Revisiting Richard Hamilton's *Typo/Topography* of Marcel Duchamp's *Large Glass*

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The production of fine art prints has a long-standing relationship with the collaborative print studio, where artists work together with master printers to realize and produce printed artworks. The collaboration between artist and print studio has predominantly been one of facilitation, where the artist is able to access specialist equipment and technical expertise with the tools, materials and operations of a particular print studio. What this involves and what the relationships are has varied between print studios and even between the master printers of a studio. Unlike most master printers in Europe, Tamarind's printers, for instance, were artists themselves or had a Fine Arts degree.[1]

Today, artists can access a number of different types of print workshops using a variety of print production processes. Silvie Turner differentiates between contract workshops that are run 'by master printers who offer collaborative skills at all stages of plate-making and proofing up to the production of the B.A.T.' and contract editioning houses that often specialize in a particular print process and mainly offer editioning facilities and collaborative proofing.[2] Turner's third category of print workshops are those 'accessible to artists, although the collaborative production of fine art prints is not the

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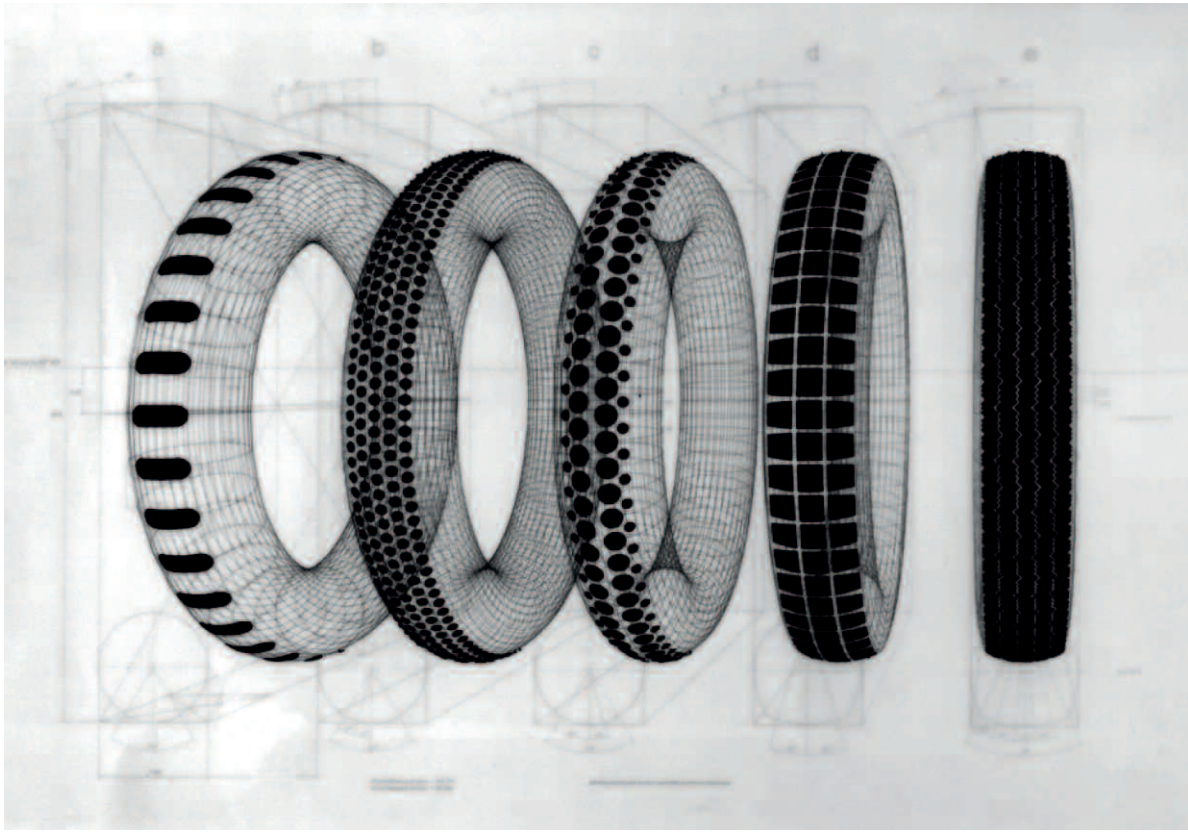
1. P. Gilmour, *Ken Tyler: Master Printer, and the American Print Renaissance*, New York, 1986, p. 30.
2. *British Printmaking Studios, a Survey of Artists' Open Print Workshops in the UK*, edited by S. Turner, London, 1994, p. 76.



