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Process made visible - in and outside the object.

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Process made visible – in and outside the object

Jerome Joseph Harrington

A thesis submitted in partial fulfillment of the requirements of Sheffield Hallam University for the degree of Doctor of Philosophy

October 2015

Declaration

I, Jerome Joseph Harrington, declare that the enclosed submission for the degree of Doctor of Philosophy, and consisting of a written thesis, DVD containing six films, and five pullouts which display visual material from the research, meets the regulations stated in the handbook for the mode of submission selected and approved by the Research Degrees Sub-Committee of Sheffield Hallam University.

I declare that this submission is my own work and has not been submitted for any other academic award. The use of all materials from sources other than my own work has been properly and fully acknowledged.

Abstract

'Process made Visible – In and Outside the Object'

This research explores the contemporary visibility of manufacturing processes, with a particular focus on the production of glass. The context for this study is the well documented sense of disconnection and estrangement said to result from our distance to and unfamiliarity with making processes.

At the centre of the study is *'The Archive of Manufacture'*, an 'archival artwork' (Hal Foster) which has been especially collated for this research. *The Archive* responds to the question – how do we know how something is made - and gathers together 'points of visibility' - secondary sources where process is made visible, from industry, craft, popular culture, and press coverage.

The study explores *The Archive* through three interrelated questions:

- **Why**, examines the social, political, and economic context in order to understand 'drivers' which affect the visibility of process.
- **How**, explores the formal and material aspects of the photograph, film, or object through which process is made visible.
- **What** is understood - investigates how this material contributes to an understanding of making process and how it shapes our understanding of objects.

Initially, *The Archive* is explored in relation to a wide range of theoretical debates regarding our contemporary relationship with making process. This includes exploring the recent popular fascination with making (including

Richard Sennett, Matthew Crawford), as well as descriptions of disconnection, alienation and invisibility (Karl Marx, James Heartfield, David Nye).

Methods from art practice are employed as critical forms of looking to explore specific examples from *The Archive*. In particular, close reading as a 'meticulous visual analysis' (Shepard Steiner) is developed as a key method. The research expands this definition to include the written form of ekphrasis, and interrogative material and visual making processes.

Through the production of the body of artworks, the research examines the contingency for the interpretation of the fragmentary or partial descriptions of process in *The Archive*, and the imagined or speculative understanding that results. The research identifies types of visibility and explores their limitations, and develops four key principles that describe how the visibility of process is effected and how it is subsequently understood. The key artworks offer a live experience, where the viewer's interpretation of the work mirrors the processes by which an understanding of process forms.

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- **In the production of *Delineating an understanding*:**

Julie Swallow, Sue Taylor, Madeleine Walton, Helen Frankart, Qiuyuan Fu, Gareth Bunting, Clare Garrett, Nathan Green, Sophie Muir, Charlotte Ryan, Nastaran Samii.

DVD with X6 films

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1.1 Introduction

My uncle, as usual was serving drinks at a family meal. I wasn't particularly focusing on him or what he said, but he made a comment that even across a noisy room I heard. Serving wine in lead crystal glasses, my uncle chipped the rim of one of them. Not particularly upset by this accident, he stated (with a sense of belief): "...it's OK, I've been told that you can cut the rim of a glass straight again, by holding it in warm water and then cutting it with a pair of scissors."

This research begins by asking: how? Within the last ten years, across a wide academic and popular culture, a groundswell of publications, exhibitions, networks, television programmes and other have sought to explore our relationship to making and the information it creates knowledge of making process - it is amidst this cacophony of voices, that my uncle's misconstrued perception of a material and a manufactured object is located.

Chapter 1 Introduction

† List of examples, many of these are explored within Chapter 2: Popular and academic publications, Research by a number of academics who suggest potential benefits from a connection to making both for the individual and society at large. (David Gauntlett's *Making is Connecting* (2013); Richard Sennett's *Handwork* (2008), and Michael Edwards's *The Lost Art of Working with Your Hands* (2009). Alain de Botton - *The Architecture and Curiosity of Work* (2010); *Artful class: Material intelligence* (2019 - Syde Yard); Gordon's *Making and Unmaking in Contemporary Sculpture* (2010 - Henry Moore Institute); *The Art of Not Making: The New Artist / Artisan Relationship* by Michael Peiry (2012); *The Power of Making* (2013, V&A - Artsworks); Simon Starling's *One Ton 2* (2005) or Melaine Jackson's work *A Global Positioning System* (2006) which both attempt to visualize the vast networks involved in production in the global context. Television programmes: *Italy's Food Poetry*, BBC1 (2010); *How to make a nuclear submarine*, BBC2 (2010). Films: Documentaries examining production in a global context: *Food in the Mobile* (2011), or Alan Sekula's *The Forgotten Spaces* (2010).

1.1 Introduction

My uncle, as usual was serving drinks at a family meal. I wasn't particularly focusing on him or what he said, but he made a comment that even across a noisy room I heard. Serving wine in lead crystal glasses, my uncle chipped the rim of one of them. Not particularly upset by this accident, he stated [with a sense of belief]: '*...it's OK, I've been told that you can cut the rim of a glass straight again, by holding it in warm water and then cutting it with a pair of scissors.*'

This research begins by asking: how do we know how something is made? Within the last ten years, across a wide range of disciplines, and within both academic and popular culture, a groundswell of publications, exhibitions, artworks, television programmes and films have set out to explore our relationship to making and the made.¹ Despite, the potential of this information to create knowledge of making process - it is amidst this cacophony of voices, that my uncle's misconstrued perception of a material and a manufactured object is located.

¹ List of examples, many of these are explored within Chapter 2: Popular and academic publications: Research by a number of academics who suggest potential benefits from a connection to making both for the individual and society at large. David Gauntlett's *Making is Connecting* (2011), Richard Sennett's *The Craftsman*, (2008), and Michael Crawford's *The Case for Working with your Hands* (2009), Alain de Botton - *The Pleasures and Sorrows of Work* (2010). Exhibitions: *Material Intelligence* (2009 - Kettles Yard); *Undone- Making and Unmaking in Contemporary Sculpture* (2010 - Henry Moore Institute); *The Art of Not Making: The New Artist / Artisan Relationship* by Michael Petry (2012); *The Power of Making* (2011, V&A). Artworks: Simon Starling's *One Ton ii* (2005) or Melanie Jackson's work *A Global Positioning System* (2006) which both attempt to visualize the vast networks involved in production in the global context. Television programmes: *Jimmy's Food Factory*, BBC 1 (2010), *How to make a nuclear submarine*, BBC2, (2010). Films: documentaries examining production in a global context: *Blood in the Mobile* (2011), or Alan Sekula's *The Forgotten Space* (2010).

Although this anecdote is specific to one situation, it seems to concur with a number of texts that propose a gap between the objects that surround us, and our understanding of their making processes. Writing in 1969, the artist Robert Morris describes how making process has become distanced from everyday life:

The very means and visibility for material transformations has become more remote and recondite. Centers for production are increasingly located outside the urban environment in what are euphemistically termed 'industrial parks.' In these grim remote areas the objects of daily use are produced by increasingly obscure processes and the matter transformed is increasingly synthetic and unidentifiable. As a consequence our immediate surroundings tend to read as 'forms' that have been punched out of unidentifiable, indestructible plastic or unfamiliar metal alloys. It is interesting to note that in an urban environment construction sites become small theatrical arenas, the only place where random distributions are tolerated.²

Morris's statement of concern pre-empts more recent texts exploring globalised production, and its impact.³ These critics note that we are separated from production either geographically, through technical complexity, or via issues that affect access such as Health and Safety or privacy.⁴ Popular writers, such as Alain de Botton, suggest that the affect of this separation is that:

² Robert Morris (1969), '*Notes on sculpture 4: Beyond Objects*', in *Art in Theory - 1900 - 2000*, Charles Harrison & Paul Wood (ed.), Oxford: Blackwell Publishing, 2002, pp. 881 - 885.

³ I purposefully place Robert Morris's observation in the introduction in order to emphasise the relevance of art practice in these debates. Morris's investigation of process through his artworks places the artist in a direct relationship with these questions.

⁴ Examples from The Archive which reflect these reasons for the invisibility of process: Geographically: *Blood in the Mobile*; Technical complexity: SCHOTT Clean room images or satellite production; Health and Safety or privacy: *How to Build a Nuclear Submarine*.

