

Maps from the past?

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This short article outlines some of the approaches and techniques involved in creating the *Maps from the past* series of facsimiles published by the Society over the last few years. It describes some of the issues encountered and explains how these were addressed using various digital image editing techniques. The personal account given here is by no means exhaustive and what follows aims to illustrate some of the ideas and steps involved in bringing these fascinating maps back to life.

Since the publication of the first facsimile in 2008, the *Maps from the past* series has sought to bring a selection of significant (and often relatively inaccessible) maps – chosen for their historic and cartographic interest and visual appeal – to a wider audience via high-quality reproduction. The preparation of each map in the series involves making a digital copy of the original (an image), which undergoes a process of enhancement before joining an essay and/or notes explaining the map's particular relevance to the story of Ordnance Survey in the final sheet layout. The series has progressed to include more challenging examples, and the facsimile of the colour proof of the half-inch sheet *Leicester* (1960), distributed with *Sheetlines* 93, marks the first attempt to reproduce a complex layer-coloured map.

The digital copy of the map is acquired by scanning the original at a high resolution. Briefly put, the scanning process involves shining light at the source (whether it is positioned flat on glass or fixed to a rotating drum) and recording the various intensities of light that are reflected back to the sensor. This is usually a charge coupled device (CCD), which is comprised of thousands of photosensitive cells arranged in a grid. Generally, the more the better, as this increases the resolution of the scanner and hence allows more detail to be captured, but at the expense of a larger file size. An output resolution of at least 600 dpi (dots per inch) can render details beyond the naked eye and allows correction of smaller features, such as fine linework. However, while a high resolution is therefore essential for making digital copies of maps, larger images can be slow and cumbersome to work with as they require more computer processing power.

The photosensitive cells receive the reflected light from the source and the relative intensities of electrical charge are subsequently converted into digital numbers (DNs), each representing a shade along a scale of 0–255. For a greyscale 'black and white' image, 0 would be black and 255 white, while in colour scanning, three sets of pixel values are usually recorded within the range of 0–255 each for shades of red, green, and blue (RGB). As light mixes in a different way to ink, eg cyan, magenta, yellow and black (CMYK), and the digital copies made here will eventually be printed, there is the possibility that the colours of the original will not be faithfully reproduced. More specifically, the gamuts (ranges) of RGB and CMYK colour spaces are different and in general, colours are

darker in print when compared with their display on a monitor. It is therefore crucial to consult the original and to use a colour key (stamp collectors' versions are especially comprehensive!) for making an independent record of the colours to check against the proof. (Colour proofs are usually produced from a large-format plotter, but individual ink levels can be adjusted to calibrate the lithographic press and ensure a good match with the proof.)

There are various image editing software packages on the market and most include an array of functions and allow the application of various filters to change the whole appearance of an image at an instant. Adobe Photoshop (version CS5) is generally regarded as one of the leading packages and offers an extensive range of tools and analytical functions while providing the facility of working in layers, which is especially useful for enhancing the facsimile maps. It may be necessary to separate part of the map from the rest (eg the areas printed in black) and manipulate this, perhaps to darken these areas, without affecting the remainder. It is important to be wary of changes which affect the map as a whole, however, as there is the danger of arriving at a result which is too clinical that simply looks artificial. Some scanners can also apply various enhancements as they capture the image (eg an unsharp mask which attempts to bring out more detail) but these are best avoided as they can introduce effects (such as a level of contrast) not otherwise present in the original. As a map from the past, it should at least have an appearance that is consistent with its nature as a product of that society.

Much of the detailed map 'restoration' work involves the use of the clone brush (which works a bit like holding two paintbrushes at the same time, except that one copies the area covered by the other), either to repair lost material or remove blemishes, dirt, tears, and other marks on the paper. As the end product is an entire sheet, any localised changes need to be performed in such a way that they are subtle enough to blend in unnoticed. The physical state of the original map determines the extent to which these alterations are plausible or desirable to some extent; again, if too much 'enhancement' is applied much time can be spent creating an end result that still looks false. It is therefore important to decide early on what should be achieved through the process of enhancing the image.

