Should museums be recreating the past?

Should we be able to 3D print our own copies of historical artefacts? Hi-res scanning and 3D printing are making it possible to recreate ancient objects and monuments but, as Mark Sinclair reveals, such techniques are not without their detractors

Artistic responses to war and suffering are as old as human conflict. From plays to paintings, films to poetry, creativity has always emerged from destructive acts – much of the art made in the first half of the 20th century is testament to that. But how should we respond if the destruction targets culture itself? Is the instinct to repair and rebuild the right one?

Ironically, while Islamic State continues to erase significant parts of Middle Eastern heritage at an alarming rate – from bringing down ancient structures in Syria, to destroying mosques, shrines and temples in Iraq – we are also witnessing the deployment of digital technologies that have the potential to record these sites in unprecedented detail, to render them in three dimensions and to produce remarkable facsimiles. Over the last few years, a new era of preservation, conservation and recreation has emerged alongside renewed debate about the very act of remaking cultural artefacts.

Weston Cast Court, V&A © Victoria and Albert Museum, London

When exhibition 'The Missing: Rebuilding the Past' opened at the Jessica Carlisle Gallery in London in April, the show brought together several examples of work by artists and scholars who, the gallery claimed, "resist the destruction of cultural heritage wrought by the so-called Islamic State". The chosen mode of resistance was artistic production or, more accurately, *re*production. Objects on display included a 3D-printed scale model of the Triumphal Arch from Palmyra – the ancient site destroyed by Isis in 2015 – produced by the Million Image Database, and artist Piers Secunda's replica of a Mesopotamian head strewn with bullet holes, themselves cast from a school building in Iraqi Kurdistan.

Factum Arte's Lucida 3D scanner recording works by Francesco del Cossa

While an artistic reaction resulting in a new work of art is one thing, replicating an object or structure that has been destroyed – or copying it before it is lost – opens up many more questions. Archaeologists, technicians, artists and fabricators have found themselves at the forefront of the ascent of digital conservation, battling against violent ideologies on the one hand and environmental factors, from natural disasters and pollution to the effects of mass tourism, on the other. The likes of crowdsourcing, hi-res scanning, 3D rendering and photogrammetry are increasingly becoming part of the methodology of preserving culture in the 21st century.