We are now as imaginatively disconnected from the manufacture and distribution of our goods as we are practically in reach of them, a process of alienation which has stripped us of myriad opportunities for wonder, gratitude and guilt.⁵

Equally, writers such as Matthew Crawford argue that there is a direct connection between our involvement in making process and our relation to objects; a connection that for Crawford, is under threat. He examines the consequences of a 'depersonalized' relationship, stating: 'the disappearance of our tools from our common education is the first step toward a wider ignorance of the world of artifacts that we inhabit.'⁶ For Crawford, the effect of this absence is 'passivity, dependence and infantilism.'⁷

The historic precedent for debate about objects and their production as commodities is, of course, Karl Marx's *Capital* where Marx describes how an object becomes a commodity. While Marx is profoundly aware of the effort of human labour and its congealment in objects, he focuses, critically, on the disembodiment that takes place as the object becomes a commodity. Through exchange, the labour of making becomes disguised and its value made abstract as exchange value. Marx suggests this as a process of 'transcendence', where our perception of the object is altered. The effect of this transformation is that it appears to stand 'on its head', gaining 'ideas' that are not embedded in its physical form.⁸ Through the making of a commodity, our common understanding of objects change and the labour, processes, materials and conditions that produced it become invisible.

⁵ Alain de Botton, *The Pleasures and Sorrows of Work*, London: Penguin Books Ltd, 2009, p. 35.

⁶ Matthew Crawford, *The Case for Working with Your Hands or Why Office Work is Bad for US and Fixing Things Feels Good*, London, Penguin Books Ltd, 2009, p.1.

⁷ Matthew Crawford, Blackwell Podcast, <<http://www.youtube.com/watch?v=cPoLDiTO3zc>> [accessed 11 December 2010].

⁸ Karl Marx (1867), *Capital, An Abridged Edition*, David McLellan (ed.), Oxford: Oxford World's Classics, 2008, pp. 42-44.

While Marx forms the precursor to de Botton and Crawford, there are significant differences in how and why they discuss production. *Capital* is concerned with the social and political consequences of the capitalist economy, while de Botton's or Crawford's examinations of work, do so with an acceptance of capitalism. Their aim is to find autonomy, fulfillment or happiness for the individual within a capitalist society. For de Botton, this can be achieved through recognizing the complexity and marvel of the world of work, and for Crawford it can be achieved by an intimate connection to making and fixing things. Despite their differences, what they have in common is a belief that our altered relationship to production affects how we relate to and understand objects.

My uncle's perception of how to repair the broken wine glass, suggests a distance between him and the reality of the objects' material properties and its making process. This gap creates uncertainty and prompts his speculation. The repetition of an idea heard elsewhere reveals a perception of this very particular material - glass. At the time this comment was made, I was studying at the Gerrit Rietveld Academie and blowing glass on a weekly basis, so my knowledge of its making processes was first-hand and in-depth. I was fascinated by my uncle's comment, it reflected an understanding of a material that from my perspective was so obviously untrue.

The discrepancy between my uncle's and my understanding revealed a gap between the layperson and expert. It demonstrates a situation where different levels of knowledge affect the understanding of an object. His comment suggested that the specific material qualities of glass: hard and brittle, could be simply made malleable by the heat of warm water. He understood the object independently of these qualities; as something new. The use of ordinary scissors to repair the glass overlooked the specific tools and conditions of a wine glass manufacturing process; conditions that were seemingly unimaginable to my uncle. However, the fact that he did not

attempt what he had suggested reveals the transitory nature of this idea, which once spoken was quickly forgotten or dismissed.

During this period rather than focus on what I could make with glass, I became increasingly curious about the myths and misunderstandings of glass. This marked the beginning of a process of exposing a cultural perception of glass, by examining 'found material' - existing evidence where glass is described or depicted. *The Glass Archive* (Figure 1) made in 2005, for example, is a collection of nearly one hundred novels where the word 'glass' features in the title. By using found material, I could decentralise my own understanding, and examine how glass is perceived by others. The books' authors all employed the word 'glass' as a metaphor to establish or visualise their narrative. The collection assembles an array and breadth of references to glass, the inclusivity of the collection exposing a form of 'common knowledge' about this material.

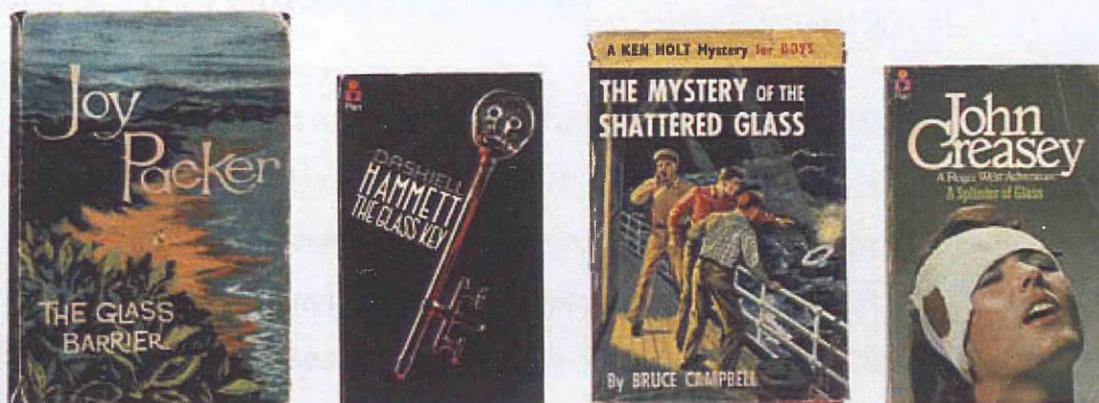


Figure 1: The Glass Archive, Jerome Harrington, (2005)

Through making the collection, I was interested in investigating the relationship between the physical reality of the material and 'ideas' of material. The art and culture critic Dave Hickey succinctly illustrates the interrelation between glass and its cultural perception when he speculates on a far off moment of history where the two congeal together. He states:

Glass existed in language before it existed in the world. Its physical attributes – its aspects of transparency, translucency, reflection and refraction – probably existed for centuries before the material itself was created; it existed precisely as the self describing rhetoric of thought and language itself. Upon its invention then, glass almost inevitably took on the aspect of language and thought incarnate, defining them in its reflection.⁹

The Glass Archive can be understood as a link between my previous art practice and the current research. Both projects have three significant aspects in common: 1) each examines found material in order to examine how knowledge and understanding are constructed. 2) Both projects employ collecting and archiving processes in order to gather this material. 3) And finally, both projects explore the relationship between the reality of something and imagined or speculative assumptions made of it.

Production Processes

1.1.1 The visibility of process

My uncle's comment highlighted how little we know about the manufacturing processes of everyday objects and that we proliferate misconceptions. Prior to starting this research, I had an intuition that such misconstrued understandings of making and material occur because of a distance from production processes. Responding initially to the descriptions of a disconnected relationship with making process from commentators such as Morris, de Botton, Crawford or Marx, the question - how do we know how something is made? - prompted me to make an archive that would collate instances where process is made visible. *The Archive of Manufacture*, an 'archival artwork'¹⁰ aimed to gather 'points of visibility' - images, film and

⁹ Dave Hickey and Jennifer R. Gross, Josiah McElheny, Boston, Massachusetts: Isabella Stewart Gardener Museum, 1998, p. 20.

¹⁰ Hal Foster, An Archival Impulse, (2004) in, *The Archive*, Charles Merewether, (ed.), London: Whitechapel Art Gallery, 2006.

objects, from many different sources including factory and craft production, ancient and modern.

In forming *The Archive*, it became apparent that there were many more examples of secondary forms (still images, films and objects) articulating making process, rather than examples of individuals' own hands-on experience of making process.¹¹ The material collated in *The Archive* is, in effect, what is left over after process has taken place. This material is the result of a technical and perceptual juncture that separates process from product. A key concept within this research, juncture (explored in detail in Chapter 4) describes a key moment where process is discarded or divorced, and product becomes permanently distinct from the complexity of its manufacturing process. However, juncture as a stage of disavowal does not equate with the total invisibility of process – depending on the context or production method, evidence remains visible, and the term 'points of visibility' is used to describe this material. As a result, the research focuses predominantly on the secondary forms through which process is made visible.

The material in *The Archive* has been explored through three interrelated questions:

- 1 Why**, examines the social, political, and economic context in order to understand key factors or 'drivers' which affect the visibility of process.