The approach to recreating *Maps from the past* has developed since the series began with the reproduction of the *London Passenger Transport Map*, Sheet 106 (1934), which followed a method of image enhancement derived from the Cassini reproductions of Ordnance Survey maps. Consequently, this map was presented as an artefact that was meant to 'look old'; its paper was given a slightly yellow tint and a light blur was applied. Furthermore, the map itself was given a shadow, which made it stand out from the rest of the facsimile sheet.

When Chris Higley asked if I would oversee the production of the *City of York* (1920) town map, the project was in its early stages and so there was an opportunity to reconsider the approach and establish exactly what we should be trying to achieve. A 'mint' copy of the City of York map had recently gone on sale on eBay for £1020, which perhaps inspired my attempt to create a 'pristine' version of the map, ie something that resembled, as far as possible, a fresh, mint

copy – to bring a map from the past back to life, so to speak. The *Map of York* was actually derived from two source maps, one of which had been folded, but both had blemishes in one way or another. The goal was simply to amalgamate the cleanest and most complete elements of these maps to ensure the best possible base from which the ‘restoration work’ could commence.

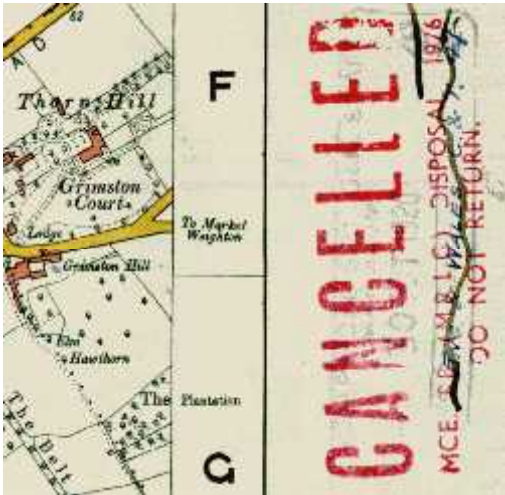
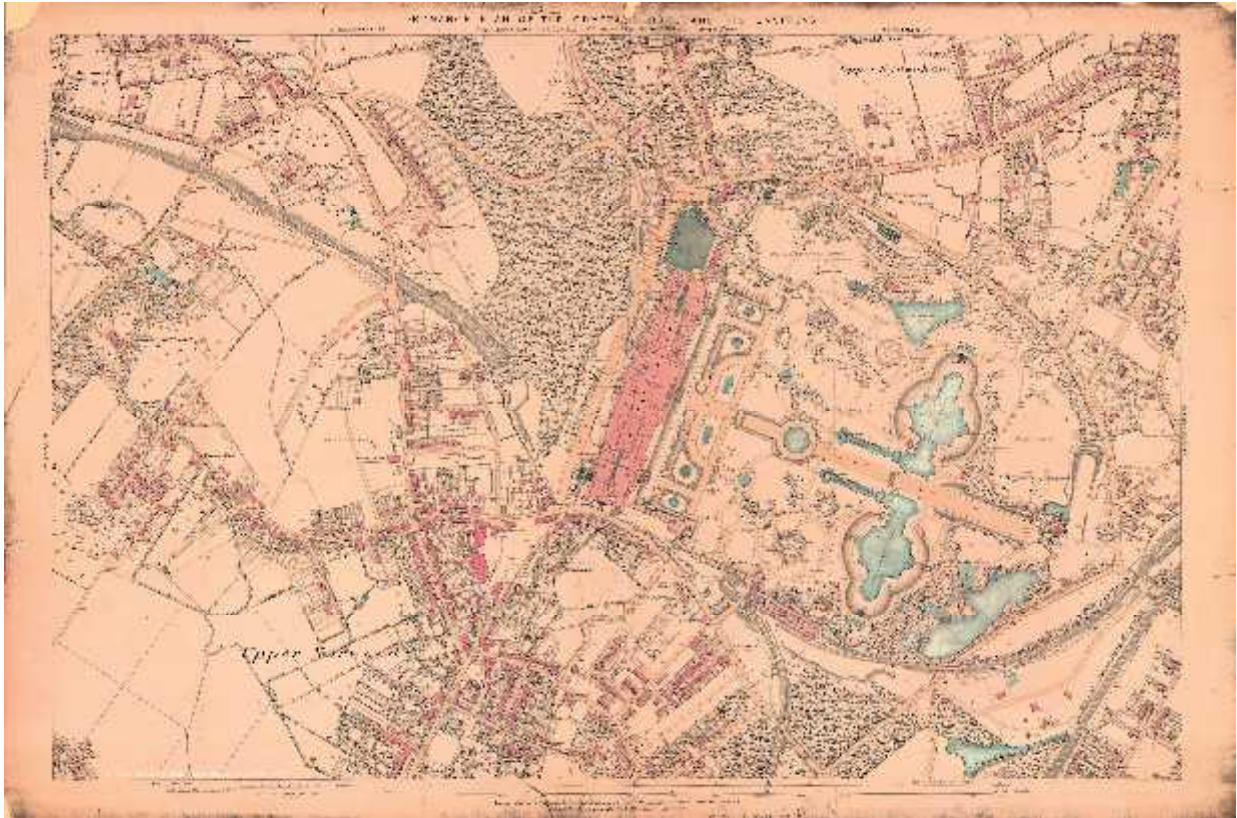


