02

RCA/PRINT DIGITAL

DIGITAL PRINTING – AN ANALOGUE PROCESS

INTRODUCTION:

Digital printing technology over the last decade has become synonymous with the commercial, and domestic reproduction market in particularly, aligning itself, in terms of familiarity and working practices, with the photocopier, fax machine and desktop publishing on the personal computer. Over this period of time the affordable technology has shown little sign of being exploited fully by designers and artists alike other than for convenient art-working allowing document proofing and subsuming the chemical processes of photography: enabling the user to print out their one-off photographs/ artworks in high resolution within seconds. These are invaluable tools for makers, but maybe a reason for their creative underemployment is that the democratisation of inkjet and laser printing technology hasn't necessarily concluded with an improvement in the user's ability to include the printer ITSELF as an interesting and valuable part of the creative process, whereas the traditional respective reproduction methods of offset lithography and darkroom printing in photography still offer a level of physical creative freedom as mediums that can be controlled and influenced instinctively by the maker – THE WORK IS OFTEN COMPLETED THROUGH THE PRINTING PROCESS ITSELF.

DOES AFFORDABLE, TECHNOLOGICAL EQUIPMENT SIMPLY MAKE FOR AN UNINSPIRING, AUTOMATED PRINTING PROCESS?

PRINTED **YMCK**

Dictionary Definitions

1 **Digital:** adjective **01** (of or relating to information represented as digits using particular values of a physical quantity such as voltage or magnetic polarisation): **02** (of a clock or watch) showing the time by means of displayed digits: **03** (of or relating to a finger or fingers).

Printing: noun **01** (the production of books, newspapers, etc): **02** (a single impression of a book): **03** (handwriting in which the letters are written separately).
www.dictionary.com/oxford popular dictionary

Digital: adjective **01** (pertaining to the fingers, or to arithmetical digits): noun **02** (a finger: a key of a piano, etc).

Print: noun **01** (an impression: a mould or stamp: a moulded pat of butter: printed state: printed characters or lettering: an edition: a printed copy): **02** (a fingerprint).
Chambers English Dictionary, 7th ed., W&R Chambers Ltd, 1990

Digital: adjective **01** (digit: a finger): **02** (of or pertaining to, using, or being a digit or digits: designating a computer which operates on data in the form of digits or similar discrete elements): **03** (designating or pertaining to a recording in which the original signal is represented by spacing between pulses rather than by a wave, to make it less susceptible to degradation): **04** (of or pertaining to a finger or fingers): **05** (recently: a finger or a hollow impression made by one).

Printing: noun **01** (The action of Print verb: an instance of this): **02** (the total number of copies of a book etc: an impression).
Shorter Oxford English Dictionary, 5th ed., Oxford University Press, 2003

PROJECT AMBITIONS:

The aim of my project is to exploit, through an understanding of the digital print process, the possibilities of non-impact/thermal printing technologies in particularly: through deconstruction, manipulation and informal application of the digital equipment, to afford an improved dialogue with the default status of the digital printer. These ideas will be discussed in more detail over the following chapters of this publication. The end pages of the subsequent sections will include tipped-in experimental prints, which are informed by the postulations and dialogue leading up to their making, either directly or indirectly.

INITIAL THOUGHTS:

My primary interest in the project has been with the alluding definition of 'digital'[1] in the term 'digital printing': A term that has been applied to printing as easily as it has to computing and video. THE TERM DIGITAL PRINTING IN COMPARISON HOWEVER, FEELS OXYMORONIC UPON CLOSER INSPECTION: A LAZY CLASH OF EXISTING TERMS.

The digital prefix of printing could refer to a number of meanings. Digital might infer the use of fingers, with printing meaning the traditional transfer of ink onto paper or other materials. This could then semantically give the understanding of digital printing as being a primitive way of printing using the hands, portraying a physical craft-based technique.

Digital printing as it is intended, not to be questioned, with its modern technology prefers to be indicative of the discrete binary language system of zeros and ones which modern computers use to describe all information. Without a re-definition of the term printing, there is a problem with the implied simplicity of the second meaning, which is the generally 'understood' meaning of the term – which very much leads us away from the body's involvement in the process.

The term digital printing personally, conjures up images of a world where non-material data or 'bits' (inside virtual or electronic specific environments) co-exist, influence and interact effortlessly with the material, physical world of atoms. This

is misleading when speaking of printing. There are two environments that co-exist but the transmission of data/information from one environment to another relies on electronics and mechanisms in order to translate to printed matter. THERE IS A CONDUIT AND AN INCONVENIENT CONVERSION OF INFORMATION THAT TAKES PLACE IN ORDER TO BRIDGE THE GAP BETWEEN THE TWO ENVIRONMENTS THAT RAISE QUESTIONS ABOUT THE VALIDITY OF ANY DIGITAL SUGGESTION OVER THE PRODUCT.