¹¹ The term 'articulate' is used to describe how objects and images communicate ideas. An example of the use of this term in art discourse can be seen in: Aura Satz, Jon Wood, (ed.), *Articulate Objects: Voice, Sculpture and Performance*, Bern Switzerland, 2009. 'When we talk about 'articulate' objects we endow a curious at times uncategorisable collection of things with the capacity for voice, speech or expression', p. 15, and 'The articulate objects examined in this book are all in varying degrees brought into speech, spoken to, spoken through, whilst speaking back to us.' p. 27.

2 **How**, explores the formal and material aspects of the photograph, film, or object through which process is made visible.

3 **What** is understood - explores how this material contributes to an understanding of making process and how it shapes our understanding of objects.

1.1.2 Thesis structure and content

The following chapter, Chapter 2 examines a range of examples from *The Archive of Manufacture* to understand visibility of process in the contemporary context. This chapter identifies and describes types of visibility, and outlines factors that affect how making process is made visible. It concludes that the 'points of visibility' in *The Archive* are often a conflicted form of information, and their interpretation is contingent: as likely to be misunderstood as it is able to elucidate.

Chapter 3 outlines the methods and methodological approach of the research. I purposefully situate Robert Morris's observation of our relationship with process within this introduction to emphasise the relevance of the artist in these matters. In Morris's practice, an interchange between observation, writing and making suggests the potential of the artist's process to engage with this area.

Within this research, a similar entwining of theoretical and material methods is used to analyse the material in *The Archive*. Studio-based art practice, the main method of this research, is uniquely placed to make an analysis of the points of visibility within *The Archive*. In studio-based art practice, there is an intimate relationship between process and artefact (both object, or image),

and existing methods of analysis which forefront the interpretation of visual and material aspects of the artefact.

Chapter 4 forefronts a discussion of the artworks made during the research period. Through the production of and reflection upon this body of artworks, the research explores the contingency of the fragmentary or partial descriptions of process in *The Archive*. A key aspect of Chapter 4 is the exploration of the limitations of the examples in *The Archive* to articulate making process, and misunderstandings of process that result. This exploration of an imagined or speculative understanding of making process, as suggested by my uncle's comment, expands theories of a distanced relationship as developed by Marx, Morris or Crawford through visual and material strategies. Within Chapter 4, the artworks which are discussed, are presented either on the enclosed DVD, which contains six films (page vii), or presented as one of three 'pullouts'.

Finally, although this research references a wide range of making processes and materials, glass is apparent throughout. In the context of the visibility of making process – glass produces a fascinating paradox: its apparent transparency suggests clarity and visibility (Figure 2) and yet it is this very transparency that hides process more than most materials.

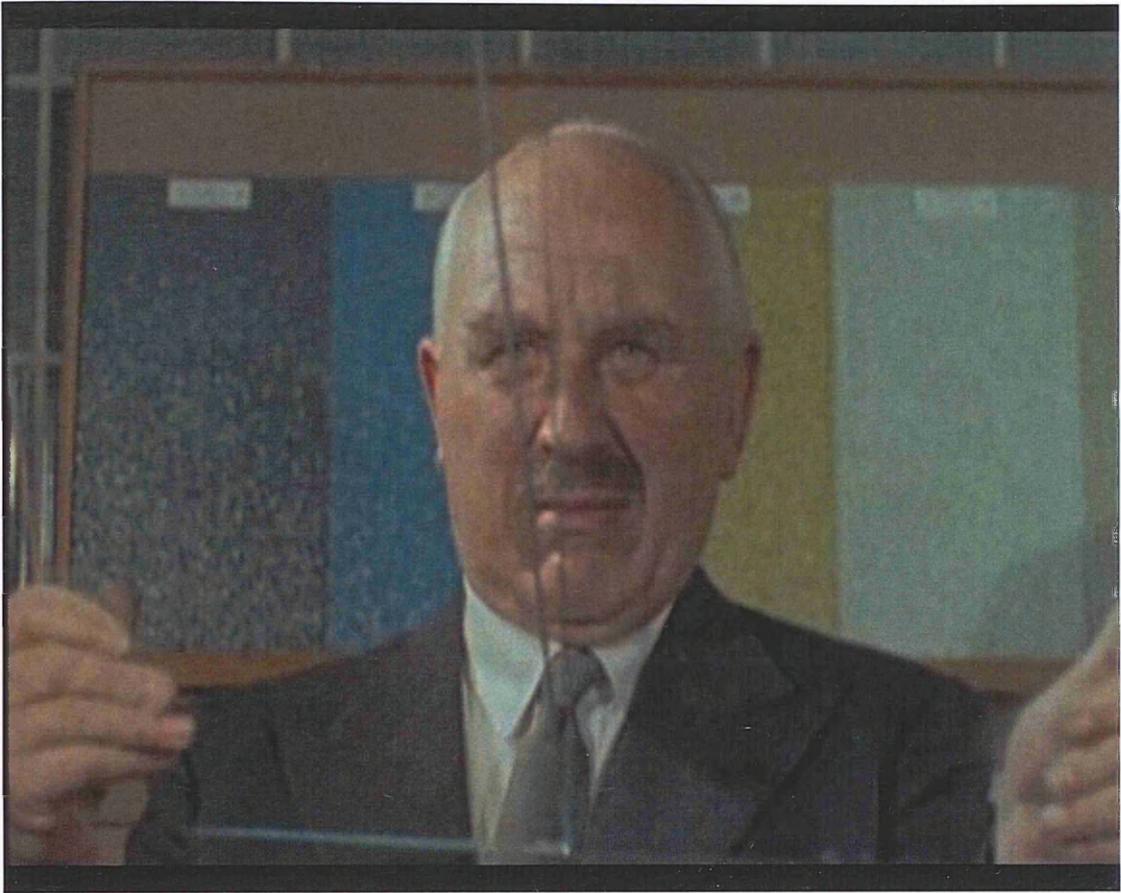


Figure 2: Still from *Glass Research*, *British Pathe*, (1959)

The visibility
of making process

2.1 Introduction

At the very start of this research, *The Archive of Architecture* was formed to gather together points of visibility – images, films and objects that have the potential to contribute to an understanding of making process. In this chapter this material is used to explore two interrelated questions: ‘why’ and ‘how’ is process made visible? ‘Why’ examines the social, political and economic context in order to understand key factors or ‘drivers’ which affect the visibility of process. ‘How’ examines the formal and material aspects of the photograph, film, or object through which process is made visible.

Over the course of the chapter, the question of ‘how’ is used to identify a number of specific forms or types of visibility. The chapter then examines the limitations of the different forms to see how they are used to produce different effects. In this way, this is the first stage of an examination of the formal, structural and material qualities of the content. This is then further extended in Chapter 3 through a discussion of the ways in which the content is produced.

The Archive of Architecture contains a range of individual examples from detailed case studies, and are discussed in relation to debates regarding our contemporary relationship with making process.¹² Secondly, a large proportion of *The Archive*’s content is presented in this chapter, making this an entwined visual and theoretical investigation. Finally, the chapter explores why the forms identified through an analysis of the entire *Archive*.

Each of the three chapters in this book has a different approach to its content and aim to account for the different ways in which visibility is produced.

¹² It is important to stress that the individual examples in *The Archive* are discussed in this chapter. Instead, key examples have been selected which are representative of the different types of visibility identified within *The Archive*.

2.1 Introduction

At the beginning of this research, *The Archive of Manufacture* was formed to gather together ‘points of visibility’ – images, films and objects that have the potential to contribute to an understanding of making process. In this chapter, this material is used to explore two interrelated questions: ‘why’ and ‘how’ is process made visible? Why, examines the social, political, and economic context in order to understand key factors or ‘drivers’ which affect the visibility of process. How, examines the formal and material aspects of the photograph, film, or object through which process is made visible.

Over the course of the chapter, the question of ‘how’ is used to identify a number of specific forms or ‘types’ of visibility and the potential and limitations of the different forms to articulate process is explored. Within the thesis, this is the first stage of an examination of the formal, structural and material qualities of the content of *The Archive*, which is subsequently extended in Chapter 4 through a discussion of the artworks that have been produced.

The Archive informs this chapter in three specific ways: Firstly, throughout, individual examples form detailed case studies, and are discussed in relation to debates regarding our contemporary relationship with making process.¹² Secondly, a large proportion of *The Archive’s* content is presented in this chapter, making this an entwined visual and theoretical investigation. Finally, the chapter explores key themes identified through an analysis of the entire *Archive*.