At the 15th Architecture Biennale in Venice, a special project by the Biennale and the V&A Museum in the Applied Arts Pavilion currently explores the threats facing the preservation of global heritage sites and how the production of copies can aid in the preservation of cultural artefacts. 'A World of Fragile Parts' is curated by the V&A's Brendan Cormier and harks back to the museum's own associations with the production of copies and replicas.
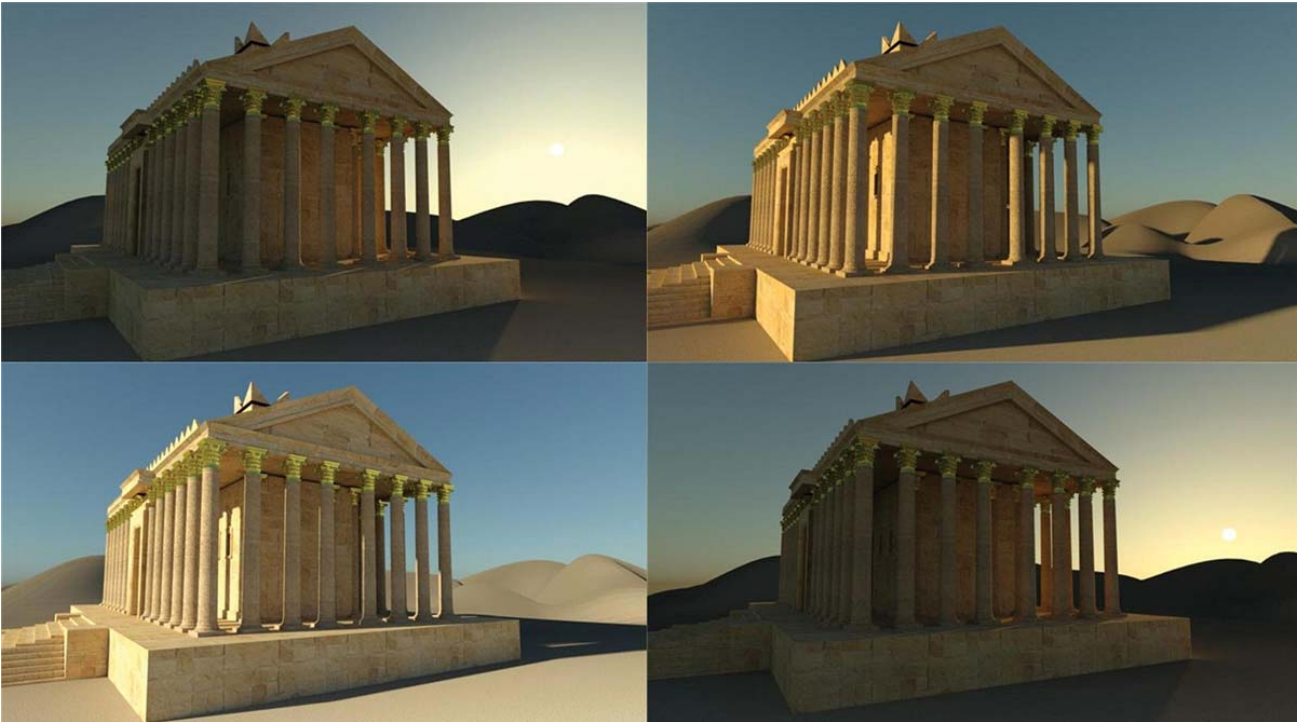
#NewPalmyra Temple of Bel model render by CEBAS VT (through Moskito)

Opened in 1873, the V&A's Cast Courts still contain one of the best collections of casts of post-classical European sculpture and feature some of the museum's largest objects, including two casts of the Trajan's Column from Rome. The V&A claims that these 1st-century reliefs, cast in the 1860s, "can be studied more easily than on the original in Rome" and that "the definition of many of the scenes is clearer than on the marble column, since they have been protected from later pollution and weathering".

Indeed, many of the casts featured in collections around the world have now survived longer than their originals and copies have therefore become valuable historical records in themselves. At the Biennale, as Griselda Murray Brown noted in the Financial Times, there is an interesting juxtaposition of two replicated panels from the doors to the Basilica of San Petronio in Bologna – a 19th-century cast is displayed next to a 3D-printed version of the same section produced by Factum Arte, one of the most interesting practitioners in digital preservation.

With its sister organisation, the Factum Foundation, the Madrid, Milan and London-based company has used digital technology since 2001 to conserve cultural heritage. It has worked on a wide range of projects, from recording paintings, maps and friezes to creating a full-size facsimile of Tutankhamun's burial chamber (so that the deteriorating original can be closed to the public) and scanning the intricate zoomorphic motifs on a series of oak doors from the mosque at Kala-Koreysh near the village of Kubachi in Daghestan. While visiting the mosque site, Factum Arte also recorded the graveyard using aerial photogrammetry and scanned tombstones that had been stored in the mausoleum, resulting in a beautiful, high-resolution 3D render of the only painted stone on the site.

Factum documenting Kala-Koreysh mosque

"Apart from the loss of the architectural richness and imagination of the place, the loss of old Kubachi would represent the loss of a vast number of entirely unrecorded carved stones of historical and cultural significance," says the Foundation in its post about the project. "In the past, villagers reused the old carved stones in the walls of new houses; now, as old Kubachi falls apart, the permanence of the stones is no longer ensured." At the old mosque, two carved stones have been recorded using photogrammetry, while others have been photographed as an example of the kind of documentary work that Factum believes urgently needs to be carried out. "We hope that the data from the project will be useful to scholars studying the Northern Caucasus, but also that it will prove equally interesting for the general public, both local and international."