Figure 1. An excerpt from a raw scan of one the City of York maps, showing the library stamp that was removed

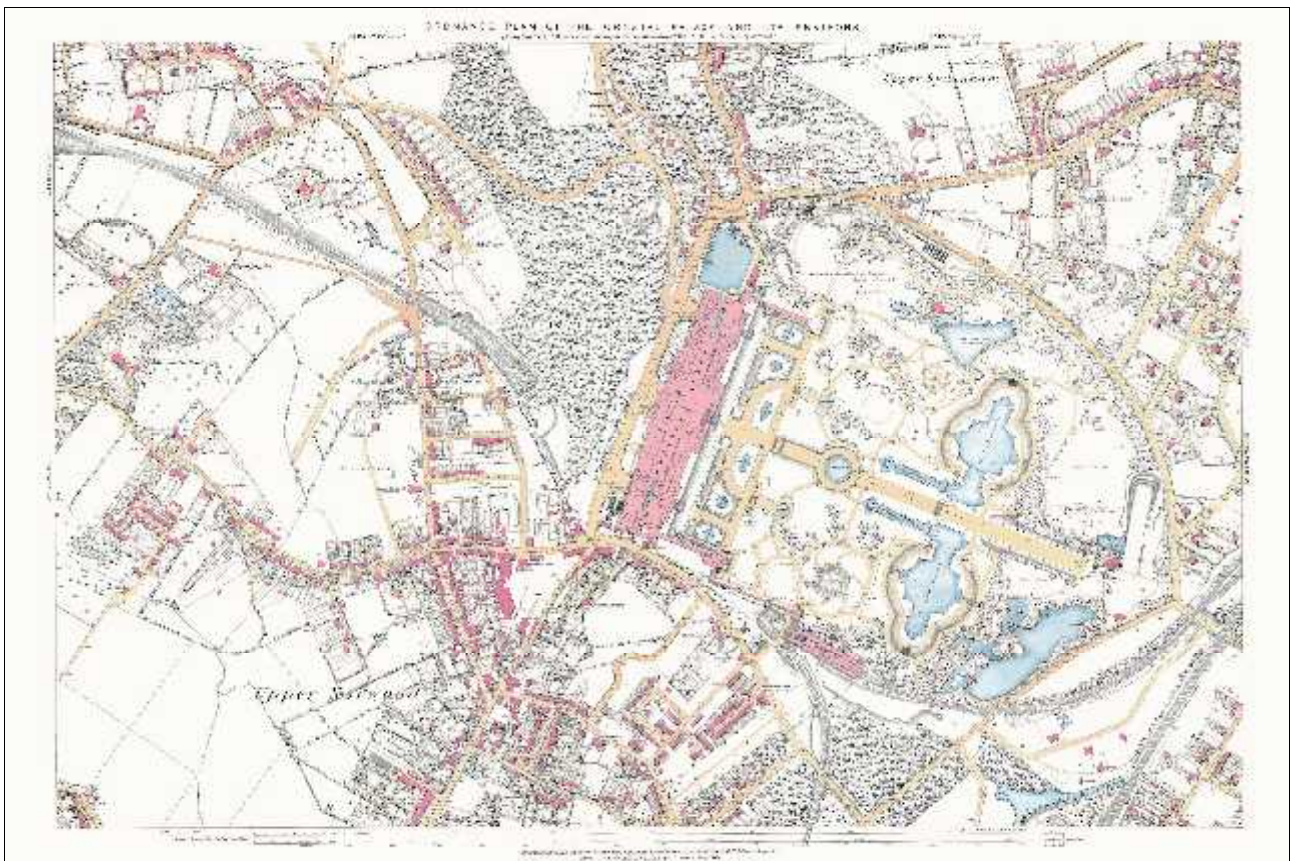
Although such detailed examination, treatment, and re-examination is a painstaking and time-consuming process, the creation of a refined digital image of the *City of York* map for printing was reasonably straightforward. The majority of work consisted of ‘repairing’ tears and reconstituting missing parts, while removing specs of dust, dirt, blemishes from foxing and other localised discolouration to achieve a standardised and uniform appearance in colour across the printed detail and the background. As scanners seldom capture the deep blacks inherent in printed originals, these were darkened (using a method of separation kindly taught to me by James Anderson who had worked on the Cassini maps) and some of the central, more detailed areas slightly lightened for consistency with the rest of the colours on the