1. Richard Hamilton, *Five Tyres Remoulded (portfolio)*, 1971, seven screenprints in black on mylar superimposed on each other (Courtesy estate of the artist).

primary function of these workshops' and includes community-based and privately owned workshops, such as educational facilities within colleges and universities.

Unlike conventional fine art print publishing studios, universities can often provide an umbrella to facilitate experimentation and in some instances research when producing prints. The university as a producer and publisher of prints is not a new concept when we consider established US-based institutes such as Graphicstudio in Tampa, Florida, which is part of the University of Southern Florida, and the Tamarind Institute, which is part of the University of New Mexico. UK-based publishing enterprises that have emerged in more recent years include the Royal College of Art and the Royal Academy, both in London, which produce prints predominantly as fundraising for student bursaries. Academic research is a central component of activity at the Centre for Fine Print Research, which is part of the University of the West of England, Bristol. It pursues similar goals to the Brodsky Centre for Innovative Editions at Rutgers University, NJ, which also collaborates with artists, such as Lesley Dill (b. 1950), on print editions. The Centre for Fine Print Research conducts practical research related to the production of a physical artefact, usually a print, embracing all aspects of technology and usually involving collaborations with a variety of practitioners, institutions and commercial users.

Arguably, the Centre for Fine Print Research's most significant artistic collaboration since its inception in the early 1990s was in 2003 with Richard Hamilton (1922–2011). Hamilton was crucial in establishing the collaborative model used in the studios today, which was further developed through working with artists on specific Centre for Fine Print Research-funded research projects. The stand-alone CFPR Editions, which acts as a print publisher within the university, emerged from this model in 2010. The first artist was Carolyn Bunt (b. 1970).

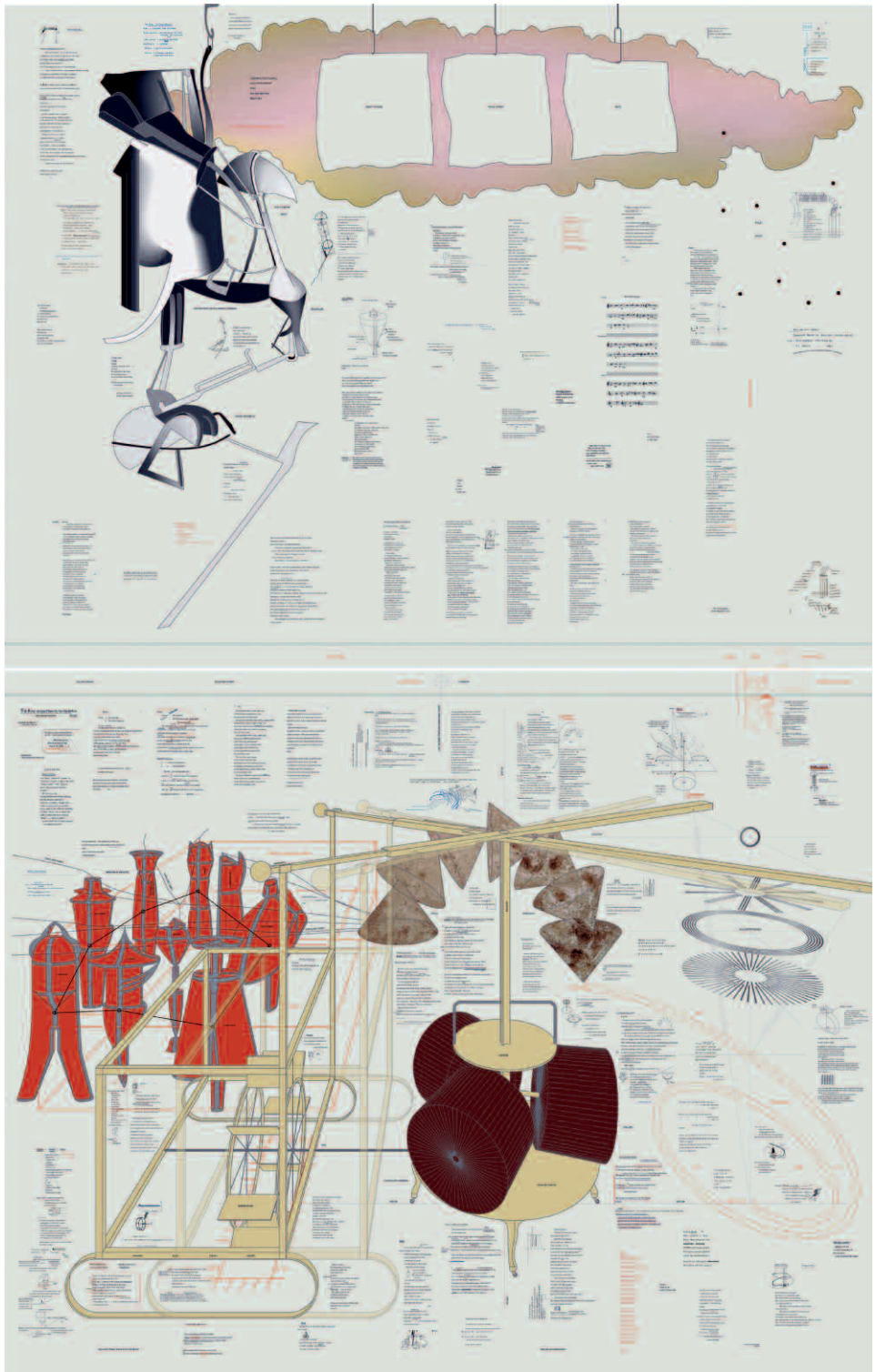
Richard Hamilton worked extensively in the field of printmaking, producing large bodies of work using

