Abstract

The collaborative print studio has had a profound impact upon the production and realisation of some of the most innovative prints within the discipline of fine art printmaking. Historically, an artist with little understanding of the print process or access to print facilities could seek technical knowledge and craft sensibilities from a master printer. In some instances these unique collaborative pursuits redefined production methods and pushed the boundaries of what was previously thought possible. These historical precedents have been established through mechanical modes of production and have contributed to defining the roles, expectations, production, publication and artisanship of the collaborative print studio.

However, over the last 20 years new digital tools and processes have entered the traditional domain of the collaborative print studio. These developments have, to some degree, brought into question the role of the traditional print studio in the digital age, notably through a shift from manual dexterity to automated systems or the ubiquitous nature of digital processes that have often replaced specialist tools and facilities. The article seeks to engage with these emerging approaches, processes and technologies as a means by which to consider the possibilities of the collaborative print studio in the digital age which is an important strand in the research of the Centre for Fine Print Research (CFPR) at the University of the West of England (Bristol).

Introduction

The collaborative print studio and its Master Printer model is a global phenomenon that has continually adapted in response to the varying movements of art history. In this article I will be analysing the Western tradition of collaborative print practices and the development of the US-based studios between 1960 – 1980, a period often described as the Print Boom era. By establishing these mechanically-defined precedents I will then discuss the development of this historical model in relation to the emergence of the digital print studio and its pioneers in the early 1990s. To offer further insights into the role of the Master Printer and the development of the print studio in the digital age, a detailed case study will be provided that documents the production and publication of an inkjet print for the late Richard Hamilton by the Centre for Fine Print Research (CFPR) at the University of the West of England
(Bristol). This specific example will enable a more general discussion of the nature and function of the collaborative print studio in a culture increasingly dominated by digital technologies.

The Concept of the Master Printer

Prints have long been a means of creating and disseminating multiple copies of artists’ images. The production of fine art prints by artists also has a longstanding relationship with the collaborative print studio - defined as a studio where artists work together with Master Printers to realise and produce printed artworks. Seminal American studios founded in the 1960s include Universal Limited Art Editions (ULAE) and Tyler Graphics, and in Britain, Kelpra founded by Chris Prater. Although the creation of artwork is often assumed to be a solitary activity, the nature of creating prints requires an artist to access the use of specialist facilities, equipment and materials. Subsequently the artist is forced to seek the assistance of another individual, not only to gain access to a process, but in the logistics of creating work through that process. The collaborative undertaking between an artist and print studio has predominantly been one of facilitation, although the process of facilitation what it involves and what the relationships are has varied between print studios or more specifically, between each studio’s Master Printers.

The Master Printer has been a constant figure within print history, particularly during the 19th and 20th Centuries as exemplified by Roger Lacourière (1892-1966) Fernand Mourlot (1895-1988) and Aldo Crommelynck (1931-2008). Traditionally the Master Printer was someone who attained a high degree of technical proficiency in interpreting, by hand, the work of artists through various graphic conventions dictated by techniques such as engraving, etching, lithography or screenprint. Deborah Wye extols Picasso’s relationship with Lacourière, who: “became an active collaborator, giving Picasso a new understanding of the intaglio process … the result was a new level of ambition in Picasso’s prints.” (Wye, 2004: 47).

The Master Printer’s skills often extended beyond technical proficiency also encompass diplomacy and patience. Kathan Brown, Director of Crown Point Press identifies “four keys to being a good printer: to be present and competent without being intrusive, without putting out constrictions; to feel honestly that doing this work is an adventure; to waste, if necessary, materials and time; and, most important, not to waste the artist’s momentum, concentration, and pleasure in the work.” (Brown, 1980: 178; original emphasis)

Not only has the Master Printer played a pivotal role in the creation of fine art prints, but the experiential knowledge gained by the printer has provided a rich vein of information for historians and archivists researching the field of fine art print. For example, Pat Gilmour discusses Ken Tyler’s development and influence due to his skill and innovation in printmaking at the Tamarind Lithography Workshop in Los Angeles. Tyler progressed from understudy to Technical Director from 1963-1965; and established his own studio Gemini Ltd in Los Angeles in 1965, and Gemini G.E.L. in 1966. He worked with numerous artists such as Andy Warhol, Claes
Oldenburg, Jasper Johns, David Hockney and Edward Ruscha until his retirement in 2000.  