Each of the three subchapters are structured by two opposing terms which aim to account for the breadth of examples, and the many differences and

¹² It is important to stress that not every example in *The Archive* is examined in this Chapter. Instead, key examples have been selected which are representative the different types of visibility identified within *The Archive*.

contradictions that can be observed within *The Archive*.¹³ The three subsections are:

- 2.2 Concern / celebration:** explores how the visibility of making process reflects two opposing descriptions of our relationship to making and the made.
- 2.3 Near / far:** investigates how the visibility of making process is affected by our proximity to the site of production.
- 2.4 Process / portrait:** examines the conflicted nature of many of the examples in *The Archive of Manufacture*, by examining the motivating forces and agendas that produce and distribute them.

Although these subchapters are structured through oppositional terms, these terms are not intended to describe a binary relationship, which is oppositional and exclusive. Instead, these terms set up a dialectical relationship - where there is an interplay between the two terms.¹⁴

¹³ The use of oppositional terms to structure this chapter is reflective of a number of the key texts examined below. These describe our relationship to making and the made through oppositional terms, for example, Marx's description of alienated and non-alienated labour, or Peter Dormer's terms personal know-how and distributed knowledge. There are many others binary oppositions in the literature. For example, David Pye (regularity and diversity), Matthew Crawford (agency and loss of agency), Alain de Botton (gratitude and guilt).

¹⁴ The use of dialectical relationships has been informed by two sources: John Plunkett, 'From Optical to Digital (and back again)' uses dialectical to describe the relationship between optical and digital recording processes. He suggests both are involved in a dialectical relationship 'whereby each thinks through the other'. John Plunkett, 'From Optical to Digital (and back again)', 19: *Interdisciplinary Studies in the Long Nineteenth-Century*, vol. 1.6, no. Forum on Digitisation and Materiality, 2008, pp. 1-10, <<http://www.19.bbk.ac.uk/index.php/19/article/viewFile/479/339>> [accessed 1 May 2014].

And in *Transforming the Managerial Class: Binary and Dialectical Thinking in Counseling* (2009), Thomas Harrison, Troyann Gentile, and Terianne Harrison suggest 'Dialectical thinking more closely approximates healthy reality: In reality, nothing is really black or white. [...] There is an inherent relationship between the two.' [...] in essence, dialectical thought puts motion into the binary thought process.'

Transforming the Managerial Class: Binary and Dialectical Thinking in Counseling (2009), Thomas Harrison, Troyann Gentile, and Terianne Harrison,

The Archive 'pullout'

The following 'pullout' displays the content of *The Archive of Manufacture* (Figure 3). Each entry is represented by a single image, which is accompanied by contextual information including the original source of the entry, its type (image, film, object), and date of its original production. Each entry is allocated a number (1.1) that is reflective of the order in which the example entered into *The Archive*. The method through which *The Archive* was formed is detailed in Chapter 3 (page 98).

Figure 3

The Archive of manufacture

1.1
A



Makers, Crafts Council, 1980
Alistair McCallum
Photograph (publication)
Photographer: Ray Carpenter

B
Making It, Crafts Council, 1982
Pauline Solven
Photographer: Unknown

C
On the edge, Kettles Yard and
Aberystwyth Arts Centre
1993

Robert Marsden
Photographer: Unknown

D
Objects of Our Time, Crafts Council
1997
Keiko Mukaide
Photographer: Philip Sayer

1.2
A-Q



Crown Glass, Volume X, Plate XV
Engraving (publication)
Diderot and D'Alembert's
Encyclopedia, 1751
Republished in: Charles C.
Gillispie, A Diderot Pictorial
Encyclopedia of Trades and
Industry, New York: Dover
Publications Inc., 1993.

R
Casting a statue, Volume VIII,
Plate I

S
The Tailor, Volume IX, Plate I

T
Feather trader, Volume VIII,
Plate II

1.3



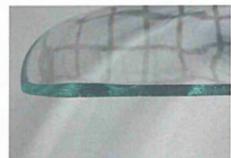
Float Glass (1959) Pilkington
invents cost-effective process
to make high-quality flat glass
Photograph (publication)
Jack Challoner, 1001 Inventions:
That Changed the World, Cassell
Illustrated, 2009
Image credit: Pilkington Brothers
Limited

1.4



Quality inspection in the
clean room
SCHOTT glass
C.2000
Photograph (publication)
Image credit: SCHOTT AG

1.5



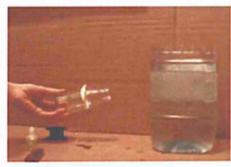
Crown glass object
Hand blown glass disk
2009
Object
Image credit: Jerome Harrington

1.6



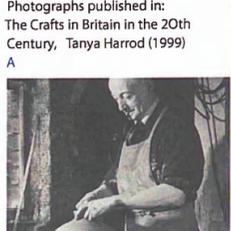
Philips LCD production
(caption in Dutch)
ITEMS 2, (page 89)
2003
Photograph (publication)
Photographer: Unknown

1.7



Wine bottle cutting with string
Online - video (no comment)
(still)
C.2000
Photograph (publication)

1.8



Photographs published in:
The Crafts in Britain in the 20th
Century, Tanya Harrod (1999)
A
Manufacturing series
Photograph (online)
2005
Edward Burtynsky
A
Manufacturing #17
B
Manufacturing #10a/b
C
Manufacturing #14
D
Manufacturing #6a/b
Still from John Anderson's 1964
film Isaac Button, Contry Potter
B
The smithy in F.H.K Henrion's
Country pavilion, South Bank
Exhibition 1951
Design Council/DHRC, University
of Brighton
C
Cricket bats being made in
the Sport pavilion, South Bank
Exhibition 1951
Design Council/DHRC, University
of Brighton

D

St Dunstaners blinded in
First World War learning to
make net bags
C.1920s
St Dunstan's London
E
Michael Cardew throwing at
Winchcombe Pottery,
7 August 1937
Pitshanger Manor & Gallery,
London Borough of Ealing
F
David Pye using his 'fluting
engine', invented 1949-50
Crafts Council/David Cripps

1.9



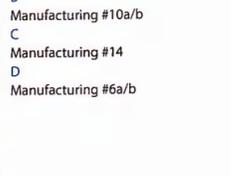
How do they do it?
Documentary for television (still)
2006
Discovery Channel
Image Credits: DCI

1.10



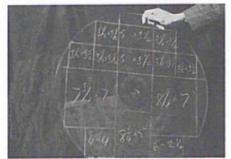
Manufacturing series
Photograph (online)
2005
Edward Burtynsky
A
Manufacturing #17
B
Manufacturing #10a/b
C
Manufacturing #14
D
Manufacturing #6a/b

1.11



ZERODUR glass ceramic
1968
Photograph (online)
Image credit: SCHOTT AG

1.11



Crown Glass marked to be cut
Photograph (publication)
The Pilkington Organisation
(1959)

1.12



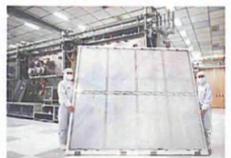
Diderot model
3D mannequin (museum display)
(date unknown)
World of Glass, St Helens

1.13



Blood Sweat and Luxuries
Documentary for television (still)
2010
BBC 3
Director: Anna Stickland

1.14



TRI Urges Taiwan to Lift Ban
on 8.5G TFT-LCD Investments
in China
Photograph (online)
C.2010
Photographer: Unknown

1.15



ZERODUR glass ceramic
1968
Photograph (online)
Image credit: SCHOTT AG

B

Glass wafer
C.2000
C
Glass casting of a mirror substrate
C.2000
D
SEVIRI: ZERODUR Mirror
C.2000
E
Lighting and Imaging production
in Mainz
C.2000
F
Clean room
C.2000

1.16



NASA
Photograph (online)
A
This panorama shows the
inside of Goddard's High Bay
Clean Room, as seen from the
observation deck
C.2000
Photographer: Unknown

1.17



Glass Works
Documentary film (stills)
1977
Amber films, Newcastle
upon Tyne
Camera: Peter Roberts
Sound: Graham Denman
& Roger Schindler
Editing: Roger Schindler
Direction: Murray Martin
& Peter Roberts

1.18



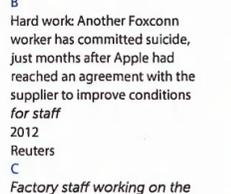
Pilkington Glass
Photograph (publication)
Image credit: Pilkington Brothers
Limited
Reproduced in: Float, Pilkington's
Glass Revolution. David Bricknell
A
CH3, 1962, showing the relative
peace and cleanliness of the bath
in operation
B
CH3 warehouse, 1963
C
Bath control room, UKS,
St Helens, 1986