2. Steve Hoskins, Richard Hamilton and Paul Laidler inspecting proofs for Richard Hamilton's *Typo/Topography of Marcel Duchamp's Large Glass* at the Centre for Fine Print Research's studio, Bristol, in 2003.

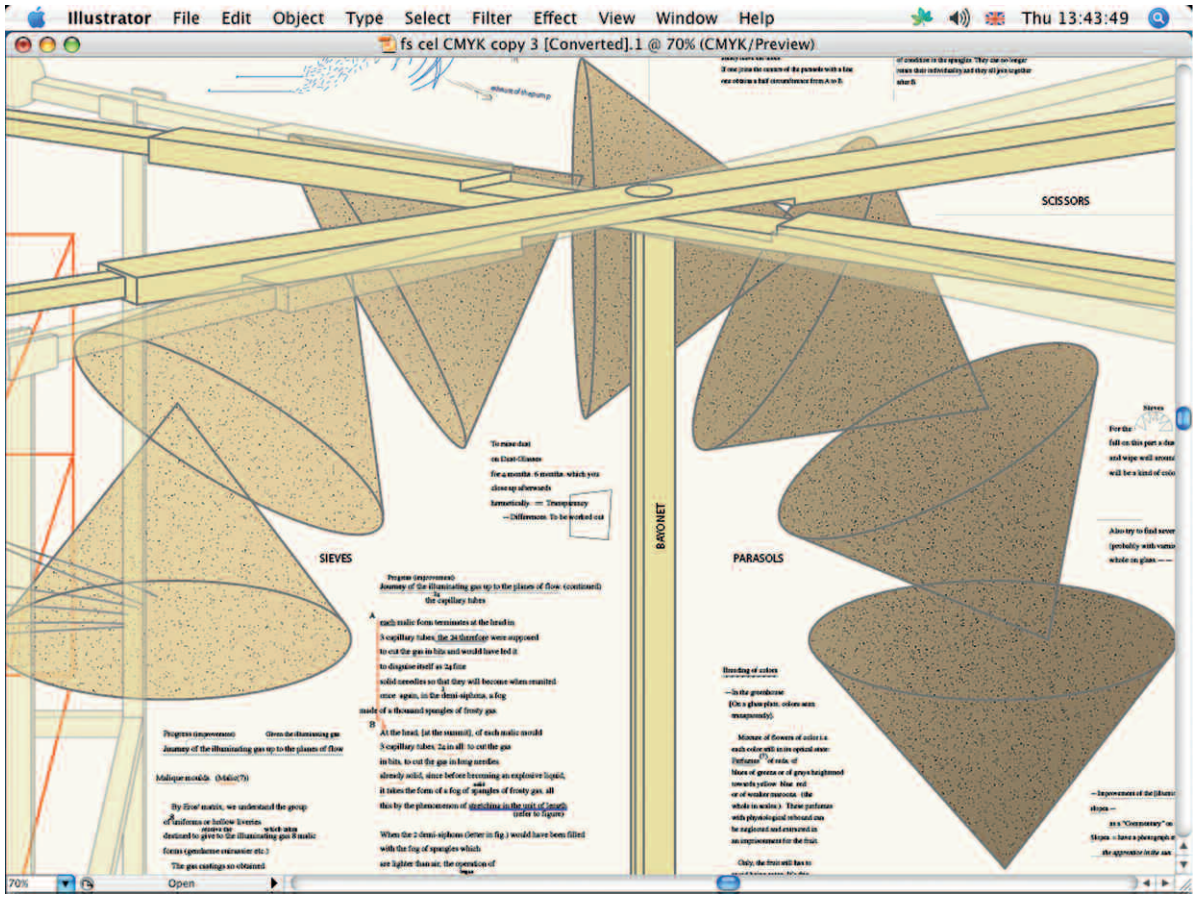
both mechanical and digital print processes. He is also well known for the care with which he selected the most appropriate master printers to realize his ideas: Aldo Crommelynck (Atélier Crommelynck, Paris) for intaglio prints, Chris Prater (Kelpra Studio, London) for screenprints and Kenneth Tyler for lithography (Gemini, Los Angeles). Hamilton had worked with computer technology and printmaking, adapting software to his own needs, since the 1970s. In an essay in this Journal, Richard Field stated that the computer was 'a modern technology tailor-made for [Hamilton's] enterprise'.[3] One of the first noteworthy examples of Hamilton working collaboratively on a digitally mediated print is *Five Tyres Remoulded*, of 1971 (fig. ##1). This project used a computer to develop further a perspectival drawing from 1964 showing five car tyres and their treads, *Five Tyres Abandoned*. It had quickly became apparent that drawing by hand would be too time-consuming due to the amount of perspective points needed, hence the word 'abandoned' in the title. For *Five Tyres Remoulded* Hamilton used a skilled programmer and computer animation specialist, Sherill F. Martin in San Francisco, to assist him. With Martin's bespoke CAD programme to plot the remaining points of the tyre treads, Hamilton was able to realize the final version of the print with what he described as 'inhuman speed'.[4]