At the core of Factum Arte's work is the Lucida 3D Scanner, a piece of equipment that uses raw video to capture a range of different surfaces, including details of the object's relief and finish. Developed by Manuel Franquelo, co-founder of Factum Arte with artist Adam Lowe, objects, paintings and documents can be scanned in incredible detail. Recorded in 2013, the Hereford Mappa Mundi was documented with the Lucida's low-intensity laser light that films continuously using black and white video cameras, Factum explains on its web page about the project. Each frame was then 'post-processed' to create the high resolution three-dimensional record of the 13th-century map.
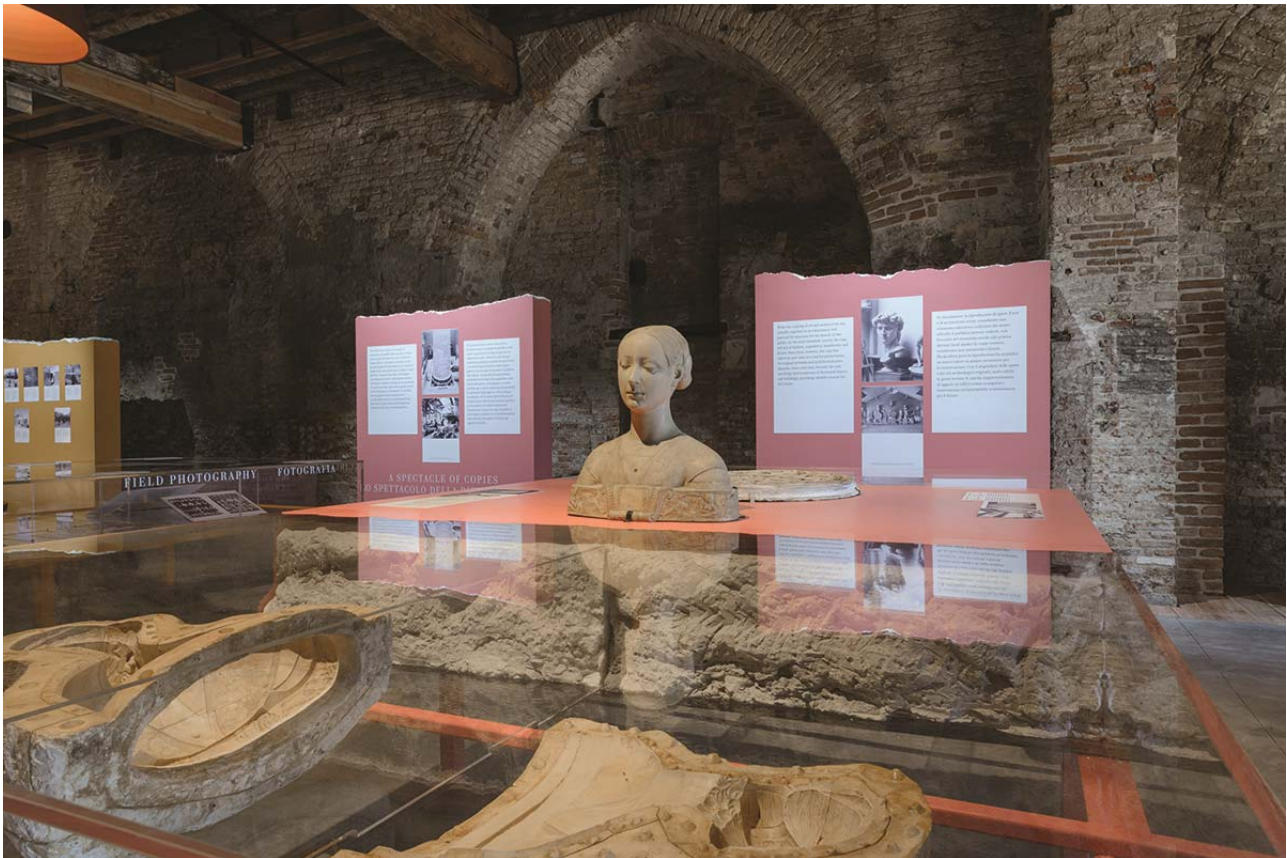
Exhibits from 'A World of Fragile Parts'

Just as casting in the 19th-century was a way of bringing cultural artefacts to people who would otherwise be unable to experience them, Factum Arte's recording of these sites is a way of ensuring they exist in the future, even as the original materials perish over time. In a further echo of the dissemination of culture practiced by the group, the software that Factum Arte has pioneered will also be available to all, they claim, while the Foundation also hopes to provide museums with the ability to record their own objects by giving them high-tech scanners.