Collaboration in Art

Artists work in many forms: individually, in co-operation with others, or as collaborators on a project. Collaboration can take many forms in itself, from joint artistic endeavours, to an artist directing a project that is produced remotely by others, or produced in the studio under the supervision of the artist. Dr Joann Moser, Senior Curator of Graphic Arts at the Smithsonian American Art Museum, describes the distinction between the artist and the artisan, originating in the Renaissance period, as one of the main obstacles to collaboration. It was here that the artist’s liberation from the restrictive guild system helped form what became the Romantic notion of the individual ‘genius’ and of ‘originality’ in art. Moser states:

Collaboration in the fine arts has been overlooked, de-emphasised, and often denigrated by those who subscribe to the notion of the centrality of the individual artist and the unique masterpiece as the highest expression of originality and quality in art. (Moser, 1995: 10)

However, collaboration in the fine arts has been utilised by artists for a multitude of reasons. Through both conceptual dialogues and pragmatic strategies, artists have been mindful of the benefits of collaboration.

Unlike other industries such as film for example, which is perceived publicly as highly collaborative - with status applied to cinematographers, writers, directors, producers and actors, all of whom are credited - the collaborative method in fine arts has, to some degree been under-emphasised due to its developmental origins within the traditional arts and crafts guild system and art’s association with originality and authenticity.

Although this notion of the individual and originality has less influence in the Postmodern era, it has no doubt hindered the growth of collaboration in the fine arts field. In more recent times that alternative perspectives of art history and artistic creation have been posited. Moser describes some of the most recent prominent influences as: Marxist, Poststructuralist, Feminist and Pluralist theories. David Shapiro, in particular, has argued that art is inescapably collaborative, citing the communal relationships within the movements of Modernism. In contradistinction to the Romantic notion of the isolated genius, Shapiro argues that we could not

…begin to have a van Gogh without Gauguin, a Cezanne who does not sign himself student of Pissarro, an Orphism without the marriage of Sonia and Robert Delaunay and collaborating poets, Dadaism without the pacifistic friendship involved throughout, Abstract Expressionism without the collaboration of Gorky and de Kooning, earthworks without the fierce alliance of Serra, Holt and Smithson…’ (in Moser, 1995:10)

Moser suggests how Shapiro’s perspective invites us to reconsider the collaborative role in other movements in art, where it has assumed a pivotal position. Using Shapiro’s focus of interaction between artists, Moser highlights the particular collaborative exchange where an artist relies on the hands of another to execute the work. This particular type of collaboration has been the most prominent method within the printmaking studio, for example in Tyler’s collaborations with Robert Rauschenberg for *Booster* (1967), and in James Rosenquist’s *Time Dust* (1992).

**Reasons for Artists to Collaborate**

Collaboration in the printmaking field is predominantly from a pragmatic perspective where the artist is able to access specialist equipment and technical expertise with the tools, materials and operations of a particular print studio. The facilitator role within printmaking studios is referred to as the Master Printer. “We think of ourselves [Master Printers] as guides, or perhaps teachers… We provide support, skills, sensitivity, intelligence, interest in ideas – but the ideas themselves are the artist’s territory.” (Brown, 1980: 178). The artist producing prints with a collaborative studio relinquishes a certain amount of control during the production of their print to an individual they may or may not know, using a process they may have never seen or used before. When artists worked with Master Printers they not only accessed the learned craft and technical skills but also the printers’ collaborative philosophies.

**Facilitating Production: Two Seminal Examples.**

The raising of the Master Printer’s profile as spokesperson, inventor and publisher has proved to be an influential characteristic towards the development of collaborative printmaking throughout the 1960s, 70s and 80s.

The lithographic print studio Universal Limited Art Editions (ULAE) was founded by Tatyana Grosman (1904 – 1982) in West Islip, New York State, during the height of the Abstract Expressionism movement in 1957, three years before June Wayne founded Tamarind. ULAE still operates as a studio today, producing limited editions of prints. Grosman initially struggled to attract any high-profile artists, so instead looked towards the up-and-coming, artists of the period. In doing so, she persuaded two young artists, Jasper Johns and Robert Rauschenberg, to work in her studio. Johns produced his lithographic edition *Target* at the studio in 1960, and two years later Rauschenberg produced seven lithographs in 1962: *License, Merger, Stunt Man I, Stunt Man II, Stunt Man III, Suburban*, and *Urban*. Rauschenberg has since produced 135 editions at ULAE, and Johns 120 editions.²

Johns and Rauschenberg’s success paved the way for many more artists to use ULAE as Grosman began to build a high-profile client list off the back of her previously astute invitations to artists. Grosman’s policy was partly determined by the size restrictions of the studio, which was at that time located in her garage Grosman also

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² A complete list of artists hosted and prints produced at ULAE can be seen found at: www.ulae.com
believed that the rapport between herself and the artist played a pivotal role in the success of printed work. This position meant that certain artists would be invited back to produce further works, but if she felt there had been “little or no rapport” with an artist during print production, then the possibility of continuing with further collaborations was deemed to be “pointless” (Hansen et al., 1995: 72).