During the ensuing years Hamilton's fascination with the computer increased. In the 1980s, IBM and Apple Macintosh developed and produced the first home computers and in the new desktop publishing era

3. R. Field, 'Hamilton', *Print Quarterly*, XXII, 2005, p. 351.
4. *Richard Hamilton: Prints and Multiples 1939–2002*, edited by S. Coppel, R. Hamilton and E. Lullin, Düsseldorf, 2004, p. 106.



3. Digital Image of Adobe Illustrator File for Richard Hamilton's *Typo/Topography of Marcel Duchamp's Large Glass*, 2004.



4. Computer Screenshot of File for Detail of Richard Hamilton's *Typo/Topography of Marcel Duchamp's Large Glass* Before the Alterations to the Sieves, 2003.

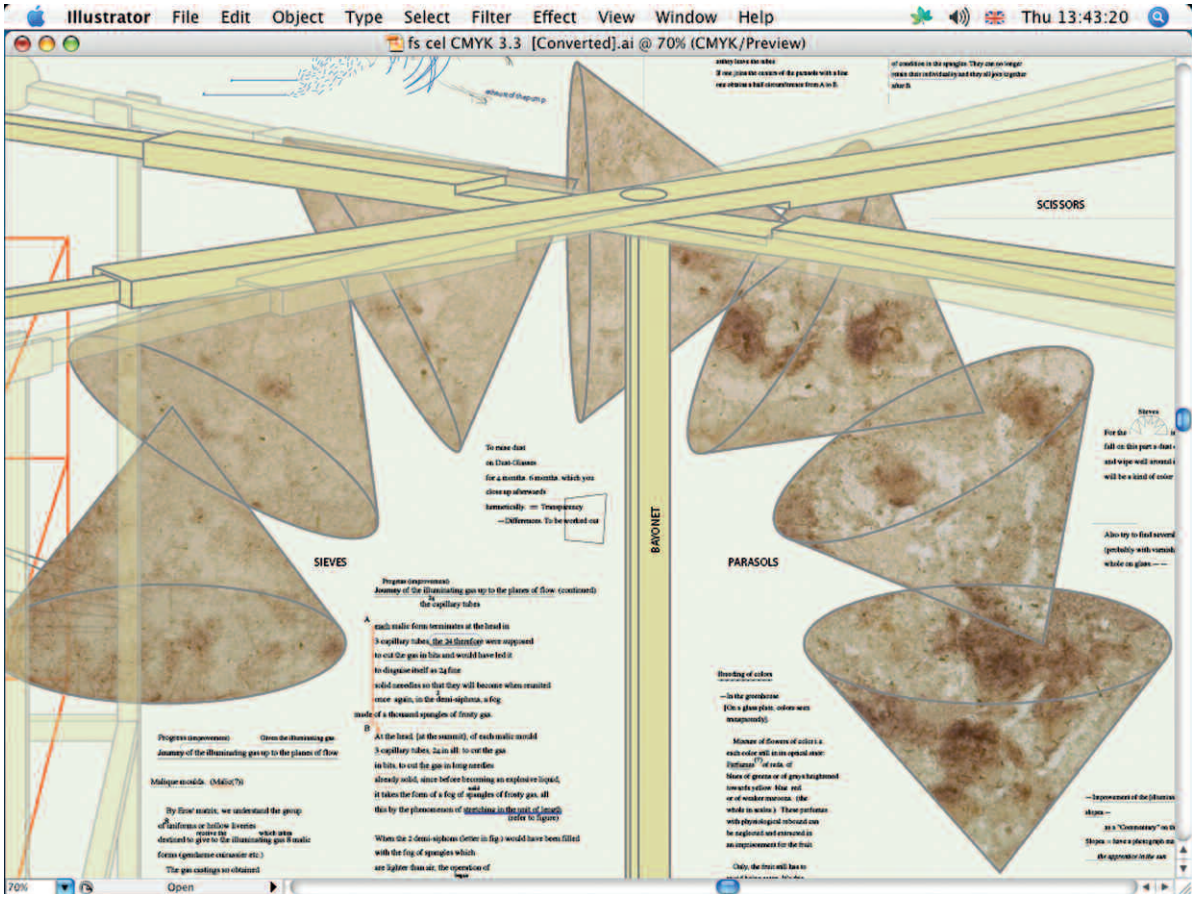
that followed, a range of digital products previously only available to the commercial print industry became affordable for the home user. It was Hamilton's participation in the BBC television series *Painting with Light* in 1987, however, that led to his discovery of the computer as an artistic tool:

> It was not until I was asked to participate in a series of programmes made in 1987 for the BBC that I saw the potential of using a computer to manipulate images. Six artists were invited to contribute to a series called *Painting with Light*. The 'Paintbox' computer, developed by the British company Quantel, was designed to be operated by an artist to draw and paint on a cathode ray tube as freely as with brush and pigment on paper. I owned and operated a Quantel Paintbox (1992–99) and a later model called Printbox. All the prints and paintings I made subsequently utilised, in a variety of ways, digital image processing equipment.[5]

