

Science and Heritage Programme Conference – 30th October 2013

Closing Address:

A Vision for UK Science and Heritage Research – May Cassar

I was invited by my Advisory Board to close this conference with a vision for UK science and heritage research. This is a very personal vision and therefore any views expressed are entirely my own.

When something as the familiar Science and Heritage Programme draws to a close, one can feel a sensation that's like free fall. But this feeling is also liberating, a chance to assess and to look afresh at the future with a renewed sense of anticipation.

But in making what might seem to be a bold attempt at mapping a vision for science and heritage in the UK, it also becomes necessary to check the resilience of heritage science today in order to test the ground on which to build. I will use three measures for this check, asking:

- Do we have well developed political systems supporting heritage science?
- Do we have well developed institutional systems? and
- Do we have well developed technological support for heritage science?

My vision is that within the next decade, heritage science will become as ubiquitous a concept and a reality, as environmental science is today, yet broader in its embrace of subject disciplines.

So in checking the foundation on which to build the vision, the first question I will address is:

Do we have well developed political systems supporting heritage science?

The Science and Heritage Programme has delivered 48 outstanding research projects and honed the skills of 200 researchers. It has raised awareness of heritage science within Parliament both at Westminster and in Strasbourg, in Government including the Department for Business Innovation and Skills and the Department for Culture, Media and Sport and its agencies; it has connected with political systems in Europe particularly the EC in the framing of Horizon 2020. It has looked beyond the present by supporting the creation of the National Heritage Science Forum which by its existence demonstrates how fragmentation is being overcome. This is good for heritage science, it is what policy makers want and this is what we should give them. But while we are joining up, to what extent are the political systems with whom we interact, joined up?

We know that they have one thing in common – heritage science is not high enough on their agenda, so we need to express clearly the arguments that will propel heritage science up their agenda and give them good cause to keep it there. So the answer to this question is that we do have well developed political systems but we need to understand and use them effectively if we are to raise awareness of heritage science among policy makers. Let's consider for a moment the example of The Archaeology Forum. It provides administrative support to the All Party Parliamentary Archaeology Group. The APPAG also has an Advisory

Group formed of archaeologists with an interest in Parliament and advocacy. This could be a pathway to be followed by the National Heritage Science Forum. Another important avenue is responding to Calls for Evidence to Select Committee Inquiries. The House of Lords Science and Technology Select Committee Inquiry on Science and Heritage was an obvious one. However other Inquiries may also be relevant. We await with interest the publication of the House of Lords Science and Technology Select Committee Inquiry Report on Scientific Infrastructure which is due any day.

The second question I should like to address is:

Do we have well developed institutional systems supporting heritage science?

Institutions engaged in heritage science research can be roughly assembled into three groups: (i) universities and research institutions whose main purpose is creating new knowledge through research; (ii) heritage and Gallery, Library, Archive and Museum organisations for whom the presentation and protection of cultural assets is the priority, but also scholarship and research to underpin practice, and (iii) professional bodies and trade associations that represent swarms of SMEs and individual consultants. Industry in its broadest sense has also emerged as a significant research partner during the Science and Heritage Programme with more than 50 business, industry and SME partners engaged in research. The transformation of cultural institutions to make them research ready is underway. As an example, many national museums, galleries, libraries and archives are achieving the status of independent research organisations recognised by the Research Councils. These are

the leading performers. It will be interesting to watch how the relationships among universities and IROs, with common aims but different objectives develop.

Collaboration is the name of the game. One could learn from the example of how universities and teaching hospitals collaborate, known as the Academic-Health Model and to consider how an Academic-Cultural Heritage Partnership Model might work: universities could make equipment infrastructure and expertise accessible to cultural institutions and the UK's galleries, libraries, archives and museums could make their heritage assets and expertise accessible to universities. By formalising the relationship between academic and cultural and heritage institutions, we are likely to strengthen the linkages between cultural heritage practice and the broad academic research and teaching base. This will not only enhance cultural heritage education, training, research and service but also allow better use of increasingly scarce resources. This covers the leading performers of research.

