

Jerry Brotton: let's take maps back from Google

Digital mapping has turned our world into one vast shop-front; it's time to map the Earth with more respect, says Professor Jerry Brotton.



The Hereford 'Mappa Mundi', which appears in Jerry Brotton's 'History of the World in Twelve Maps' Photo: By kind permission of the Dean and Chapter of Hereford and the Hereford Mappa Mundi Trust

By Professor Jerry Brotton

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Virtually everyone loves maps; but these days, most of the maps we use are virtual. Over the last five years online mapping has been dominated by Google, but competitors like Apple and Nokia are catching up. This has led Google to announce recently the first major redesign of its digital Maps applications since their creation eight years ago. Instead of creating one virtual map of the world, **they are trying to make personalised maps for every one of their users**, producing billions of maps matched to each of our personal interests, based on their ability to predict what we like by caching data from the searches we conduct on a daily basis.

Location-based online searches using maps is huge business. Google understood this before anyone else, and has captured around 90 per cent of such searches in the US, generating global annual revenue of around \$3 billion from related advertising. Although **Apple's iOS 6 Maps application had a disastrous launch last September** (Stratford-upon-Avon disappeared, Helsinki gained an airport), its recent updates suggest that we are not only entering a ferociously

competitive era of online "map wars", but that the map itself is going through a transformation as profound as its shift from manuscript to print in the 15th century. The paper map is dead; long live its digital offspring.

And yet many of us mourn the passing of the physical map. Struggling up the side of a hill with an Ordnance Survey map? Check your phone. Lost on the M4 without a roadmap? Turn on the Sat Nav. The romance of the paper map has been replaced by the interactive photo-realism of digital maps derived from tens of petabytes of satellite imagery crunched through servers and then made freely available – for the moment – to anyone who wants to **download applications like Google Earth and zoom around the planet**. The technology is impressive, but something has been lost in the digital transfer: maps have become inhuman (one reason that Google is striving for ever-greater "personalisation"), driven by the imperatives of e-commerce rather than a confrontation with physical, terrestrial reality.

Digital mapping also marks the end of over 200 years of state-sponsored mapmaking and the return of mapmaking into private hands, where we should not forget it resided for centuries. No single governmental organisation – and certainly not the Ordnance Survey – has the ability (or inclination) to marshal the amount of data and technical knowledge amassed by Google or Apple and transform it into regional or global maps. Globalisation gives us a sanitised image of the globe in a digital file, which is great for shopping and advertising, but not so helpful in engaging with the vast, sensuous, fragile world "out there".

The problem is not the medium of digital reproduction but how such maps are used; to invert Marshall McLuhan's famous quote, when it comes to maps, the medium is not necessarily the message. Maps have gone through many mediums, from stone, clay and papyrus to paper and now digital pixels. Whereas earlier cultures have created world maps shaped by religious, imperial or national beliefs, the current digital mapping revolution is driven by commercial interests, where the globe is turned into one enormous web browser. But what if we use the formidable technology of digital companies to translate the torrent of freely available data about the earth to build new maps of the world that celebrate its physical diversity, rather than its economic geography?

This weekend at the Hay Festival marks the moment when we try to take digital mapping technology in a radically different direction. In collaboration with Adam Lowe, founder of **Factum Arte**, a Madrid-based team of artists, conservators and technicians that has developed ways of digitally capturing data and transforming it into two, three, even four dimensions, I will unveil a new three-dimensional facsimile of one of the UK's great artistic treasures: the world's oldest surviving medieval world map, the Hereford Mappa Mundi. The map, dated around 1300, was made from the skin of an enormous cow, and shows the world from a Christian perspective. East – and the Garden of Eden – is at the top, Jerusalem in the centre, Christ sits atop the world, and

monstrous races float around its edges.

The facsimile, created with the support of the Hereford Mappa Mundi Trust and the **Dean and Chapter of Hereford Cathedral**, has been made employing Factum Arte's cutting edge digital technology, already used in collaborations with Grayson Perry and Anish Kapoor, and in the conservation and restoration of works like Caravaggio's paintings and Egyptian tombs. Factum's facsimile was recorded using a three-dimensional scanning system and software called "Lucida", which captures data from the object using two black and white video cameras positioned either side of a laser. The distortions produced by the map's surface are stored as raw tonal information which can then be converted into three-dimensional information.