As with his *Five Tyres Remoulded* project, where the computer was predominantly used for its speed and computational power, Hamilton employed a skilled operator, Martin Holbrook, to help construct the digital file. The *Painting with Light* project allowed Hamilton to develop a virtual collage of source material, whilst seamlessly distorting scale and colour, to create *The Apprentice Boy*, a computer-manipulated image printed as a dye-transfer photograph, in 1988.

Between 2001 and 2003, Hamilton twice attempted, without success, to reprint *Five Tyres Remoulded* in the UK, the second time at The Print Room in London run by Ian Cartwright. Cartwright produced fine art prints

5. R. Hamilton, *Painting by Numbers*, London, 2006, p. 7.



5. Computer Screenshot of Original File for Detail of Richard Hamilton's *Typo/Topography of Marcel Duchamp's Large Glass* After the Alterations to the Sieves, 2004.

for over 25 years before establishing The Print Room in 2000 and is still considered one of the leading inkjet master printers in the UK. His studio has produced fine art digital prints for artists such as Richard Hamilton, Julian Opie, John Hilliard and Wolfgang Tillmans. Cartwright recommended the Centre for Fine Print Research's digital studio to Hamilton because of the depth of its research into inkjet printing and the wide range of specialist equipment available, such as a 60-inch-width-capacity printer. Hamilton was particularly interested in finding a printmaking facility that understood the technology needed to develop customized computer files for editioning artwork to his exacting standards. The Centre for Fine Print Research builds custom profiles in-house which are specific to each model of printer, software and paper used in a singular edition.