And once we begin to talk about leading performers, we also need to include business. By that I include the suppliers, providers, developers, sponsors and partners in research so that they are engaged in mutually beneficial co-operation. Just as cultural institutions drive the research questions in heritage science, so business and commercial partners should be allowed to seek opportunities to develop heritage markets as their reward for collaboration. We should recognise this as a real contribution that we make to economic growth.

But what of the majority of heritage, gallery, library, archive and museum organisations that cannot compete at such a level because of budgetary

constraints? How can they benefit from the knowledge that results from public and other investment in heritage science? How can we deploy capital intensive resources more effectively? This leads me to my third and final question:

Do we have well developed technological support for heritage science?

Technological support – human, capital and e-infrastructure - for heritage science is not an end in itself and cannot be considered in isolation. The relational context of enhanced technological infrastructure needs to be understood using insights from the socio-economic dimensions of heritage science.

According to official sources, the UK ranks 7th out of 50 nations worldwide for its cultural heritage significance, a key driver of heritage tourism which supports almost half a million jobs. The economic benefits of the UK's major museums and galleries are estimated to be £1.5 billion annually, taking into account turnover and visitor expenditure, while privately owned historic houses generate over £1.6 billion. In total the sector makes a £7.4 billion economic contribution. However all businesses need to invest in order to be sustainable. Heritage tourism requires heritage science capacity in order to maintain the UK's cultural assets and develop new forms of access and engagement with them.

An example of a plan that can increase heritage science capacity is the English Heritage Asset Management Plan for the Maintenance of the Historic Estate (2011-15) that focusses on how English Heritage manages and prioritises the repair and maintenance of the National Collection of

Historic Properties in its care. It forms part of the overarching National Heritage Protection Plan.

Described last year by Ed Vaizey as ‘effectively the business plan for the historic environment’, the NHPP is a major strategy that identifies those parts of our cultural heritage that matter to people most and are at greatest risk, and then concentrates efforts on saving them. Heritage science is one of the essential underpinning elements of the NHPP, fundamentally important to the work of understanding and conservation. Priorities set out in important science strategies across the cultural heritage sector - including the National Heritage Science Strategy and English Heritage’s Science Strategy launched at this conference yesterday - therefore directly support NHPP objectives. And an increasing number of key organisations relying on science to safeguard heritage such as the Heritage Lottery Fund and the Church of England, are participating in the NHPP. Alignment with this strategy is therefore an important first step in making the case for public investment in heritage science.

Cultural heritage is community business. Without time and effort given freely by heritage volunteers, the effectiveness of conservation, education and promotion of cultural heritage would decline significantly. English Heritage estimated that 450,000 adult volunteers contributed to the heritage environment in the UK in 2010-11. Just as volunteers are the lifeblood of the heritage sector, so too can volunteers help to strengthen and spread heritage science. This capacity-building is recognised in the NHPP as another essential support requirement.

Before the Science and Heritage Programme, most research questions addressing issues of cultural heritage were considered as part of activities

that were primarily focussed on an underlying technique or technology. Whilst such an individual approach did deliver some valuable research outcomes, it had huge weaknesses for the development of the hard and soft science skills that the sector needs. After all, it is very important for the applicability of the research, that researchers have a full understanding of the heritage sector and the many complex evolving issues of particular relevance to it. Furthermore, an individual approach offers no route for sustained or strategic engagement among institutions. The Science and Heritage Programme has been a game-changer in developing a highly skilled cross-disciplinary heritage science research community explicitly focussed on cultural heritage needs and experienced at working with a broad range of partners.

This is therefore a unique moment in history to engage in the development of capacity within our sector. We need to recognise and use existing structures and mechanisms, to go with the grain and to make the case for future investment persuasively.