The Artist’s Sanctuary

Grosman’s obsessive attentiveness to both the details and standards of the process was key to attracting so many artists. Her attention to the working environment was, in many cases, pivotal to the progression of a project. It was Grosman’s empathy with her artists and their struggles to create their art that lead her to tailor the studio to the particular needs of each visiting artist. When working with the abstract painter Barnett Newman, Grosman ensured that all references to, or evidence of other artists who had previously worked there would be removed so that the studio felt completely his own. This method encouraged Newman to work freely and without distraction in his exploration of materials and process. An example is his *18 Cantos* produced at the studio (1963-1964). Newman describes how lithography was not a process, but an instrument that needed to be mastered in order to play. Newman effusively thanked Grosman for her “devotion, encouragement and patience” in the production of *18 Cantos* and Master Printer Zigmunds Priede for his “sympathetic cooperation on the press” (Newman, 1992: 184). Grosman’s ability to make each artist feel that the studio was solely for their own use was reflected in Newman’s proposition that “Studio is Sanctuary” (Hansen et al., 1995: 74).

Signature

The style of the artist’s work was always a principal concern of ULAE. Grosman would go to extraordinary lengths to accommodate them, such as selecting the correct combinations of materials that she believed best suited a particular artist. However, the physical application of these materials during printing was not manipulated by her own hand. As Grosman had no technical experience of the printmaking process, this task was given to the studio’s Master Printer Bill Goldston. Grosman’s talent lay in her sensitivity for the materials of printmaking, her intuitive relationship with the artist, and an insight into the craft of art making. By functioning as an intermediary between artist and Master Printer, transcribing the artist’s intentions - Grosman was able to remove any possible technical persuasion that the printer may invoke. Maintaining this acute awareness with the production process meant Grosman’s publications would be unique amongst other studios as there was no, or very little, house-style detected in the work. Grosman’s collaborative strategy of firmly separating the distinct roles of artist and printer was central to ULAE’s practice, and in line with the Tamarind Institute’s maxim regarding the printer detecting the “true spirit” of the work. Ironically the antithesis of both ULAE and Tamarind’s collaborative philosophies came from one of the Tamarind Institutes graduates, the Master Printer, publisher and arts educator Kenneth E. Tyler.

Ken Tyler - Tyler Graphics Limited
Ken Tyler received a Ford Foundation Grant to study at the Tamarind Lithography Workshop in Los Angeles in 1963, where he worked under the Technical Director Irwin Hollander, and later under the French Master Printer Marcel Durassier, former Master Printer of Imprimerie Mourlot, Paris. Tyler acquired broad technical skills through research and practice, and, from 1964-65, was appointed Technical Director of the Workshop.

In 1965, an ambitious Tyler left to establish his own print studio, Gemini Ltd, in Los Angeles, and, in 1966, Gemini Graphic Editions Ltd. (Gemini G.E.L.) producing prints and multiple editions. In 1973, after selling his collection of printer’s proofs and drawings to the National Gallery of Australia, Tyler moved to New York and founded Tyler Workshop Ltd., which evolved into Tyler Graphics Ltd. in 1974, and was overseen by Tyler until he retired in 2000. From 1974 until his retirement in 2000, Tyler collaborated with numerous artists including: Josef Albers, Claes Oldenburg, Anthony Caro, Robert Motherwell, Richard Hamilton, David Hockney, Frank Stella and Roy Lichtenstein. During this time, Tyler redefined both the artisan role and the studio ethos, extending what was possible in printmaking and what an artist could expect from a print studio.