Most commercially available scanning equipment records shape, but Factum's interest is in recording, analysing and monitoring the changes to the depth surface of objects like old paintings – or maps. The map's tonal data is transformed into a "tool path" which is fed to a routing machine and then printed onto a physical surface, in this case plaster. In the cast of the Mappa Mundi the undulations of the skin mimic a landscape of rolling hills and valleys, although the actual surface information of the relief on the pigments and ink was so subtle that the Z axis (or original height) was multiplied by a factor of two.

The results are sensational. They allow us to see the map as a physical object in unprecedented detail, offering fascinating insights into how, and possibly even why, it was made. It is an exact copy of the original – but at the same time new and different. Freed from the original decorative detail of monsters and mythical stories, and approached as a physical rather than a written and painted object, this new "map" shows that the Mappa Mundi was originally conceived as a three-dimensional object, with the neck and shoulders of the cow from which it was made at the map's top. The surface is an undulating, rippling skin, across which the medieval mapmakers created rivers and continents, working with and against the creases, scars and folds of the animal's flayed body.

The facsimile might also reveal exactly where the map was made. It shows that a compass was used in drawing Jerusalem and Crete. Dendrochronology carried out on the wooden board behind the Mappa Mundi shows that it came from Herefordshire. If further digital investigation can match the holes made by the compass points on the map with marks made on the back-board, then we can prove conclusively that the map was made in Hereford, overturning decades of scholarly belief that it was made in Lincoln before being transferred to Hereford Cathedral.

Further research into the new digital map by scholars will undoubtedly unearth new findings, but the cathedral already has one further poignant contemporary use for the facsimile. As Hereford is

home to the Royal National College for the Blind, the map will be set up alongside the medieval original, and we are exploring the possibility of encouraging the partially sighted to "feel" their way across a 700-year-old map, in an act of faith as powerful and moving as the theology that gave rise to its creation.



'Lucida', a three-dimensional scanning system, collecting information from the Hereford Mappa Mundi (Factum Arte)

A map is usually regarded as a two-dimensional representation of a three-dimensional object, the earth. The excitement of digital mapping technology is that it

can now reverse this process, and turn a map into three dimensions. Having used this technology to throw new light on the Hereford map, Lowe, myself and his team are now working on an even more ambitious project to re-imagine the world. We are in the process of making what we believe will be the largest "map" of the world ever known.

By combining their three-dimensional scanning and printing techniques with the topographical and bathymetric data used by most online map applications, Factum are creating a world "map" without water, printed in relief, the size of a football field. Visitors can see the world from a completely different perspective (and certainly not one provided by online map applications), without the seas and oceans that have defined our physical and political geography (but which climate change is already altering). In contrast to the Hereford map, this is an explicitly artistic and utopian project. It will be part-sculpture, part-installation and part-theatre. Once installed, the world will be flooded to current sea levels. The flooding will then continue, until the moment when the whole world is submerged, and our fragile planet is drowned.

In the biblical cycle of flood and recession, geographical outlines, coastlines and boundaries that we all assume are gone, replaced by an alien, spiky terrain with no distinction between land and water. At other times the continents, coastlines and islands will assume their reassuringly familiar shapes. The result will be an object that visitors can walk round, experiencing a fragile, unfamiliar world they thought they knew. Factum propose to make it from millions of tiles in a variety of possible mediums (wood or cement would work), each one representing individual pixels held within a gridded structure to create a distinctive three-dimensional relief.

Like any world map made using paper or pixels, this one is made from a particular perspective, and it makes the point by adopting a dramatic new projection, which Factum call "terra-centric". Rather than putting the north pole at the top and Antarctica at the bottom, the axis has been rotated to produce a projection that is far more equal in terms of the area of each land mass. This unusual variation on more familiar rectangular map projections acknowledges the partiality of all global map projections, and ensures that the viewer is confronted with a world that appears surprisingly unfamiliar.

Digital mapping technology is still in its infancy. At the moment we are probably still at the "dot matrix" print level, and the technology will undoubtedly evolve. But digital technology like Factum's enables us to see the globalised world very differently from the monetized geospatial applications pre-programmed on our phones and computers. I would like to see digital mapping that does not turn the globe into an "application platform" from where businesses trade "actionable information". Instead, let's make the globalised Earth a stranger, spikier, more perilous place, and one that we treat with a little more respect, before it goes under.

Jerry Brotton's 'A History of the World in Twelve Maps' (Penguin, £10.99) is out now in paperback. He will be appearing with Adam Lowe at the Hay Festival on June 1 at 2.30pm, where they will unveil the Mappa Mundi in 3D.

Keep up to date with the Telegraph's coverage of the Hay Festival 2013.

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