Similarly, the Institute for Digital Archaeology – founders of the Million Image Database – is involved in crowdsourcing data from sites in the Middle East and north Africa, but with a view to replicating structures in solid materials, such as stone. Having given out 5,000 lightweight 3D cameras to people in and around conflict zones, this method of capture (and the process of turning that data into a physical object), has perhaps gained the most publicity internationally, thanks to the production of a six-metre version of the Triumphal Arch, laser-cut from Egyptian sandstone, and installed in London's Trafalgar Square for two days last May, before a planned move to Dubai, New York and Palmyra. The IDA has already worked on several projects that aim to preserve cultural artefacts, for example, such as making recordings of the paintings in the Marsoulas Caves in the south west of France. Yet the potential to actually recreate a physical site, less than a year after its destruction, is startlingly new territory.

Palmyrene column capital (Temple of Bel) by #NewPalmyra

The advances being made in 3D printing also make this an increasingly contentious area: if we can accurately recreate a cultural treasure from the Syrian desert, for example, is it right that we go ahead and do so? On sketchfab.com, users can now download 56 different objects, mainly busts and figures, from the British Museum's collection and print them in 3D. Thus, on one level, access to replicating   artefacts   from   antiquity has become more open and straightforward. But the ability to remake significant structures on the sites where they once existed is clearly a process that requires an awareness of cultural sensitivities, not to mention a desire to collaborate with local communities and organisations.

As Robert Bevan, author of The Destruction of Memory, wrote in the Evening Standard, UNESCO's take on the matter of rebuilding sites came to light when it rejected the idea that the Buddhas of Bamiyan in Hazarajat, Afghanistan, destroyed by the Taliban in 2001, could be reconstructed using what was left of the originals – a process known as 'anastylosis'. "Better that the Buddhas' empty niches stand as a memorial to the horrors of wanton destruction, it was argued," Bevan noted. "Rebuilding – whether by the perpetrators or their victims – can serve to mask the genuine, if unpalatable, past; erasing the gaps, the voids, the ruination that bears witness to traumatic events. It can conceal the reality of the present." Yet the act of remaking, Bevan conceded, is a defiant counter to the wider programme of erasure of ethnic and religious traditions being carried out by Isis – and therefore "'critical reconstruction' remains the most honest course of action".

Another approach is to look to reconstruct a site in virtual space. #NewPalmyra is an open source digital archaeology project to which users can upload pre-destruction images of Palmyra and

contribute to an increasing bank of visual data that can then be turned into 3D renders. The organisation's appeal – "Help us use digital tools to build a future #NewPalmyra from the past" – continues the work of the Syrian open access activist, Bassel Khartabil, who was arrested by government forces in 2012 and has been missing since October 2015 after he was transferred to an unknown location. Build data for Palmyra's Triumphal Arch and the Temple of Baal Shamin is on newpalmyra.org, while the project's social channels show followers printing off models of the structures, actively engaged in conserving the ancient site.

With current technological advances, the ability to record our culture and ensure it can be enjoyed by future generations has never been easier. While the intentions of the #NewPalmyra project sound incredibly progressive, as with many of its contemporaries in this new world of digital preservation, its aims in fact link back to the efforts made in the 19th-century to conserve, save and share the things we make.

Lead image: Casts on show as part of the V&A's 'A World of Fragile Parts' exhibition at the Architecture Biennale in Venice. Photographs © Andrea Avezzù (La Biennale di Venezia), labiennale.org