Tyler set no boundaries insisting: “Here is a workshop, there are no rules, no restrictions, do what you want to do.” Through innovative use of processes, mixed media possibilities and development of technology for individual projects, Tyler created an environment that excited artists, offering them endless possibilities in the production of fine art prints. Tyler became the epitome of June Wayne’s initial vision for Tamarind and for America’s contribution to the field of collaborative printmaking. Tyler’s ascendancy during this period, alongside a number of other studios in the USA including ULAE (New York), Landfall Press (Santa Fe), Crown Point Press (San Francisco) and Graphic studio (Florida) benefited from the affluent art markets of this period. The work produced in these studios reflected a range of artistic movements including, for example: Abstraction, Minimalism, Realism and Pop. Although each of the studios would produce prints for various artists, the Master Printers would often become associated with particular styles or groups. This association was to some extent attributed to each Master Printer’s own preference and influence on the production process.

In the case of Ken Tyler and Tyler Graphics, the studio was renowned for its highly-polished, industrial aesthetic, which at the time was very suited to the concerns of the Pop artists. Tyler’s collaborations with Rauschenberg, for example on Booster (1967), and Lichtenstein for Peace through chemistry (1970), were astute publications that suited both the aesthetic considerations of the artists and the production sensibilities.

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3 In the documentary film Reaching out – Ken Tyler, master printer, directed by Lee Tirce and Sid Avery (Avery Tirce productions 1976), Tyler discusses his collaborations with artists Roy Lichtenstein, David Hockney and the writer Michael Crichton. A transcript of the film’s audio can be read at: http://www.nga.gov.au/InternationalPrints/Tyler/Default.cfm?MnuID=8&vidmnu=1 [accessed 02/03/09]. See also Pat Gilmour’s Ken Tyler: Master Printer, and the American Print Renaissance, 1986.
of the studio. The house styles of Tyler’s various workshops: Gemini Ltd and Gemini G.E.L. (Los Angeles) and Tyler Workshop and Tyler Graphics Ltd (Bedford and Mount Kisco) were important contributory factors for the premise of some his collaborations.

Tyler’s association with house style and technical *tour de force* was not always the most prominent attraction for artists to his studio. For some artists such as Richard Hamilton, it was Tyler’s early association with, and affinity for the lithographic process that attracted Hamilton to the studio. Hamilton worked with Tyler at Tyler Graphics in 1975 on the suite of four-colour lithographs *Flower-piece B*, experimenting with two stones (as duotones) for each colour – cyan, magenta and yellow, and printing another layer of white. Prior to extending his technical repertoire, Tyler had learnt his trade as a Master Printer in lithography. He often used a series of colour lithographic prints which he had helped produce for Josef Albers, *White line squares* (1966) as “his calling card”⁴ for enlisting prospective artists. Albers was the first major artist with whom Tyler collaborated and the success of the print enabled Tyler to establish his own studio. Hamilton was an advocate of enlisting printers or processes for any given project.⁵ He therefore selected printers according to what he deemed to be their technical strengths rather than having ideas or processes imposed upon him.

Tyler’s collaborative tactics were the opposite of Hamilton’s; by examining the artist’s work, Tyler would identify which artists would be best suited to a particular process. This could also include innovative or experimental productions that Tyler had in mind, where a range of processes may be combined, for example in Robert Rauschenberg’s first print with Gemini G.E.L. *Booster* (from the series *Booster and 7 Studies*, 1967) using an experimental process of photo lithography and screenprint.

This particular mix of lithography and screenprint was to start a new trend for mixed-media printing. “Tyler virtually redefined the possibilities of size and scale in contemporary print. Rauschenberg’s *Booster* was publicised at the time as the largest hand-pulled lithograph ever made in America.” (Gilmour, 1986: 48).

Tyler’s research and development of printmaking techniques was constant, and working with other high profile artists such as the painter and printmaker Frank Stella resulted in Tyler investing in new and unorthodox printing machinery such as vacuum forming machines and hydraulic presses. As Pat Gilmour noted in *The Mechanised Image* “When necessary building presses, developing inks or custom making papers, Tyler documents his prints as ‘collaboration between artist and staff’; he lives in a country that realises you do not get to the moon on your own.” (Gilmour, 1978: 96)

**Technological Developments and the Inkjet Printer**


The democratisation of digital technology from the desktop publishing era in the mid-1980s provided individuals with the opportunity to develop and experiment with consumer-orientated digital technologies. Many technology enthusiasts grasped the potential of digital imaging during this early period, and for artists, the potential of digital information as a high-quality print would propel the development of digital within the fine art printmaking field. When considering specific digital processes within the field of fine art printmaking one might refer to the advent of The Graphic User Interface (1981), Adobe software (1990) or Pigmented Ink (1998) for example. Whilst these technologies contributed to the development of fine art digital print it was the Iris inkjet printer that sparked the initial interest from the emerging digital fine art print fields; bridging the gap between the digital image on screen and the digital file’s high-resolution rendering as a printed image.

