

The Showgirl, the Comic Strip and the Physicists

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Cross-dressing singers and The Beano are not the sorts of topics you'd expect to hear discussed at a physics conference. But that's exactly what will happen at the Institute of Physics in London on Monday 24 and Tuesday 25 April when the latest methods of conserving and digitising photographs and artworks will be described.

The two-day meeting on "Preservation and Conservation Issues Related to Digital Printing and Digital Photography" will bring together physicists, conservators and chemists from museums, universities and photographic companies. Participants will hear about the latest research into the longevity of digital prints and storage methods, which we are all increasingly using to document the important events in our lives, as well as the rise of digital reproductions of fine art, and what should be considered "an original".

"Increasing numbers of artists are creating their work using digital technologies. It gives them many opportunities readily to manipulate the image produced as well as the ability to sell images via their own websites that buyers can simply download," says Dr Andrew Manning, director of the Materials and the Arts (MATAR) Research Centre of the University of the Arts, London, and one of the conference organisers.

Collectors of such prints are understandably going to want the print to last for their lifetime at least, and scientists are working on establishing acceptable standards for both paper and printing inks in order to achieve this aim. "Physics and chemistry are being used to develop new materials

that are more stable and that tolerate a greater exposure to heat, light, humidity changes and chemical attack," explains Manning. This will not only benefit art lovers and galleries, but also - ultimately - any individuals using digital photography.

Digital reproduction can also help during conservation of both early digital prints from the 1980's, and digital artworks that have not been designed with longevity in mind. "There is a great need to make accurate reconstructions of original prints and artworks. This is so that experiments can be carried out to determine how various conservation techniques might affect the original, and also to help develop new conservation techniques," explains Dr Joyce Townsend, senior conservation scientist at Tate.

Sometimes artists themselves are involved in the preservation of their own work, and on Tuesday, Prof. Stephen Hoskins, director of the Centre for Fine Print Research at the University of the West of England will describe his group's collaboration with illustrator Leo Baxendale. Baxendale drew the "Bash Street Kids" and "Little Plum" cartoons for The Beano comic in the 1950's and 60's, and wanted high quality digital reproductions of some of his original drawings, which were becoming too fragile to exhibit.

At the time these comic strips first appeared, The Beano was printed in letterpress duo-tone, which only used two colours - in this case red and black - and required each of the drawings to be made up into "blocks". These were metal plates etched in such a way that the pattern of the drawing was raised up in comparison with the rest of the metal surface so, when covered in ink, it would transfer a copy of the drawing onto any paper that was pressed against it. To get the two different colours, one block would be created for the black parts of an image, while a separate block was made for the red sections.

Prior to printing, Leo Baxendale's black and white line drawings would be coloured in with red tones, before the accompanying text was put into speech bubbles. The aim of the UWE team is to reproduce digitally the coloured-in originals as faithfully as possible, while also retaining features such as fingerprint and gum marks from where the captions were added.

"We've been photographing some of those drawings very carefully with a high quality scanning digital camera specially designed for taking pictures of artwork," says Hoskins. "We then reproduce the drawings by wide format digital printing on a special type of inkjet printer 60 inches across." This is not a straightforward process.

"The copy is never exactly the same," explains Hoskins, "because you're going from a scan of an original consisting of red and black ink on a creamy background to a print made up of minute dots of the six colours used in the inkjet printer." Paints, inks and pigments look coloured to us because they absorb certain wavelengths (colours) from any white light falling on them, but reflect others. Our brains then combine the reflected colours to produce the shade we see. To try to get as close a match between original and copy as possible, the researchers have been using a device known as a spectrophotometer, which detects colour in a similar way to humans.

By using the spectrophotometer to 'measure' the colours of the inks in the original drawings and in the newly created reproductions, the team can adjust the colours they print until an acceptable match is produced. However, this does not mean the spectrophotometer alone can determine the colours that will appear in the final reproduction.

"It becomes a subjective thing," says Hoskins, explaining that colours will always appear different to our eyes depending on what other colours are surrounding them, and that the spectrophotometer can only measure

tiny patches of colour so cannot allow for this effect. "What's been good about this project is that I can go back to the artist and say 'Is this what you intended?'" says Hoskins.

Among the other subjects covered in the conference will be the conservation and scanning of historical documents and photographs - such as the scrapbooks of the Victorian music hall star and male impersonator Vesta Tilley recently purchased by Worcestershire Record Office.

Tilley was one of the highest paid - and most famous - female artistes of her generation, and had a fan base most pop stars today would envy. However the souvenirs her admirers avidly collected from the 1880's until her 1919 retirement from show business would be in danger of disintegrating if they were handled regularly, and would also fade over time if exposed to UV light. So that interested readers and researchers can look at the scrapbooks' contents without damaging the originals, the Worcestershire Record Office is undertaking a project to scan the material, and also preserve the originals before any further deterioration can occur. On Monday, freelance paper conservator Moira Buick will be describing her work to preserve these scrapbooks, which are made up of newspaper cuttings and publicity photographs.

"The main problem is physically unfolding the overlapping newspaper cuttings prior to scanning," says Buick, who prevents damage by supporting the backs of any vulnerable cuttings with a special type of heat sensitive tissue that cannot damage the delicate fragments of newspaper. The newspaper is not the only problem however.

Any artefacts produced after the Industrial Revolution tend to decay more rapidly than earlier works because of the increase in the amount of chemical processes used to produce them. In this case, the bindings of some of the scrapbooks have got the start of "red rot". This condition

occurs when so many of the natural oils in the leather have been washed out - in order to produce a fine-grained effect - that the skin starts to break down, and eventually crumbles into red dust. To help combat this, Buick has used archival tissue paper repairs to support some of the damaged bindings, but has had to remove one completely.

Once the restoration is complete, Worcestershire Record Office will put the Tilley books into environmentally controlled low temperature storage. This is useful for books and newspapers as it slows down chemical reactions that can occur in bindings, as well as mould growth that can form on the gum used to stick cuttings - or even book pages - together. A carefully controlled level of humidity will also help preserve both paper and photographs.

Source: Institute of Physics

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