and accurately monitored over time (AOC Archaeology Group 2014).

Following the collection of comparable direct-measurement data, significant changes to the site were noted, largely due to moss and lichen growth over the exposures caused by the removal of the surrounding conifer plantation (which had previously provided a protective screen). The resulting exposure of the rock panels led to considerable lichen and moss growth, to the extent that some carvings were entirely covered.

This had a direct effect on the results of the laser scan survey. Very black lichens meant that it was difficult to obtain a good response from the laser during scanning, with the consequence that data voids were unavoidable. It also caused difficulties in carrying out point cloud-to-point cloud registration between the 2007 and 2014 datasets, meaning that useful surface-to-surface comparison analysis was only possible in a few key areas. Subsequent careful cleaning of the panels successfully removed much of the lichen and moss growth.

The photogrammetric meshes, while lower resolutions, provide a valuable additional source for illustration and are comparatively easy to produce, requiring much less processing than laser scanned data. While high-resolution sub-millimetre laser scanning provides exceptional detail, the various associated logistical challenges mean that photogrammetric solutions are more practical for recording most rock-art sites. It is clear that any wider programme of rock art recording (including multiple sites in the wider landscape) should probably utilise photogrammetric recording techniques.

However, archaeological measured survey provides more than just a foundation to inform conservation management. It is a visibly impressive method of effectively demonstrating and confirming the importance of a site to land managers and visitors. The work at Ormaig highlights and confirms the significance of the site through research and communication—and this has a trickle-down effect towards the wider historic environment. Through the visible act of archaeological survey, the importance of the wider historic environment is confirmed and enhanced.

**Figure 1: Recording Exposure 1 South using a Faro Platinum Arm with laser line probe under a protective canopy. High resolution sub-millimetre terrestrial laser scanning systems are typically susceptible to variable exposure conditions, with strong lighting a particular problem; during the 2014 survey a lightweight tent was used to provide shade for the scanning operations. © Forestry Commission Scotland by AOC Archaeology**

**Figure 2: Exposure 1 South, geometric mesh illuminated from top left, showing the location of the surface-to-surface inspection map. Copyright Forestry Commission Scotland by AOC Archaeology**

**Figure 3: Exposure 1 South, surface-to-surface inspection map between 2007 laser scan data and 2014 data, showing some differences in cup and ring depth in the smaller cups. The 'rosette' carving shows some evidence of variation in the ring depth of up to 1mm. Copyright Forestry Commission Scotland by AOC Archaeology**

**Figure 4: Exposure 1 South, detail during cleaning using a medium bristled brush. The area to the right is an example of unchecked lichen growth; the area left has been carefully cleaned. Subsequent conservation management advice was to ensure the site is strimmed on a regular basis (keeping it exposed to the air and less damp); and to brush it each year (to repress black lichen growth). Regenerating tress will also be removed. Copyright Forestry Commission Scotland**

**Figure 5: Exposure 1 South, oblique view of a detail from the geometric mesh. Two of the 'rosette' motifs are shown using simulated raking light and a juxtaposition of real colour texture (recording lichen growth) and greyscale depiction (allowing detailed observation). Copyright Forestry Commission Scotland by AOC Archaeology**

## Case Study 38

### *The Picts: a learning resource*—an inclusive approach to integrating archaeology and the *Curriculum for Excellence*

**Matt Ritchie**

The FCS learning resource [The Picts](#) was developed in collaboration with Highlife Highland (Highland Council's Museum and Gallery Service), Archaeology Scotland, Scran and HES's Learning Services. It aims to support indoor classroom and museum learning and to encourage visits to Pictish symbol stones and hillforts local to the school. Several of the best examples of Pictish hillforts are situated on Scotland's National Forest Estate. By providing broader information and ideas within an inclusive package (both promoting and promoted by a range of partners), the learning resource becomes a self-sustaining hub with many routes of entry (and many potential champions).