THE DIGITAL ONLY REFERS TO THE DATA that has been organised/generated for the printing press/ink-jet or laser printer to use: FOR AT SOME INEVITABLE POINT, FOR THE OUTPUT OF THE PROCESS TO BE DEFINED AS A PRINT, THE PRODUCT MUST BECOME A PHYSICALITY THROUGH THE USE OF MATERIALS: INK ON PAPER ETC. This is one of many points that I am interested in. How is the organised raster grid of discrete binary information interpolated onto the material fluid ink? How does the on-screen unit of the pixel (projected light) compare/inform the dot and line units of the printed matter (now reflected light), organised by the print head/drum and blanket?

RE/DEFINING PRINT:

Printing terminology and development were traditionally synonymous with letterpress printing and typography. When print was referred to, it meant the transfer of ink from cast metal to paper — The word on the page.

This brings into question other semantic inaccuracies when looking at the various definitions. Should a print now be defined as something that can be touched, smelt, generally perceived in other sensory ways rather than purely being seen: otherwise an on-screen presence may simply suffice.[2]

It seems that digital printing is riddled with semantic problems of using a traditional language borrowed from older technologies/ activities, which is a common blight — look at the internet for instance.[4] Is this in any way indicative of the relationship the maker has with the medium? If the signifying language is clumsy,[5] awkward and metaphorical in describing the technology, is the resulting reality that the equipment is never truly engaged with or understood?[3,6]

2 **'Printing is something which can be seen, perceived with our eyes and reproduced in quantity. Regardless of the many possible differences, all printed products have one thing in common: the result is always a quantity of the same visible image.'**
Pocket Pal: A Graphic Arts Production Handbook, 12th ed., International Paper Company, 1979

3 **'Our "age of anxiety" is, in great part, the result of trying to do today's jobs with yesterday's tools and yesterday's concepts.'**
Marshall McLuhan & Quentin Fiore, The Medium is the Massage: An Inventory of Effects, Penguin Books Ltd, 1969, p8-9

4 **The Internet (Web)**
Within the newer technologies such as the web, we often refer to 'surfing' content, viewing 'webpages', and 'bookmarking' these 'sites' which are 'constructed'. Print in particular is often referred to. All the terms mentioned here are based on the perceived material world in order to allow us to understand the virtual or abstract.

5 **Software Terminology**
The page layout programme, Quark Express, relied on the traditional language of type-setting in order to communicate to the new users of the digital tools based on the physical tasks it replaced: which were rooted in the hot-metal letterpress: terms such as 'leading'. Unfortunately the term was applied to mean 'line-feed' in the programme, which is a very different, albeit subtle, action.

6 **'The fact of the matter is that the "real world" is to a large extent unconsciously built upon the language habits of the group.'**
Robert Hodge & Gunther Kress, Language as Ideology, Routeledge, 1979, p62

FIG 01.
A photograph of hot-metal, letterpress type, set in a column with 3pt leading (the 'leading' is the strip of lead which distances the descender line from the ascender line of the next row of type).

FIG 02.
The term 'leading' in the programme Quark Express actually refers to traditional 'line-feed.'

FIG 01.

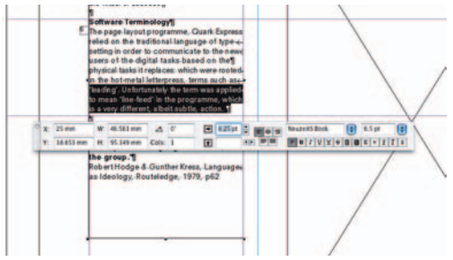

FIG 02.

Digital printing upon presses such as the HP Indigo provide alternatives to minimum editions on the offset lithography presses, which means that the 'one-off' print is very practical and possible – another definition of print diverted. The quantity need only be one. The traditional expectations of printing are changing.

PRINTING TECHNOLOGIES:

Under the current umbrella term of digital printing there are many technologies being referred to within one easy generic including technologies such as: Laser printing, electrophotography, inkjet printing, magnetography and thermal transfer dye-sublimation for example. This ambiguity within one term becomes very evident when communicating to paper manufacturers who supply 'digital papers' (another problematic idea). This usually means HP Indigo paper, whereby the paper's water content is adjusted in order to cope with the heat intensities of that particular process. Inkjet paper is generally a lot harder to source in variety than Indigo and litho. papers and doesn't need to respond to heat in the same as Indigo paper. Inkjet paper, on the other hand, has the ability to hold a greater coverage of ink on its surface due to the higher densities of ink that are achieved through non-impact printing.

It is interesting to note that Epson inkjet technology[7] are based on (and owned by) Seiko, using quartz watch technology which harnesses the frequencies of the vibrating crystals to produce a controlled output of ink. Epson inkjet digital printing is literally a time-based medium.