1.19



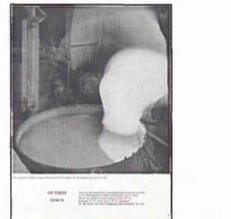
Ipad suicides
Photograph (online)
Mail Online, 14 June 2012
A
This image is believed to show
the Foxconn worker preparing to
jump from a dormitory building
on June 13
2012
Chengdu Police
B

1.22



Hard work: Another Foxconn
worker has committed suicide,
just months after Apple had
reached an agreement with the
supplier to improve conditions
for staff
2012
Reuters
C
Factory staff working on the
Apple iPad: 90 per cent of the
technology giant's products are
made at Foxconn's plants
2012
Reuters
D
Cramped: A report released
earlier this year found that
Foxconn employees often
worked long hours in unsafe
conditions for poor pay
2012
Reuters

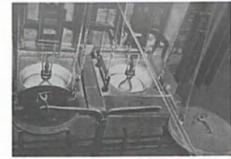
1.20



The Pilkington Organisation
Photograph (publication)
1959
Image credit: Pilkington Brothers
Limited

The Pilkington Organisation
A
Research
page 14
B
Research
page 15
C
Four million square feet a week
page 19
D
Outsize discs
page 27
E
Emergency operation
page 28
F
Searching tests
page 31

1.21



Process for forming window
glass cylinders, Pittsburgh
Plate Glass Company
Photograph (publication)
C.1923 republished 2010
The Corning Museum of Glass
Republished New Glass Review 31

1.22



Museum of English Rural Life
Photograph (museum display)
A wheelwright using a lathe to
turn a wheelhub
Museum of English Rural Life,
University of Reading
Date: Unknown

1.23



Jimmy's Food Factory
Documentary for television (stills)
BBC1
2010
Presenter: Jimmy Doherty
Producer: Jerry Foulkes
Executive Producer: Greg
Lanning

1.24



How to build... A nuclear
submarine
Documentary for television
BBC2
2010
Executive Producer: Tina Fletcher
Series Producer: Steve Crabtree

1.25



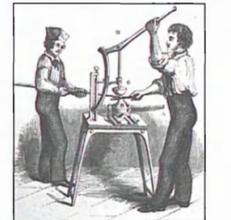
A Logistical Journey
Photograph (publication)
Photographer: Richard Baker
Pleasures and Sorrows of Work,
Alain De Botton 2009

1.26



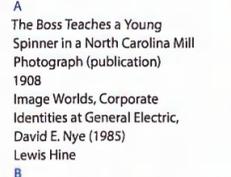
Marguerite Wildenhain showing
the motion of hands making a pot
Photograph (online)
C.1945
Otto Hagel

1.27



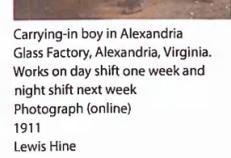
Curiosities of Glass Making
Drawings (publication)
1849
Apsley Pellat

1.28



The Boss Teaches a Young
Spinner in a North Carolina Mill
Photograph (publication)
1908
Image Worlds, Corporate
Identities at General Electric,
David E. Nye (1985)
Lewis Hine
B

1.29



Carrying-in boy in Alexandria
Glass Factory, Alexandria, Virginia.
Works on day shift one week and
night shift next week
Photograph (online)
1911
Lewis Hine

C

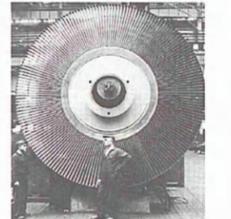
Steamfitter, Pennsylvania Railroad
Photograph (publication)
1930
Lewis Hine
Industry and the Photographic
image (ed.) F.Jack Hurley 1980

1.29



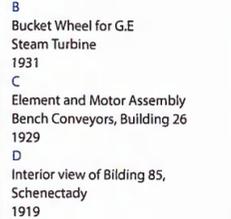
Quit Your Day Job -
Sea Babe Jeweller
Photograph (online)
C.2010
Image credit: Seababesjewelry

1.30



Photographs from General
Electric archive
Photograph (publication)
Image Worlds, Corporate
Identities at General Electric,
David E. Nye (1985)
General Electric Archive
A
Transformers in Testing Pit
1923
B
Bucket Wheel for G.E
Steam Turbine
1931
C
Element and Motor Assembly
Bench Conveyors, Building 26
1929
D
Interior view of Biling 85,
Schenectady
1919
E
Meter Conveyor for Final
Inspection of Watthour Meters
1929

1.31



Nachtmann Bleikristall
Photograph (publication)
C.2000
Photographer: unknown

1.32



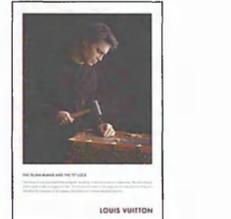
How to make fireworks
Online instructions (photographs
with text)
C.2000
Instructable user: pudl.dk
Instructables website

1.32



Amid the economic rubble,
a revolution is being knitted
Article (online)
9 July 2009
Libby Brooks
the Guardian Online

1.33



Louis Vuitton advertisement
Photograph (publication)
C.2000
Photographer: unknown
Guardian magazine

1.34



Life Gem
Online
2010

1.35



Making of a glass bottle
Photograph (publication)
C.1900
Victorian Encyclopedia
Photographer: unknown

1.36



How to make fireworks
Online instructions (photographs
with text)
C.2000
Instructable user: pudl.dk
Instructables website

1.37



Grand Designs
Television programme (still)
2010
Written and presented:
Kevin McCloud
Channel 4, Series 7, Episode 27

1.38



Woodmen, Lacock
Photograph (publication)
1845
William Henry Fox Talbot
The Victorians and Edwardians
at work, John Hannavy (2009),
Shire Publications

1.39



Craft Skills Demonstration Area
Wedgewood Museum,
Stoke-on-Trent
2010
Image credit: Jerome Harrington

1.40



Digital Glass Blowing
Interactive animation (online)
2010

1.41



Wallaceburg Glass Gallery
Photograph (online)
Photographer: Unknown

1.42



Pride in the wool: the rise of knitting
Photograph (online)
6 July 2011
Perri Lewis
the Guardian Online

1.43



How to make a vintage cake stand
Photograph (online)
26 July 2011
Betty Bee
the Guardian Online

1.44



B&Q plant pot
Object
2011
B&Q

1.45

Image unavailable
The manufacture of glass
Director: Len Lee & Frank Worth
1959
Pilkington Brothers Limited

1.46



Made in Britain
Documentary for television (still)
2011
Presenter: Evan Davis
Executive Producer: Dominic Crossley-Holland
Series Producer: Michael Tuft
Director: Martin Small
BBC 2

1.47



Are Gibson guitars killing the rainforest?
Article (online)
13 October 2011
Adam Blenford
BBC News Online

1.48



Ceramics a fragile History
Documentary (still)
2011
Narrator: Ruth Wilson
Director: David Vincent
Executive Producer: Jonty Claypole
BBC 4

1.49



Viasat broadband 'super-satellite' launches
Photograph (online)
20 October 2011
Jonathan Amos
BBC News Online

1.50



Why does every person need 200kg of steel a year?
Article (online)
24 November 2011
Michael Blastland
BBC News Online

1.51



Why doesn't Britain make things any more?
Article (online)
16 November 2011
Aditya Chakraborty
the Guardian Online

1.52



Blood in the Mobile
Documentary (still)
2011
Director: Frank Poulsen

1.53



Germany once admired British workmanship - but that was a long time ago
Article (online)
6 January 2012
Ian Jack
the Guardian Online

1.54



1 Million Workers. 90 Million iPhones. 17 Suicides. Who's to Blame?
Article (online)
6 February 2012
Joel Johnson
Wired magazine

1.55



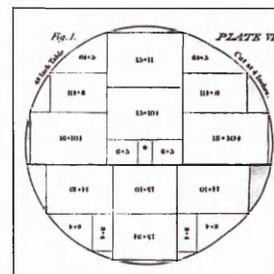
The story of the Sony Walkman
Publication
1997
Paul du Gay, Stuart Hall, Linda Janes, Hugh Mackay and Keith Negus
Doing Cultural Studies - The Story of the Sony Walkman
Sage Publications, London.