It was with the Centre for Fine Print Research that Hamilton printed *Typo/Topography of Marcel Duchamp's Large Glass* in 2003, some 30 years after *Five Tyres Remoulded*. The team that worked with the artist consisted of Rod Hamilton, who had been working since 2001 on technically generating the digital file, myself, responsible for the printing and proofing of the final work, and Professor Steve Hoskins as facilitator (fig. **##2**). Hamilton's initial work at the Centre was associated with the ongoing research project 'Methodologies for the Integration of Fine Art Practice and Wide Format Digital Printing', funded by the Arts and Humanities Research Council from 2003 to 2007. The research project provided a testing ground for producing and facilitating digital inkjet prints for artists such as Jack Youngblood (b. 1961), Cecilia Mandrile (b. 1969) and Hugh Sanders (b. 1955), with the research documenting and archiving the technical process of digital editioning, for best practice in the collaborative digital print studio.

Prior to generating in 2003 the digital file for

Typo/Topography of Marcel Duchamp's Large Glass (see fig. **##3**, which was from some months later), Richard Hamilton had collaborated with Marcel Duchamp between 1957 and 1966 to translate and reconstruct Duchamp's sculptural piece *The Bride Stripped Bare by her Bachelors, Even,* also known as *The Large Glass,* of 1915–23.[6] In 1957, together with the Yale art historian George Heard Hamilton, Richard Hamilton began translating Duchamp's notes from *The Green Box* into English, which were published by Hamilton as *The Green Book* in 1960. Duchamp's *The Green Box*, published in 1934, is a limited-edition box containing collotype reproductions of notes on various pieces of paper that detail the artist's thought process during the conception and execution of *The Large Glass*. In 1965 Hamilton began, under Duchamp's guidance, a reconstruction of *The Bride Stripped Bare by her Bachelors* for a Duchamp retrospective curated by Hamilton at the Tate Gallery in 1966. The reconstruction was necessary because Duchamp's sculpture in the Philadelphia Museum of Modern Art was too fragile to travel. Hamilton worked almost thirteen months on the reconstruction, which was signed by Duchamp at the opening of the exhibition in 1966. Using the translated notes as a guide, Hamilton sought 'to reconstruct procedures rather than imitate the effects of action.'[7] He used the same materials as Duchamp's *Large Glass*, thereby replicating the original work but not the effects of time on it. The transparent pastel colour in the sieves (the seven cones representing a section of the 'Bachelor' in figs. **##4** and **##5**), for instance, is the visual translation of the words 'time' and 'dust' from Duchamp's notes.

Hamilton used similar colour and texture descriptions for the printing of his digital file for *Typo/Topography of Marcel Duchamp's Large Glass,* requesting that colours be the brown of 'milk chocolate' or the grey of 'lead' in reference to Duchamp's text. Thus two separate works coexist in the print: the text from Hamilton's *The Green Book* and the image of the Duchamp sculpture *The Bride Stripped Bare by her Bachelors, Even (The Large Glass)* as reconstructed by Richard Hamilton in 1965–66.