The learning resource encourages the inclusion of archaeology within both classroom and outdoor learning; and to promote the study of the Picts as a formal 'topic' in schools. It summarises a range of new work on the Picts, making it easier for the education specialist to understand and use. The innovative use of illustrative material (created by Small Finds & Design) helps to encourage classroom use, promoting the concept of 'stories in stone' via the attractive reworking of Pictish carvings. For example, this image is instantly recognisable as the story of Little Red Riding Hood (with the Pictish [Ardross](#) Wolf, now in Inverness Museum). The characters and scenes carved on many Pictish stones were probably just as recognisable to the Picts themselves, although their stories are now forgotten. Just who is this mounted horseman, depicted during an exciting deer hunt on the [Kirriemuir stone](#)?

Visiting and understanding a Pictish hill-fort or symbol stone can engender pride of place through an archaeological appreciation of the monument—and Pictish symbol stones are an immediately accessible and very tangible element of our early history. Place-based learning can inform objective recording and subjective interpretation and can also inspire creative writing and a range of arts and crafts projects. For example, a trip to the Eagle Stone in [Strathpeffer](#) can be combined with a visit to the once-mighty nearby hillfort of [Knock Farril](#). In Inverness, a trip to the hill-fort of [Craig Phadrig](#) can be combined with a visit to the Pictish collection in Inverness Museum and the online exploration of national websites such as [Scran](#) (where a number of associated image collections known as *Pathfinder Packages* are available).

*The Picts: a learning resource* has a clear framework for use and attractive design. It forms part of a growing suite of FCS cultural heritage learning resources, including *Wolf Brother's Wildwoods* and *Trees and the Scottish Enlightenment*—all designed to complement the *Curriculum for Excellence*. The free publication is readily accessible, with boxes of hard copies given to local museums. It is also available for download from both the FCS and HES websites.

**Figure 1: Little Red Riding Hood. © Forestry Commission Scotland by Small Finds & Design**

**Figure 2: Kirriemuir Hunt. © Forestry Commission Scotland by Small Finds & Design**

**Figure 3: The Eagle Stone, Strathpeffer. © Matt Ritchie**

## Case Study 39

### Auchnaha cairn in Cowal, and its cross-carved stone

Gilbert Márkus

The Faith in Cowal pilgrimage landscape (see Faith in Cowal: Case Study 12 and [www.faithincowal.org](http://www.faithincowal.org)) contains a number of medieval church and chapel-sites, and a good number of carved stones, both early Christian and later medieval. One early carving of a very small cross at [Auchnaha](#) on the west side of Cowal is particularly interesting. This is not for any aesthetic reason—it is the most modest and superficially the most unattractive of carvings—but because of what it may reveal when we interrogate it about the belief and culture of the people who carved it.

On a hillside covered in a sitka spruce plantation are the remains of a chambered cairn with a crescent-shaped 'forecourt'. The cross is carved on the easternmost stone of the crescent; it is small (18 cm tall, 11 cm across) and shallow, and carved into a very rough surface which makes it hard to find. In 2015 it was even harder to find because the cairn had largely been covered by fallen trees. They had been planted too close to the monument and, having grown to 30 or more feet in height, when they fell they almost completely obscured the cairn for some years. Recently the site was cleared, and Faith in Cowal cut a path through the forestry from the road to the site, marking the route with arrows to guide visitors to the cairn.

While it is hard to imagine a less impressive carved stone, this one has the power to excite the imagination and raises fascinating questions. Why did someone in early Christian Cowal carve such a stone on a prehistoric cairn? Did he or she perceive this as a risky place occupied by dangerous otherworld beings or by the restless spirits of the dead, and so seek protection by carving a cross there?

Or perhaps there is another, more plausible explanation. We know that people in the early medieval Gaelic world regarded prehistoric burial monuments as significant and powerful, treating them as if they contained the remains of their own ancestors. Could the cross have been carved there so that Christ's saving power would embrace the pre-Christian ancestors? We know that the cross was used in other parts of early Christian Europe to 'save' the unbaptised dead. It was in this belief that one couple in 5th-century Gaul buried their unbaptised child and placed a cross beside it, with an epitaph in which they expressed their trust that God 'will give rest to any member lying beneath the noble sign of the cross, and the child will be heir to Christ'.

**Figure 1: The incised cross at Auchnaha (detail). © Gilbert Márkus**

**Figure 2: Auchnaha chambered cairn, with its covering of fallen trees removed in 2015. © Gilbert Márkus**



<http://www.scottishheritagehub.com/content/future-thinking-carved-stones-scotland>