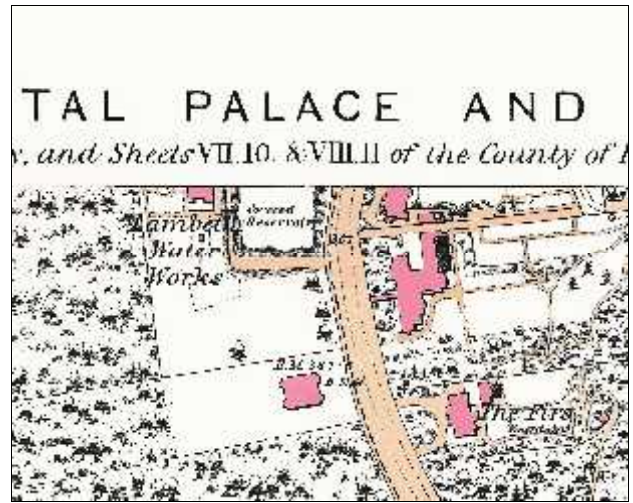
map. As the provenance of the sources themselves were of no particular significance on this occasion, library stamps (*eg figure 1*) and other additional marks were deleted and the resulting holes ‘filled in’ by cloning adjacent areas of the margin.

A greater challenge was presented with the Crystal Palace map, where the raw scan of the original preserved many rips, tears, blemishes, and other imperfections (including distortion of the paper) that beset this 150 year-old map. Moreover, adopting a similar approach to the *City of York* map and restoring the original to a ‘mint’ state was made all the more difficult by its being a hand-coloured map with variations in colour and shade that were part of the map’s original method of production and indeed part of its appeal. Standardisation of colour – apart from the background paper – was therefore out of the question. The intention here was therefore to identify and eliminate all visible traces of ageing (so to speak) while preserving the minor variations in intensity and beautiful characteristics of hand colouring which lend the map its charm, visual complexity, and impact. The resulting image is brighter and crisper than the original, particularly as the colour of the paper itself is restored (*figures 2a and 2b*). Some of the missing material was difficult to replace, but with the use of the clone brush and some other tools, it was possible to achieve a satisfying result (*figures 3a,b and 4a,b*).



Figures 2a (above) and 2b. The raw scan of the original copy of the Crystal Palace map was discoloured and included a host of imperfections which were corrected with minimal disruption to the original hand colouring





above: figures 3a and 3b, below left: figures 4a and 4b

The restoration of material missing from the original Crystal Palace source map through careful application of the clone brush, which used material from visually similar areas elsewhere on the map

below right: figures 5a and 5b

