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# STRONGER THAN PASSING TIME

## WHY DID ISLAMIC STATE DESTROY PRECIOUS ARCHAEOLOGICAL SITES IN NORTHERN IRAQ? EARTH OBSERVATION IMAGERY WAS ABLE TO REVEAL THE SURPRISING ANSWER

To many people, it was simply inconceivable. How could anyone do what these people had done?

Wars have been waged for millennia in virtually corner of the globe. To a certain extent, war is understandable, with people using violence to achieve their aims or defend themselves against others. But even in wars, people have frequently drawn up rules to avoid destroying too much infrastructure, infrastructure they themselves might want to use one day or which needs to be protected by those living there already.

Many of the world's greatest buildings have survived invading armies and wars, although not always completely. The Parthenon on the Acropolis in Athens was built in the fifth century BC as a temple to the goddess Athena Parthenos. Nearly a millennium later, it was plundered and converted into a church by the Christians of the Byzantine Empire. It was almost another millennium before Athens' new rulers, the occupying Ottoman Empire, changed the church into a mosque. Just a few centuries later, it was almost destroyed accidentally by Venetians trying to capture the city from the Ottomans, when one of their shells fell on it, exploding the gunpowder stored there.

Yet still it endures, seemingly blessed with eternal life by the goddess whose name it still bears.

The Parthenon was already old when the cities of Hatra and Palmyra in Northern Iraq were built. But Nimrud in nearby Mesopotamia is mentioned in the very first chapter of the Old Testament and dates back to the middle of the 13th century BC, nearly a millennium before the Parthenon was built. While still as ruined as the Parthenon, they all stood virtually to this very day as symbols of enduring civilisation, a cultural heritage that's still important to us now and irreplaceable.

Except Islamic State decided this year to destroy them with bulldozers and pickaxes.

Why? What was their motivation to perform this almost unprecedented act of vandalism against civilisations that were millennia dead?

On page 18 of this issue, Kevin Corbley tells the story of how German archaeologists tried to establish whether the news of IS's actions was correct. They turned to the very

modern to establish what had happened to the very old: using very high resolution satellite imagery, the archaeologists were able to use change detection to determine how much of the sites had been destroyed. Along the way, they discovered the surprising reason for IS's almost inconceivable actions.

This issue, we also look at another new way of visualising the world: augmented reality. Rather than the all-encompassing virtual reality, augmented reality overlays data on the real world to produce a hybrid view that tells more than either could provide by itself. It's by no means a new idea and already smartphone app stores burgeon with consumer implications of the idea.

But as Sarah Durante highlights on page 22, consumer and enterprise requirements can be quite different. It doesn't matter very much if a missing statue isn't quite in the right place when viewed by a tourist; it's another altogether if a warehouse picker looks for goods on the wrong shelf or a fieldworker digs in the wrong place or climbs the wrong pole. Durante looks at the potential applications for augmented reality in the enterprise, how its requirements are different to those of consumer apps, and the new hardware and services that are helping to make it a reality.

On page 25, Melanie Langlotz talks to some trailblazers in Australia and New Zealand who are using augmented reality to perform asset management for both utilities and the government. By projecting existing datasets onto the real world, they can see what assets need to be included – or avoided – in a project, as well as whether those datasets need updating with more accurate information. As well as improving their datasets, they're learning the value of sharing data – reality is complicated and simply because you know where the water pipes are, it doesn't mean you know where the gas mains are, too.

Lastly, on page 17, Alistair Maclenan looks to the future of cities. With migration and urbanisation only likely to increase in the coming years, 'smart cities' that use resources more efficiently are going to be vital. However, as with augmented reality, key to that efficiency will be precise location information.

I hope you enjoy the issue.