The Iris inkjet printer was produced and introduced in 1987 by IRIS Graphics in Massachusetts as the first high quality, continuous-tone, photographic, digital inkjet print device. The Iris printer could print digital images onto cotton-based papers making it appealing to both printmaking and photographic disciplines. Prior to any fine art print interests, the Iris printer was originally developed and used as an industrial proofing machine in the commercial print industry. Because of its speed, by making amendments to a computer file that was linked to the Iris printer, proofs could be produced in quick succession, demonstrating to the client how the adjustments made compared to the previous printout.

By the end of the 1980s, and into the early 1990s, individuals such as David Adamson, Jon Cone, Graham Nash and Mac Holbert, all of whom later pioneered the development of digital fine art print, began using the printer within a fine art print context. Nash Editions purchased their IRIS 3047 in 1989 from IRIS Graphics and used it until 2004. In 2005, Graham Nash donated the printer alongside the first print created at Nash Editions, to the collection of the Smithsonian National Museum of American History, where the museum’s director stated: “The IRIS printer will stand as a symbol of change within the world of professional digital photography.”

David Adamson of Adamson editions claimed that the:

“...Iris printing process is essentially an accelerated version of lithography, requiring the same fluent communication between artist and printmaker that the traditional method demands. One of the reasons artists like Chuck Close and Jim Dine are very comfortable working with me is because we're speaking on the same terms, they don't have to talk to me about color balancing, or magenta shifts. We’re using printmaking vocabulary. The drawing matrix of lithography has been replaced by the matrix of the pixel. The printmaker or the artist pushes the pixels around.” (in Offman, 2004: 1)

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From this experimental, fine art perspective (and despite the $126,000 cost),
developments with new software and hardware adjustments were made by those
studios that could afford it, to meet the changing needs of the fine art printer.
These refinements in printmaking technology created a benchmark for artists to begin
producing Iris prints and the ‘digital fine art print studio’ was firmly established.

**The Unique Qualities of Digital Print**

Digital technology is a highly mutable and transferable medium that has infiltrated all
areas of creative practice. The potential to produce physical artefacts from digital files
using a range of output devices is growing. To give a brief example: George Whale
and Naren Barfield in *Digital Printmaking* describe a list of “output technologies
used in printmaking” (Barfield & Whale, 2001: 20) that includes: engraving, cutting,
milling and transfer methods, to name few - alongside the various inkjet and laser
printing technologies, that are still the most accessible output devices to date.

**The Master Printer in the Digital Age**

Collectively, technological developments in the 1980s - 90s, and the emergence of the
digital print studio in the US brought into question further specialist associations with
the production of fine art digital prints and the role of the Master Printer. At present
the digital Master Printer role is still in its infancy when compared with traditional
printmaking conventions, and subsequently very little literature exists on the holistic
nature of facilitating the production of fine art, digital prints for artists.

The main focus of my own research at the CFPR stems from the close relationships
that exist between technology, ideas and making in the arts and crafts - particularly in
the area of digitally-assisted print and its many offshoots.

To begin engaging with the specific discipline of producing digital prints for artists,
the CFPR embarked on an AHRC-funded research project in 2003: ‘Methodologies
for the integration of fine art practice and wide format digital printing’. The project
incorporated an artists’ residency programme ‘The Perpetual Portfolio’ that provided
the testing ground for my own enquiry in to the role of the Master Printer in the
digital age. The residency highlighted the diverse production methods required to
accommodate a range of different artists concerns for the production of a digital print,
and those concerns contributed to the initial generation of my PhD thesis

The case studies included early career and established artists working across a variety
of visual outputs in an attempt to explore a range of practices and scrutinise a
diversity of knowledge applicable to digital print technology. Probably the most
established artist to contribute to the research was the late Richard Hamilton (1922-
2011). Hamilton provided a unique opportunity to test and explore the digital
facilitation process as he had an extensive history of collaborating with Master
Printers and a profound engagement with the tools and processes that were used to

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7 *Collaborative digital and wide format printing: Methods and considerations for the artist and master
printer* (2012).
create his work. When speaking Hamilton the artist offered his own insights about the collaborative process and the introduction of digital technology into the field of printmaking.