Let us consider again the National Heritage Protection Plan to which we can contribute with advanced heritage science research. We have the newly developed heritage science skills of 200 Science and Heritage Programme researchers with their potential for future growth. There is already a 450,000-strong volunteer community in the independent sector, among local communities and groups involved in protecting and presenting our nation's heritage. What is needed to connect these elements? What additional human and capital resources would enable a health check similar to the English Heritage Asset Management Plan to be accomplished on a national scale?

Let me now concentrate on what I consider to be the two key requirements for building future heritage science capacity and then describe how these two requirements can be fused. Firstly, we need to develop the necessary heritage science skills, ranging from young researchers to heritage volunteers that could enable them to participate in a health check of our nation's heritage. Working with National Heritage Science Forum, I could envisage a volunteer community of citizen scientists being identified and trained in large scale data capture by experienced heritage scientists in our universities, research and cultural institutions, and in industry in order to prepare them to map the current state of cultural heritage. Our aim will be to make more cultural heritage safely available to the visiting public.

Secondly, we need the technological infrastructure to enable this national health check to take place. The renaissance in heritage science research brought about by the Science and Heritage Programme has drawn in its wake investment in capital infrastructure that has benefitted heritage science, such as the investment of £850,000 by UCL in the UK's first dedicated Heritage Science Laboratory. Furthermore, trends in miniaturization particularly in electronics are bringing about a revolution in instrumentation. The growing availability of handheld, portable and transportable, non-destructive and non-invasive scientific analytical equipment would enable on site analysis to be performed and popular interest in science and heritage could make such a project an attractive prospect if it could deliver substantial social benefits.

With regards to the delivery mechanisms, this could rely on a network of permanent laboratories focussed on regional hubs providing support and the means of sharing open digital data from a range of advanced tools,

instruments and sensors to meet the need for material and structural characterisation, diagnostics, attribution and authentication on the one hand and the training of citizen scientists on the other. The unique features of a distributed facility of coordinated, collaborative mobile units could include: (i) *specialisation* by groups of advanced instruments e.g. for imaging, spectroscopic, microscopic, laser, radar and ultrasound examination; (ii) *distributed network* across the United Kingdom; (iii) *mobility* to enable scientific analysis on location at museums, historic properties and archaeological sites across the United Kingdom where, for reasons of size, weight, fragility, importance, value or context, heritage assets cannot be sampled or moved; and (iv) *integration* of research support to assist beneficiaries in framing their research questions, to conduct high quality measurements, to popularise the interpretation of results and their significance for objects, curators or owners and to deliver inspirational training to citizen scientists equipped to participate in a national health check of heritage assets.

The development of a local approach to heritage science could engage the public in ways that remote institutions alone rarely do. Using advanced technologies including the enormous potential of visualisation and digitation would make an assessment more engaging, help bridge the gap between specialists and non-specialists and prioritise the use of scarce resources. In some cases a few thousand pounds could solve a problem or reassure a museum that a problem was not a problem after all. It is liberating to think that local communities could access advanced knowledge that would enable them to manage their heritage assets in full knowledge of the risks involved. The aim is that within a decade, heritage science would be firmly embedded in the popular psyche and we would have a reasonable idea of the state of the nation's heritage assets. To

achieve this we need to demonstrate that we can address a national agenda in order to attract resources for large scale improvements in advanced skills and infrastructure.

The National Heritage Science Strategy has given us the national framework for science, while the National Heritage Protection Plan has given us the priorities for its application, so a vision for UK science and heritage research that integrates the two would include:

- A research and training agreement between universities and cultural institutions
- The development of advanced skills and technological infrastructure in heritage science involving universities, cultural institutions and industry
- Investment in improvements in portable and miniaturised technologies to spread understanding and protection of fragile heritage assets from the islands of excellence created by the Science and Heritage Programme across the UK
- Engaging local volunteers and communities as citizen scientists creating opportunities to popularise heritage science
- Rolling out a health check of our nation's heritage assets underpinned by heritage science to help prioritise asset management
- And through all these, to participate in the National Heritage Protection Plan.

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