1.56



The Real price of an iPhone: life in the Foxconn
Article (online)
13 September 2012
Jemima Kiss
BBC News Online

1.57



Crown Glass Cutter and Glazier's Manual
Instruction manual
1835
William Copper
Republished
May 2012

1.58



Spinning Crown Glass
Photograph (online)
1951
Chance Brothers

1.59



Flashing out Crown Glass
Drawing (online)
1860
Artist: Unknown

1.60



Made in Dagenham
Feature film (still)
2010
Director: Nigel Cole

1.61



Ho Ping Standing Between Two Rows She Supervises
Photograph (art exhibition)
2003
Polly Braden

1.62



British Glass
Publication
Date: Unknown
Pilkington Brothers

1.63



Working gun made with 3D printer
Article (online)
6 May 2013
Rebecca Morelle
BBC News Online

1.64



Microsoft signs Android patent deal with Foxconn
Article (online)
17 April 2013
Author: unknown
BBC News Online

1.65



Children's Glass Blowing
Interactive animation (still)
2013
The Children's Museum of Indianapolis

2.2 Concern / celebration

This subchapter uses the terms concern / celebration to explore two opposing descriptions of our relationship to making and the made. It examines these terms as 'drivers' through which process is made visible.

2.2.1 How concern creates visibility

In 2010, a spate of suicides of workers at the Foxconn electronics factory in the Chinese town of Shenzhen brought the ethics of global production into the headlines. Coverage debated the West's culpability, questioning whether the suicides were caused directly by factory working conditions. Others questioned whether the number of suicides although tragic, were simply consistent with suicide rates across all areas of life.¹⁵

Online coverage carried the headlines: 'Who died for your iPhone?'¹⁶ or 'Is a phone worth dying for?'¹⁷ In the *Daily Mail*, the use of photographs directly linked the suicides with the mode of production, by placing a photograph that is 'believed to show the Foxconn worker preparing to jump from a dormitory building'¹⁸ in close proximity to an image of the factory's production line (Figure 4). In online forums users debated the suicides:

¹⁵ Brendan O'Neill, Buy an iPad Kill a Chinaman. Spiked Online, 2010.
<<http://www.spiked-online.com/index.php/site/article/8954/>>
[accessed 13 December 2010].

¹⁶ TG Daily, iPhone suicide: is a phone worth dying for?,
<<http://www.tgdaily.com/consumer/43340-iphone-suicide-is-a-phone-worth-dying-for>> [accessed 10 December 2010].

¹⁷ Jenny Uechi, Beyond Robson website, Who died for your iPhone?,
<http://www.beyondrobson.com/tech/2010/05/who_died_for_your_iphone_suicides_mount_at_chinese_manufacturing_plant/> [accessed 10 December 2010].

¹⁸ Mail Online, Apple faces fresh questions after another apparent suicide by worker at Chinese iPad and iPhone supplier Foxconn, <<http://www.dailymail.co.uk/news/article-2159457/Apple-faces-fresh-...apparent-suicide-worker-Chinese-iPad-iPhone-supplier-Foxconn.html>> [accessed 5 Oct 2013].

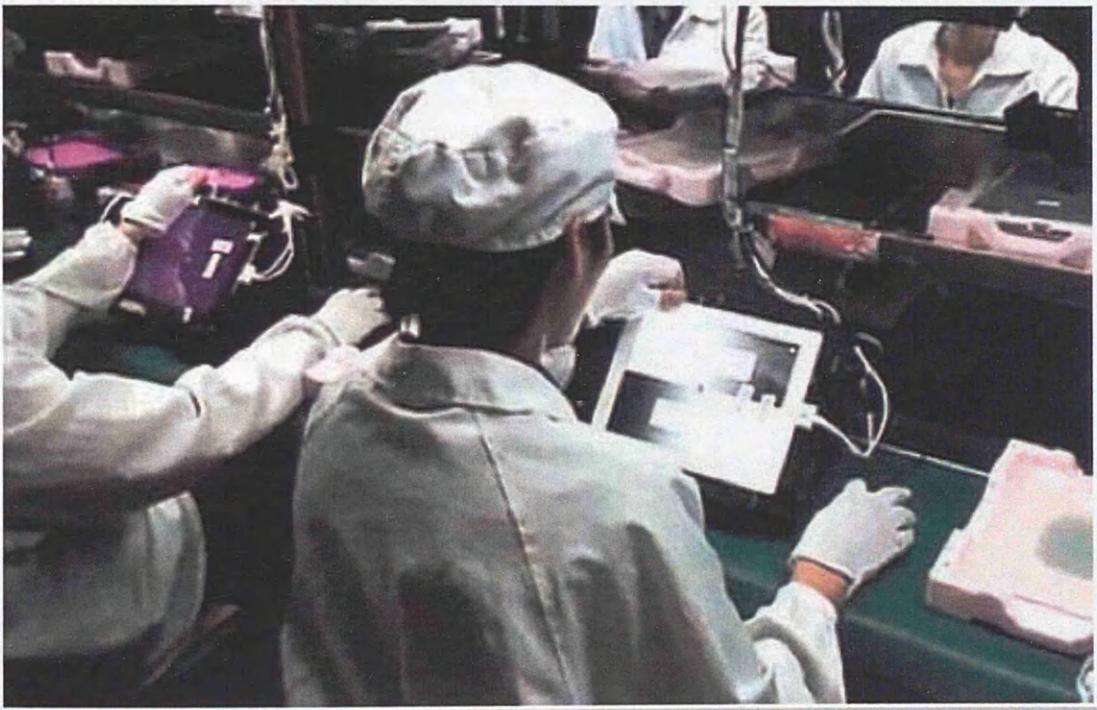


Figure 4: Apple faces fresh questions after another apparent suicide by worker at Chinese iPad and iPhone supplier Foxconn, Daily Mail, (14 June 2012)

I can't imagine how demoralizing it would be to spend your life creating a product you'd never be able to buy. Sometimes it baffles me how nonchalant I am about my relative privilege as a middle-class North American. I'm glad Jenny highlighted these points because I had literally never thought about how Macs were made until now.¹⁹

The Blogger's comment is reflective of a number of examples from recent popular culture explored below (page 24) which describe a sense of disconnection from everyday products, potentially linked to the invisibility of their production. However, these contemporary descriptions are nothing new and reflect historical descriptions of our relationship with making and the made. In *Capital*, Karl Marx examines how through its transcendence into a commodity, the making process of an object becomes separated and disguised. At the same time through this process of abstraction, the labour of others becomes invisible.²⁰

Marx demonstrates that the 'exchange value' of the commodity is dependent upon the socially necessary labour time invested in its production.²¹ However, because it is labour in its abstract form that is exchanged, this is not an exchange based upon a social relation between people, but an exchange based on a relation between the values of commodities. He states:

the relations connecting the labour of one individual with that of the rest appear, not as direct social relations between individuals at work, but as what

¹⁹ Jenny Uechi, Beyond Robson website, Who died for your iPhone?, <http://www.beyondrobson.com/tech/2010/05/who_died_for_your_iphone_suicides_mount_at_chinese_manufacturing_plant/> [accessed 10 December 2010].

²⁰ Marx, *Capital*, p. 44. 'To the latter [the producers], therefore, the relations connecting the labour of one individual with that of the rest appear, not as direct social relations between individuals at work, but as what they really are, material relations between persons and social relations between things.'

²¹ Marx, *Capital*, p. 16.

they really are, material relations between persons and social relations between things.²²

Marx suggests this as a process of 'transcendence', where our perception of the object is altered.²³ Marx points to a two-fold affect of this process - the individual worker is alienated both from their work and the output of their production. The Blogger's concerned reaction - her disconnection to the computer and the people who made it prompts a speculation on the space of production that is not commonly known but can only be imagined.

Published in 1867 *Capital* was written as a response to the conditions of production generated by the Industrial Revolution.²⁴ In *Need and Desire in a Post-material Economy*, James Heartfield offers a Marxian reading of contemporary capitalism, describing a further shift in our relationship to making and the made as production is fragmented and hidden in a Global context.

Heartfield explores Ronald Ingelhart's notion of a 'post-material economy', which describes a shift from industrial production to an economy driven by services, culture and information.²⁵ However, Heartfield critiques the idea of a post-material economy that he suggests ignores the fact that industrial production in the late twentieth century has not decreased but increased.²⁶ Heartfield states: 'The realm of production never went away. It is just

²² Marx, *Capital*, p. 44.

²³ Marx, *Capital*, pp. 42-44. Marx suggests that the effect of this abstraction of labour is that: 'as soon as it steps forth as a commodity, it is changed into something transcendent'.