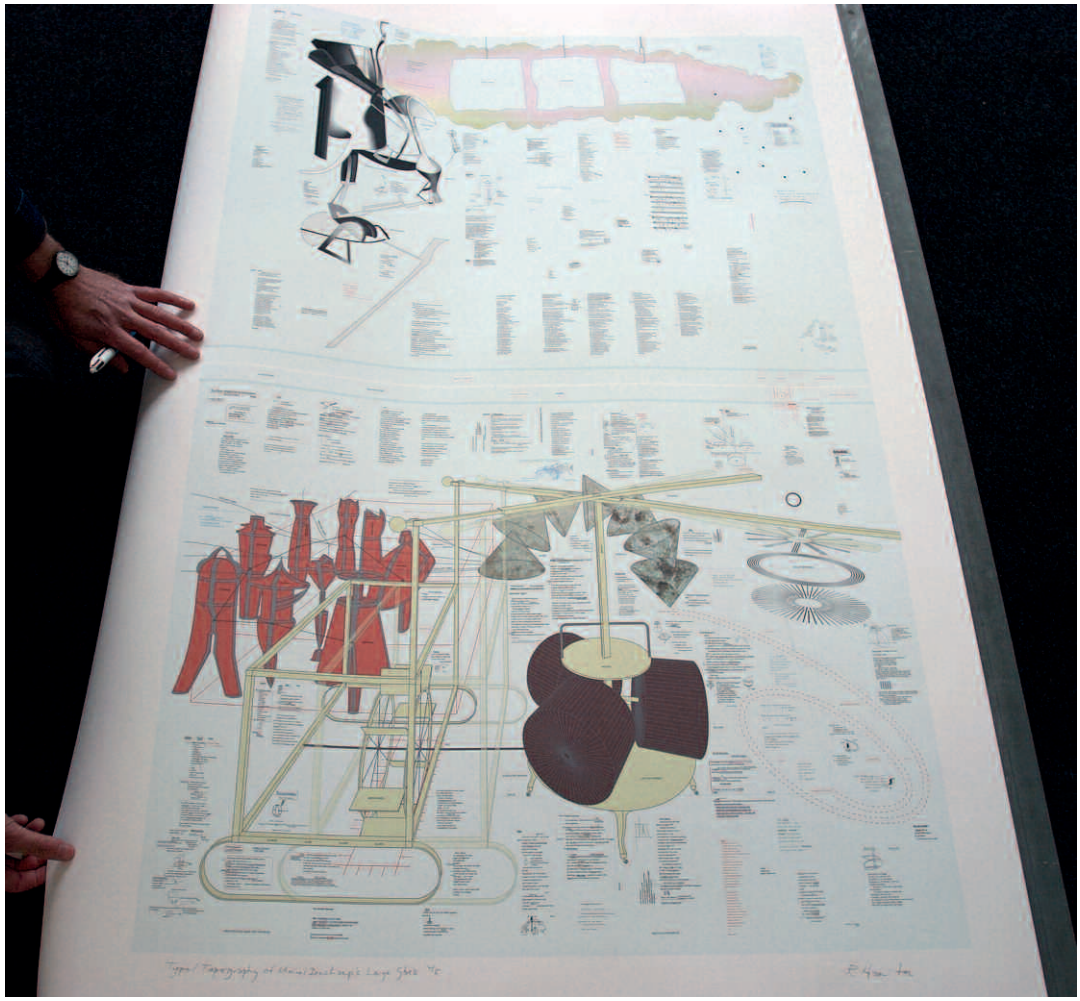
The initial problem in printing Hamilton's file was that the printed image needed to match the dimensions of Duchamp's original two-piece *Large Glass,* which measured 60 by 90 inches (1,524 by 2,286 mm). This required an inkjet printer capable of creating a high-resolution image of a width of at least 60 inches using pigmented inks. The printer also had to be able to handle the programming language Postscript 2 used to translate the vector-based image associated with computer-aided design into a graphic image constructed out of pixels (a bitmap). Preserving a consistent black gradation without compromising the other colour values in the vector file was a technical challenge. Prior to working on this particular digital file, the majority of digital prints that I had worked on originated as bitmap images, which is a predominantly photographic-based file that is resolution dependent. The resolution formula uses a grid-based system of pixels where each pixel holds a specific colour value to map and define various elements of an image. The vector-based image differs from the bitmap in that a vector file is created through a CAD program such as Adobe Illustrator. Because it is constructed by a computer, the vector file holds the essential information to create well-defined elements such as lines, shapes and colours.

In accordance with the studio's standard practice, a paper profile (an algorithm to measure how much ink is deposited on a particular substrate) was written for Somerset Enhanced Radiant White Velvet paper, and initial proofs were created whilst Hamilton was present. Hamilton was pleased with the majority of colours in the first printed proof, but there still remained some problems with the gradations between the light and dark sections. The most difficult part was the particular area of black and grey neutral tones with no other colour in the Bride section at upper left of the print (compare fig. **##3**). A decision was taken to print the entire image as a CMYK (raw cyan, magenta, yellow, and black sample) file, contrary to current practice of printing from an RGB file (a file created on a Silicon Graphics workstation), thus making far easier the removal of hues. At the time of creation, Hamilton wrote:

> I received the prints from Ian a week ago and was very pleased to see them. Ian had spoken to me on the phone so I had his reactions before I opened the package. It's a small step in the Print Industry but a giant step for mankind. You have done well and I congratulate you. When I compared your prints with the technicoloured grey scale of an earlier version I was more than impressed – considering that they were both done on a HP [Hewlett-Packard printer] (I assume that you were using the same 60-inch machine you worked with when I was in Bristol) it's a miracle. I waited until my son (who was

6. The following discussion on the historical relationship between Duchamp and Hamilton is based on P. Thirkell, 'From the Green Box to Typo-Topography: Duchamp and Hamilton's Dialogue in Print', *Tate Papers*, Spring 2005, also available online.