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.

When working with a craftsman possessing the incredible skills and aesthetic sensibility of Aldo Crommelynck I never doubted that the prints that resulted were my work. I do not believe that digital printing has expanded the potential of print yet, and we may have to wait a long time to discover whether artists are up to the task of gaining the technical skills to exploit that potential. It seems to me more difficult than, for example, making a drypoint.

Richard Hamilton and Typo-Topography of Marcel Duchamp’s Large Glass, 2003

Richard Hamilton approached the CFPR in 2003 to print the digital file for Typo-Topography of Marcel Duchamp’s Large Glass that he had been working on with his son Rod Hamilton since 2001. Between 2001 and 2003 Hamilton had twice attempted, without success, to print the image at two studios in the UK, the latter being The Print Room in London run by Ian Cartwright. Cartwright is considered as one of the leading inkjet Master Printers in the UK, having produced fine art prints for over 25 years before establishing The Print Room in 2000. The studio predominantly produces fine art digital prints for artists including Richard Hamilton, Langlands & Bell, Julian Opie, John Hilliard, and Wolfgang Tillmans.

Cartwright subsequently recommended the digital studio at CFPR to Hamilton because its experience with printing for artists, and the range of its equipment could assist Hamilton’s printing issues. Hamilton was particularly interested in finding somewhere that could produce custom profiles for his preferred paper and printer combinations.

Prior to the generation of the digital file, Hamilton had collaborated with Marcel Duchamp between 1957 and 1965-6 towards the translation and reconstruction of Duchamp’s sculptural piece The Bride Stripped Bare by her Bachelors, Even (The Large Glass), 1915 -1923. In 1957, together with the art historian George Heard Hamilton, Hamilton began translating Duchamp’s notes from The Green Box (1934) into English, which were later published by Hamilton as The Green Book in 1960. In 1965 Hamilton, aided by Duchamp, began a reconstruction of The Large Glass for a Duchamp retrospective Hamilton curated for the (then) Tate Gallery in 1966. The reconstruction became more necessary because Duchamp’s sculpture was too fragile to travel from its permanent installation in the Philadelphia Museum of Modern Art.
Hamilton’s reconstruction took nearly a year to complete, prior to being signed by Duchamp at the opening of the exhibition in 1966. Using the previously translated notes as a guide, Hamilton sought “to reconstruct procedures rather than imitate the effects of action.” From this perspective, Hamilton’s reconstruction used the same materials as Duchamp’s *Large Glass* to replicate the original work rather than copy the effects of age. The replication of colour in the *Sieves* for instance, was a system-based procedure using “‘time’ and ‘dust’ to produce a transparent pastel colour”.

Hamilton later used these kinds of colour descriptions during the printing of his digital file at CFPR for *Typo-Topography of Marcel Duchamp’s Large Glass*, 2003, requesting that colours be formulated as ‘chocolate’ or ‘lead’ in reference to Duchamp’s text. The print allows two separate works to exist together, the text from *The Green Book* and the image of the sculpture *The Bride Stripped Bare by her Bachelors, Even (The Large Glass)* 1915-23, reconstruction by Richard Hamilton 1965-6.

**The Needs of the Artist and the Project**

The initial logistical problem posed in printing Hamilton’s file was that the image needed to match the same dimensions as the original two-piece construction of Duchamp’s *Large Glass*, which was 60 inches by 90 inches. This required an inkjet printer capable of creating an image of a suitably high resolution that was at least 60 inches across. It also needed to accommodate pigmented inks, and be able to handle the Postscript 2 files necessary to translate the vector imagery into bitmap.

The initial technical challenge in printing this work was to preserve a consistent black gradation (that could only be achieved using a specific output method) without compromising the other correct colour values in each section of the vector file. The bitmap image is predominantly a 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 programme such as Adobe Illustrator™. Constructed by a computer, the vector file creates well-defined elements such as lines, shapes and colours that contain only the essential bits of information to generate those specific elements.

**Initial Technical Proofing Stages**

In the studio’s standard procedures, a paper profile 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

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8 From the display caption June 2010, Tate Modern, Room 1, Level 5. Richard Hamilton in Matthew Gale and Andrew Wilson *States of Flux: Cubism, Futurism, Vorticism, Marcel Duchamp and Richard Hamilton*.

9 ibid.