²⁴ The industrial revolution took place in England from 1780 - 1850.

²⁵ James Heartfield, *Need and Desire in the Post-Material Economy*, Sheffield, SHU Press, 1998, p. 10.

²⁶ Heartfield, *Need and Desire in the Post-Material Economy*, p. 11. Heartfield states: 'Between 1960 and 1990 the number of people working in industry globally has increased from 247 million to 381 million.'

conceived differently.²⁷ He describes this shift in attitude as a 'retreat from industrial production'²⁸ in which 'the contemporary models of the economy all revolve around the desire to liberate making money from the business of producing goods.'²⁹ He continues:

The change described is less of a structural transformation of industry than a changing public perception and changing ideological framework. The demotion of the 'game with nature' – industrial production – does not indicate a simple shift towards other kinds of working. Rather it reflects the reduced importance of the world of work in public debate.³⁰

Whilst Inglehart's 'post-material economy' suggests a movement away from industrial production, Heartfield forwards a more complex reading of our relationship. He suggests that the movement of industrial production to the Far East and the developing world was one that was desired; that production moved out of sight because Western governments wanted it to, in part caused by the 'failure to reinvest the surplus value in production.'³¹ Heartfield describes a 'parasitic' relationship between the West and developing countries, where the 'messy business of production and exploitation' takes place elsewhere while the West reaps the financial benefits.³² He states:

²⁷ Heartfield, *Need and Desire in the Post-Material Economy*, p. 6. Heartfield states: 'The change described is less of a structural transformation of industry than a changing public perception and changing ideological framework.'

²⁸ James Heartfield, Mute online magazine, *A crisis of under accumulation*, <http://www.metamute.org/en/a_crisis_of_under_accumulation> [accessed: 10 December 2010].

'The ideology of post-materialism gave voice to the retreat from industry. The great expansion of the financial sector meets this elite distaste for industry'

²⁹ Heartfield, *Need and Desire in the Post-Material Economy*, p. 22. Heartfield cites VISA as an example.

³⁰ Heartfield, *Need and Desire in the Post-Material Economy*, p. 19.

³¹ Heartfield, *Need and Desire in the Post-Material Economy*, p. 45.

³² Heartfield, *Need and Desire in the Post-Material Economy*, p. 22. 'Businessmen have long entertained the fantasy that money could be made without having to get involved in the messy business of production and exploitation. But it is only in today's conditions of class peace that this fantasy could be given its head.'

The picture is one of a new division of labour in the world, where more and more of real production takes place outside of the West. The advanced nations are using their monopoly over capital to exploit that production [...] Meanwhile the real work is done outside the City and increasingly outside of the country.³³

Heartfield's description of a change of public perception and changing ideological framework describes a further stage of abstraction and estrangement in our relation to production.

In this period, the UK saw the large-scale closure of factories and industries. In some instances, the concern at this loss produced the visibility of making processes that were under threat and on the verge of disappearing. The 1977 documentary *Glass Works* for example, has been described by the industrial historian Stafford Linsley as a 'rescue recording'³⁴, recording 'the disappearing working lives' of Newcastle's working class communities 'at a time of huge changes'.³⁵



Figure 5: Still from *Glassworks*, (1977), Amber Film Productions

³³ Heartfield, *Need and Desire in the Post-Material Economy*, p.14.

³⁴ *Making the Tyne documentaries*, (2007), An Amber Film Production, The Tyne Documentaries DVD collection, 2007.

³⁵ *Glassworks* (1977), An Amber Film Production, The Tyne Documentaries DVD collection, 2007.

Linsley's description of the film as a 'rescue recording', informs the visual aspects of the film in a number of ways. Throughout, the skills and techniques under threat are described through sequences that depict close ups of the skilled hand of the maker and the concentration on their faces (Figure 5). The precarious state of the knowledge embodied by the factory and its workforce is further emphasised through reference to the depiction of glass production in *Diderot and d'Alembert's Encyclopédie* from 1751 (Figure 6).³⁶

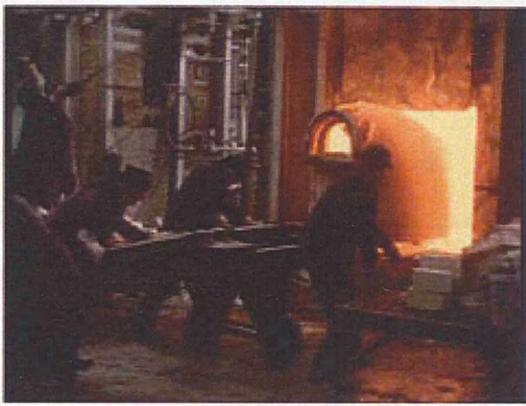


Figure 6: (left) *Glassworks*, (1977); (right) *Diderot and d'Alembert's Encyclopédie* (1751)

³⁶ Making the Tyne documentaries, (2007), An Amber Film Production, The Tyne Documentaries DVD collection, 2007. Stafford Linsley a Tyneside industrial historian discusses *Glassworks* says: 'aspects of the glass manufacture such as the tube drawing, you see illustrated in the earliest medieval books on glass manufacture, here you see it still being practiced... the whole place was gothic I felt.'

The *Encyclopédie's* depiction of glass making in the 1750's emphasises the continuity of the processes that we see in the film, with much earlier traditions. This visual connection makes reference to the opening of the Lemington Glass Works in 1787, thereby emphasising the loss of a two hundred year old local industry.³⁷ However, in making this reference, the film does not record the Lemington glass factory in an objective way, recognizing its situated-ness in the 1970's when the film was made, but instead presents a nostalgic view of the factory and a time that has already passed.³⁸

Concern creating a need to see

In an apparent contradiction to Heartfield's assertion that global manufacturing has increased – not decreased, a number of examples from popular culture describe and mourn a disconnected relationship with process. These examples suggest that we have become separated from the manufacturing of things because it has moved out of sight, either within factories or within hi-tech industrial processes and frequently overseas. They suggest that the inability to see or to witness leads to an inability to understand. It is this conception of manufacture that provides the key motivation for these broadcasts and publications in their attempt to trace or witness the origin of our things.

In his 2009 book *The Pleasures and Sorrows of Work*, the popular writer Alain de Botton describes this sense of disconnection. He states:

³⁷ The factory finally closed in 1997.

³⁸ Rachel Moore, Hollis Frampton (nostalgia), London: Afterall Books, 2006, pp. 8-9. Moore describes nostalgia as a 'longing' for 'a when and where in which time and space were easily felt and understood.' She suggests: 'The much maligned noisy smelly factory with its Taylorist mode of production romances us now, compared to the silent exploitation elsewhere that delivers the goods today.' Moore quotes Edward Casey, who describes how nostalgia 'is customarily and by definition tied to place.'

Two centuries ago, our forebears would have known the precise history and origin of nearly every one of the limited number of things that they ate and owned, as well as the people and tools involved in their production. The range of items available for purchase may have grown exponentially since then, but our understanding of their genesis has diminished almost to the point of obscurity.³⁹

De Botton implies that the physical separation between the individual and production, results in an emotional separation, leaving the individual devoid of a range of emotional responses: ‘wonder, gratitude and guilt’.⁴⁰

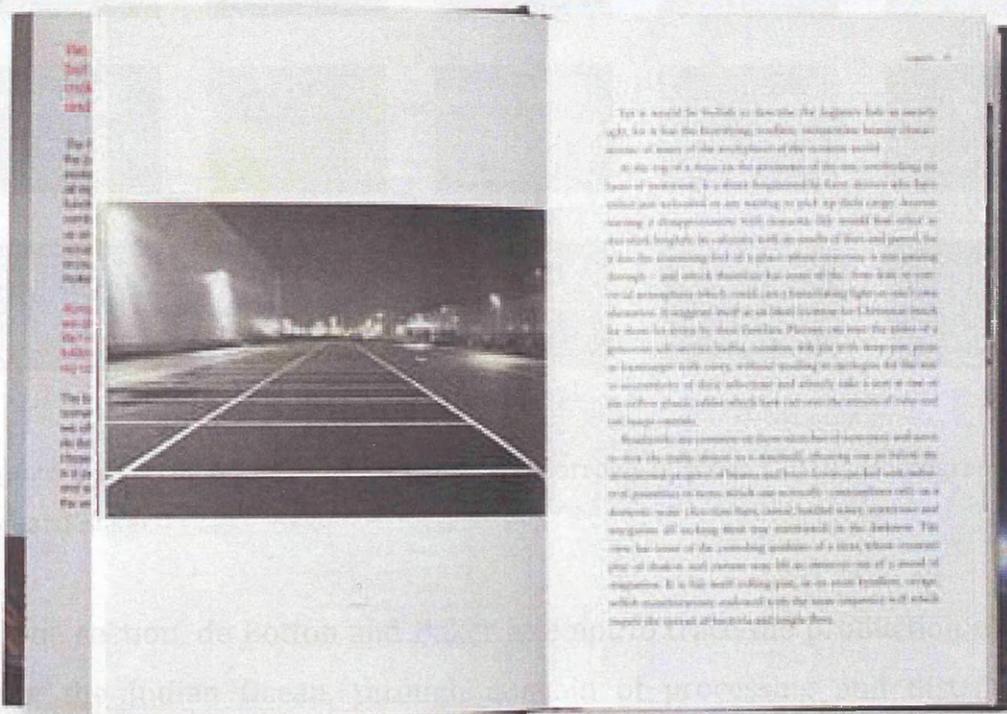


Figure 7: Alain de Botton, *The Pleasures and Sorrows of Work*, (2010). Photographs Richard Baker