ELECTRICITY:

From all of the technologies mentioned it's very clear that electricity plays a fundamental part in the process of digital printing, not only driving the motors of the mechanisms but powering the generation and production of the artwork to be printed. The control and adaption of electronic technology, on a microscopic level, is at the basis of all desktop printing. The data environment of pure information is created through electricity, and the physical world

7 Within Inkjet printing technologies there are two specific types of ink-jet printer: continuous jet and on-demand. On-demand uses two printer technologies: thermal or piezoelectric inkjet systems. Piezoelecrtic inkjet uses a voltage pulsed through piezo crystals in the imaging head to emit a droplet of ink. Epson uses this form of technology as a preference in the inkjet printing units whereas HP uses thermal.

is influenced by the physics of electricity: for instance inkjet paper is negatively charged to accept the charged ink in order to achieve better adhesion, but the printing itself remains a fairly fragile process. Electricity is everything in the virtual world but is only one part of the environment of the physical world.

EFFECTS OF TECHNOLOGY:

One would predict that quality and quantity will evolve to a new relationship as less effort is needed in order to produce as the decision of when to print is now at the agency of the individual rather than the commercial establishment and digital print runs do not need a large number to be justified in committing to the exercise, which are pros of the technology. At present digital printing has become the cheap alternative to lithography,epitomised through its employment of producing direct-mail with variable data technology, which has added to the abundance of poor-quality, ill-thought-out, disposable print that our letterboxes are swamped with on a daily basis, although HP's Indigo presses are readdressing the quality of mass-produced digital material.

Through the conjunction of the digital environment with the mechanical terminal of the printer: a larger level of control over the printing process inferred. The commercial goal has also been to standardise colour output through ICC profiles which is where the RIP[8] becomes very useful in helping to calibrate both printer and inks as well as profile the paper. THE DIGITAL LEVEL OF CONTROL DOES SEEM A VERY INDUSTRIAL PURSUIT, THE HOLY GRAIL OF COMMERCIAL PRINTING, RATHER THAN AN ARTISTIC IDEAL.

Is there a certain behaviour implied by this structure of making, as the printing process has become more remote (in practice rather than proximity) from the printmaker in digital printing? Is there an element of technological determinism, which may cause a valance over the attitude of the act of printing itself as well and the printed matter produced?

8 One of the main reasons for using the RIP is also the outputting of lines of 'accurate' raster based information. Digital printing technology relies upon the transposing of postscript data to dots, which is where the RIP decodes the string of binary numbers to assign coordinates and values.

LIMITATIONS:

The inkjet printer in particularly is set up to be a foolproof tool with many overt and many hidden default settings that affect utilising the equipment as a conducive part of the creative process. These defaults take many forms such as an apparent recognition and reluctance to over-print a process colour many times over (See Sara and Leah's experiments): the print head is set at a certain height from the substrate which limits stock weights as a result: there are only one/two paper paths through the printer: the RIP establishes the limits of the ink and the colour gamut etc. IN SHORT, THE MODELS I SPEAK OF HERE ARE SET UP TO BE AUTONOMOUS AND INVISIBLE.

There are of course restrictions within any medium although with the promising, unlimited prefix of digital as part of the printing process (with variable data and on-demand printing terms and ideas being discussed) the parameters of any interaction would be expected to be further away from the process outcomes or at the very least smaller.

QUESTIONS/HYPOTHESIS:

An insinuation from the term digital printing is that there is a digital level of accuracy within the printing, an analogy brought forward from the virtual domain. This presents itself as an apparent environmental gap within the notion of accuracy in digital printing: with inkjet in-particularly — even when speaking of the Indigo press the contact of the drum and the paper causes inaccuracies. How does the pixel really relate to the dot of ink? How accurate is the digital presence in printing? Both positions exist, pixel and dot, as the basic units of their environments, the grid structure of image production. But can one get to them? Are they accessible? IS IT FUTILE TO LUST AFTER A DIGITAL LEVEL OF CONTROL OUTSIDE OF A VIRTUAL ENVIRONMENT?

9 **'For the worker, machine production has meant a heavy, almost deadly loss in the value of experience, and it is entirely wrong to put it on a pedestal. That it is 'modern' is by no means the same as saying that it has value or that it is good: much more it is evil'.**
Jan Tschichold

Essentially my questions with digital printing are: What are the advantages over analogue forms of printing? and, where is the space for craft and causality in the process? I remain stubbornly sceptical over 'advances' in technology knowing that our behaviour as practitioners will change through using new tools, and that often creative options are lost as a result.[9]

I would like to find ways of reintroducing some of the positive playful aspects of analogue methods of working (such as the explorative mistake) back into the digital printing process. Therefore, my involvement in Print Digital boils down to a few core threads of interest that I have begun to explore and discuss through printed works.

01: To investigate the notion of accuracy through printed matter (see section 8 with Dan Fern's 'Walks with Colour' book project which looks at colour accuracy), in-particularly the interpolation from the on-screen pixel to the ink dot (see the 'spot the ball' and 'tour de France' prints tipped-in).

02: To consider re/defining print as an activity. How does the environment, that the nozzle spraying ink-jet allows, afford new interference, involvement and activity in producing printed matter?

03: To question the notion of employment/ underemployment of the hands and the body in making work via digital tools.

These observations and questions are discussed over the following sections as research through practical, as well as theoretical, experiments and aim to conclude in an edition of one-off/limited edition prints as tip-ins which are informed by the discussions throughout this project as a whole.