10 For a discussion of the historical relationship between Duchamp and Hamilton in print, see Dr Paul Thirkell’s *From the Green Box to Typo/Topography: Duchamp and Hamilton’s Dialogue in Print*, Tate Papers, Spring 2005. The entire paper can be read online at: [http://www.tate.org.uk/research/tateresearch/tatepapers/05spring/thirkell.htm](http://www.tate.org.uk/research/tateresearch/tatepapers/05spring/thirkell.htm)
printed proof compared to his previous attempts at printing the file. There still remained a few problematic areas of rendered tones in black and grey. Overall, Hamilton had seen enough for the Centre to continue proofing whilst investigating how to solve the neutral rendering of the grey tones.

The most difficult part was the particular area of black and grey neutral tones with no other colour. A decision had to be taken to print the entire image as a CMYK file (contrary to current practice of printing most images from an RGB file) making the removal of any other hues in the black far easier. Hamilton responded on receipt of his print:

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 (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 largely responsible for the Illustrator™ file) visited me at the weekend and he was equally impressed.¹¹

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. The amount of testing and print proofing for the project meant that a documentation procedure needed to be devised in order to keep track of the day-to-day testing phases. To manage the proofing stages a ‘print parameter document’ was composed to catalogue and record the varying renditions of Hamilton’s digital file.

The Print Parameter Document

At root the document breaks down the specific stages of the printing process into: image source and image generation, image file parameters, printer driver information, substrate, data storage and participants in production. These categories identify the

¹¹ E-mail from Richard Hamilton to Paul Laidler August 25, 2003 12:52:56pm
usually unseen parameters that manage and contribute to the digital production of the final printed artwork.

The Print Parameter Document was derived from identifying the key production considerations for the work, recording how a digital image is generated, adjusted and printed. The documenting of data is an absolute necessity in order to record the huge array of variables that go into producing a digital print. An image can be modified at many stages of the generation process, and recording each variable allows the Master Printer to isolate anomalies in the output of the print, to reproduce accurately previous prints and print states, and to produce the final edition after the B.A.T.

The use of digital technology to produce an original, limited edition print has prompted some discussion of originality in digital printmaking. A particular feature of digital that has prompted these concerns is the fact that the matrix does not degrade; it can also be stored indefinitely and is just as easily reproducible as the hardcopy. The versatility and flexibility of the digital matrix is therefore important in terms of archiving its various states, and acknowledging storage considerations relating to access and ownership of image data.

The Documented Data storage includes the completed digital file, an uncompressed version with its layers and any raw images (none of the manipulated image sources) used in the file. The final addition is the Print Parameter information describing how to output the digital image after the artist’s approval of the printed proof. As a best practice method the Print Parameter information was fundamental to Richard Hamilton’s case study when revisiting the print for the variant edition.

The archiving practice presents another function of a digital print studio – that of a digital storage facility. For artists who may not have space to store large digital print editions, the potential to produce digital prints on demand (POD) becomes an option. Similarly, the storage potential also realises the possibility of replacing damaged or destroyed prints for publishers and museum conservation purposes.

**Revisiting the Digital File**

![Figure 1](image-url)

One year later Hamilton returned to the CFPR to produce a further edition of the *Typo-topography* print. After producing the first printed edition of the work at the
CFPR, Hamilton had decided to add another element to the digital file in the sieves section of the image (fig 1).

Instead of a computer-generated gradation, Hamilton introduced a photographic rendering of the sieves’ glue and dust contents present in Duchamp’s *Large Glass* sculpture. Hamilton 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 printing a second time. 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 proofing remained consistent. With only two alterations to the initial *Typo-Topography* file, the same output parameters were applied to the second printing as 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 whole print proofing procedure for the entire image would have had to start again.

The need to document the output parameters became apparent because of the complex adjustment strategy and the intermittent proofing procedure. Hamilton could not be present during every stage of the proofing, therefore a series of proofs had to be sent to Hamilton for his approval before continuing. The complexity of the printing parameters assigned to each proof made it imperative to know how they were produced so that the proof selected by Hamilton could be refined based upon his instructions. Although Hamilton had taken both the completed digital file and the editioned hard copy of the previously editioned print, the print data that was used to output the final print remained in the recorded notes held at the CFPR digital print studio. The documented print parameters that were generated through the collaborative proofing stages enabled Hamilton to reproduce the work in a far more efficient manner than if no documentation had been produced. Therefore the data effectively becomes a blueprint with which to reproduce accurately the approved printing of the digital file.