7. R. Hamilton, *The Collected Words 1953–1982*, London, 1982, p. 212; cited by Thirkell, op. cit., paragraph 13, accessed on 11 December 2015.



6. Richard Hamilton, *Typo/Topography of Marcel Duchamp's Large Glass*, 2004, pigmented inkjet print, 1,070 x 1,500 mm (Private collection. Courtesy estate of the artist).

largely responsible for the Illustrator file) visited me at the weekend and he was equally impressed.[8]

Upon Hamilton's return, he wished to adjust specific colours that he referred to as 'rust red' and 'milk chocolate'. Up until this point, adjustments had been made to the whole image, and these global alterations to the vector file meant that the alteration of one area of colour created colour shifts in other areas, in particular, the very light-toned background colour in large flat areas, and the large areas of bright, solid or strong neutral tone. The next step was to make local adjustments to separate areas of the file in the Illustrator programme. This was done by making alterations iteratively to each of the individual areas in need of colour correction. Once each set of groups and layers had been colour-corrected individually, and proofed as small sections enabling colour comparisons with the larger print, we were able to begin proofing the full-scale image. The full-scale proof required some minor changes once the printed image could be viewed in its entirety, prior to producing the edition of six prints, the final image measuring almost eight by ten feet.

One year later, in 2004, Hamilton returned to the Centre to produce a further edition of the *Typo/Topography* print. He had decided to add another element to the digital file in the sieves section of the image. Instead of a computer-generated gradation (fig. **##4**), Hamilton introduced a photographic rendering of the glue

8. Email from Richard Hamilton to Paul Laidler, 25 August 2003.

and dust visible in the sieves in Duchamp's *Large Glass* sculpture (fig. ##5). He had added the photographic element to the same digital file that had produced the previous printed edition. With this addition, and a minor adjustment to the background colour, the digital file was prepared for its second printing. During the first printing of the work, all the adjustments that were made to the file's printing parameters were documented to make sure that the process could be recreated. The same output parameters were applied to the second printing because Hamilton wanted to keep the other areas of the image the same as he had previously approved. Without the documented parameters that were arrived at after months of proofing, the print proofing procedure would have had to start again.

In summary, Hamilton had a total of three variant editions of *Typo/Topography of Marcel Duchamp's Large Glass* printed at the Centre for Fine Print Research; a full-size edition of three in 2003 produced to the same scale as Duchamp's *Large Glass* (1,700 by 2,675 mm, 60 by 90 inches); a second full-size edition of nine with the alteration to the sieves in 2004; and a third, smaller-sized edition of five, also in 2004 and also with the sieves altered (1,070 x 1,500 mm; fig. ##6). *Typo/Topography of Marcel Duchamp's Large Glass* led to five further collaborative digital print editions with Hamilton: *An Annunciation(b),* of 2005; *Passage of the Angel to the Virgin* (preliminary proofing, 2008); *The Hutton Award,* of 2008; *Professor A. D. (Tony) Nuttall,* of 2008; and *Shock and Awe,* of 2010.

In November 2010, the artist expressed his views on digital print technology and the role of the master printer in the digital age as follows:

> In my experience any printing 'collaboration' requires a relationship in which the printer serves the artist: if the printer does not respect the artist's technical competence, or the artist does not have sufficient knowledge of the medium to participate in the work, or understand the way his mental image might be transferred to paper, then the result will be unworthy of either printer or artist … There is no doubt that working with computers is completely unlike working with the classical methods of print. My contribution to *Five Tyres Remoulded* was to provide the information that could be put into a perspective programme to draw some difficult vectors. Digital image making has moved a long way since 1971 and digital printing will only produce great art when artists master the software tools as advances in printing machinery continue.[9]

The collaboration with Hamilton and the exchange of process-based knowledge provided an incentive for future artist-led projects at the Centre. Similarly Hamilton's search for collaborative partners and his exploration of image-making tools provided a perfect match with the Centre for Fine Print Research's meticulous and interdisciplinary approach to realizing ideas in print.

9. In conversation with the author and cited in P. Laidler, 'Collaborative digital and wide format printing: Methods and considerations for the artist and master printer', PhD, University of West of England, 2012.