The project highlighted the digital studio’s commitment to the production process after completing an edition for an artist. Because of the electronic means with which digital information can be copied and stored, the digital print studio essentially becomes an archive facility for the artist. By archiving both the digital file and the specific print parameters that produce the B.A.T. the potential is created for an artist to revisit accurately a previous work.

The archiving procedure created for this research study has been formulated in consideration of a ‘best practice’ model, but this procedure can of course be susceptible to the rapid development of digital technology, where software and hardware devices become obsolete after a number of years. The same archiving procedure should therefore be applied throughout each new development in any technology associated with the production process.
Since 2003, Hamilton has printed three variant editions of *Typo-Topography of Marcel Duchamp’s Large Glass* at CFPR; a full size edition of three in 2003, produced at the same scale as Duchamp’s *Large Glass* (170 x 267.5 cm), another full size edition of nine with the alteration to the sieves section in 2004, and a smaller-sized edition of five (107 x 150 cm) in 2004 (fig 2).

**CFPR Editions**

The majority of prints produced at the CFPR provide the basis of process-orientated research enquiries that aid the technical and collaborative production of prints for artists. Moreover the introduction and rapid development of digital print technologies such as 3D Printing and laser cutting has expanded the CFPR’s print production possibilities for artists.

In response to this situation and my own research activity, CFPR Editions ([www.cfpreditions.co.uk](http://www.cfpreditions.co.uk)) has been initiated as a collaborative print studio that specialises in the production and realisation of digital print publications for artists. By publishing digitally-mediated prints using technologies such as inkjet, UV, rapid prototyping and laser cutting, the emphasis on new print technologies in the field of fine art printmaking places CFPR Editions within a unique area of the print production and publishing market.

During its first year, CFPR Editions has worked with nine artists towards the production of twenty-three separate editions that has resulted in 263 prints being published. The following two publications are indicative examples of CFPR Editions interest in selecting projects that encounter print, engage with digital technologies and potentially offer further insights towards new or novel forms of making. There is also a dual publishing and research focus here; in that the role of publisher brings a certain amount of responsibility and foresight when initiating projects that will eventually be
measured alongside other contemporary prints and publishers. The research emphasis functions through the collaborative print studio model as a practice-led research method that provides primary evidence for process-orientated research enquiries, including questions about fields and contexts, such as the heritage of printmaking, its discourses and the potential broadening of the discipline and its practices.

Arthur Buxton’s work incorporates data visualisation methods that use colour extraction tools to explore trends in painting and print media (fig 3). Using open source software, Buxton extracts colours from images gathered online to create charts and timelines that typically display the five most common colours in each image as a percentage. In this instance, the removal of figurative and formal elements from an image presents a series of colour harmonies and trends, alluding to sampling methods, information graphics, automation technologies and objective forms of re-presentation.
Artists Katie Davis and Peter Walters laser-sintered 3D print explores similar interests in collecting and visualising data. Here, the print *Vela* uses astrophysical data emanating as a radio signal from a distant pulsar star, (some 950 light years from earth). The radio signal contains the components of frequency, intensity and time that are plotted to generate the 3D surface from which the resulting 3D-printed artwork takes its shape (fig 4).

The introduction of rapid prototyping into the field of printmaking raises interesting debates around the idea of discipline specificity – is it printmaking or sculpture? Does this distinction matter and if so to whom, and why? This form of questioning presents the often-associated blurring effect of digital technology upon previously separate disciplines.

CFPR Editions’ engagement with new technologies places the publishing practice within a unique area of the art market. At the same time the practice has historical parallels with previous studios and printers such as Ken Tyler’s association with technical innovation and Tatyana Grosman’s promotion of less established artists and processes. More importantly (the core of my research) the collaborative print studio practice resonates with Kathan Brown’s identification of the central quality of the Master Printer, the ability to make the artist feel that producing the work is a satisfying adventure.
List of Illustrations:

Figure 1. Above left: original file. Above right: new alterations. The discrepancy in colour between the two images comes from different computer monitor's settings that were used to make the screen grabs.

Figure 2. Richard Hamilton, Typo-Topography of Marcel Duchamp’s Large Glass, 2004

Figure 3. Arthur Buxton, 30 years of Vogue covers, 2012, pigmented inkjet print edition series

Figure 4. Katie Davis and Peter Walters, Vela, 2011, digital file construction and rendering as a laser sintered 3D print

References