³⁹ de Botton, *The Pleasures and Sorrows of Work*, p. 35.

⁴⁰ de Botton *The Pleasures and Sorrows of Work*, pp. 30-35. De Botton suggests the complexity and wonder of the world of work and how it provides us ‘with a principle source of life’s meaning.’

De Botton's book contains a photographic essay by Richard Baker. Many of the photographs make visible the spaces of production disconnected from us. The photographs depict the outside of factories (Figure 7), vast distribution networks, incomprehensible technological tools, and sites of production overseas.⁴¹

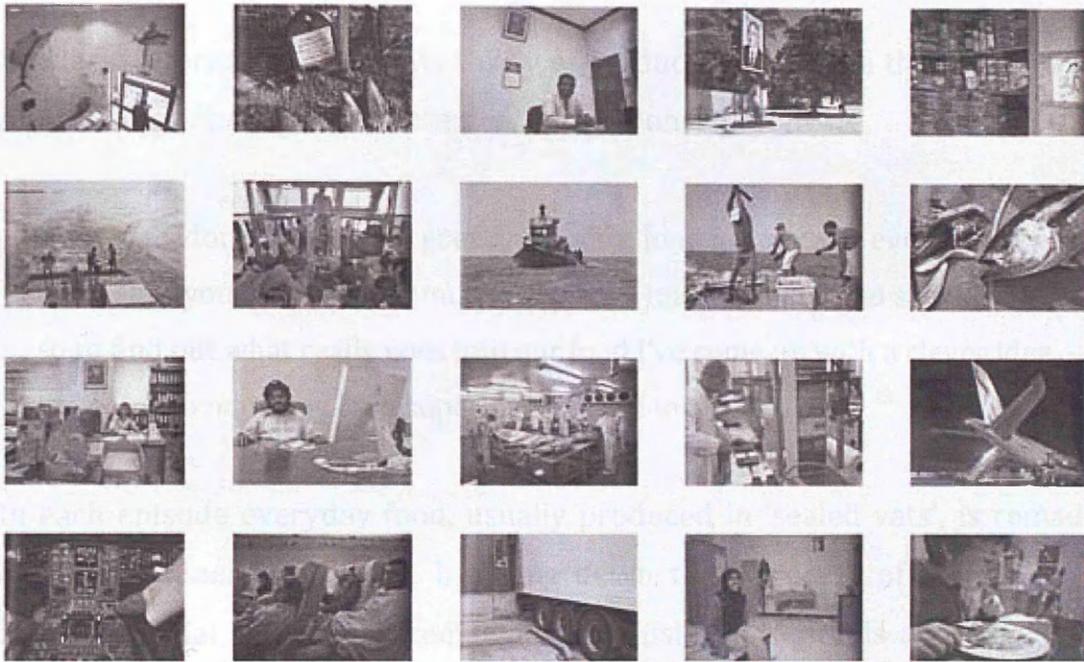


Figure 8: Alain de Botton, *The Pleasures and Sorrows of Work*, (2010). Photographs by Richard Baker

In one section, de Botton and Baker attempt to trace the production of tuna from the Indian Ocean, through a chain of processing and distribution networks, to the dinner table of a family in Bristol. The text is accompanied by a sequence of twenty photographs, illustrating stages in this global journey (Figure 8). De Botton describes the ambition of this study:

⁴¹ Within de Botton's book relevant photographs can be seen on the following pages: the outside of factories and vast distribution networks (pp. 48-67), depict glimpses of global scale production (p. 15), or incomprehensible technological tools (page 168), or sites of production overseas (p. 54).

The tuna's lessons, while played out in particularities, are nonetheless general ones about the value of swimming upstream in order to observe the forgotten odysseys of crates, to witness the secret life of warehouses and hence to mitigate the deadening, uniquely modern sense of dislocation between the things we so heedlessly consume in the run of our daily lives and their unknown origins and creators.⁴²

Similar concerns about the invisibility of production motivate the BBC's 2010 *Jimmy's Food Factory*. The presenter, Jimmy Doherty, states:

Most of us don't know what goes on inside a food factory and even if they held open days you wouldn't see much – its just a mass of pipes and sealed vats – so to find out what really goes into our food I've come up with a clever idea, I'm going to make my own supermarket food inside this barn.⁴³

In each episode everyday food, usually produced in 'sealed vats', is remade using individual ingredients, breaking down their process of manufacture into sequential stages, and remaking them using basic tools and machines that Doherty makes as part of the programme.⁴⁴ In one episode for example, Doherty remakes a 'J' shaped chip by extruding potato dough through a piece of apparatus made from various everyday materials and objects: pieces of timber to form a base frame on which a section of a drainpipe is mounted with cable ties (Figure 9). A rubber sink plunger and a car jack form the hydraulic mechanism which will push the dough along the inside of the drain pipe and through a piece of ply wood which has been pierced with an electric drill to create a 'J' shaped hole. The hole acts as a template through which the dough is pushed and subsequently formed.

⁴² de Botton, *The Pleasures and Sorrows of Work*, p. 47.

⁴³ *Jimmy's Food Factory*, BBC1, 2010.

⁴⁴ In *Jimmy's Food Factory*, presenter Jimmy Doherty remakes supermarket foods using home made tools and machines, an approach that emphasizes visibility and accessibility.

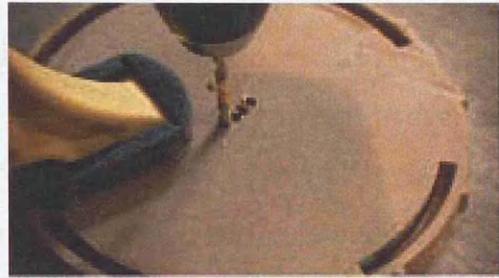
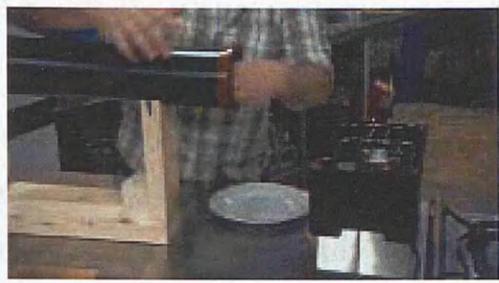
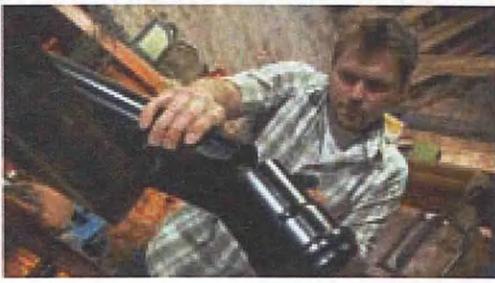


Figure 9: Jimmy's Food Factory, BBC, (2010)

Doherty's demonstrations reproduce hi-tech processes with apparatus that is visually homemade and produced with readily accessible tools and materials. This is a language of construction that would be familiar to any viewer who has engaged with basic DIY activities. The apparatus suggests that 'you' the viewer could make a similar exploration in an attempt to bridge the perceived inaccessibility of these production processes.

These examples from popular culture describe and mourn a disconnected relationship with process. Whilst the shift of manufacturing processes overseas is part of their motivation, their concern at the apparent invisibility of process also raises the question of who makes process visible and why? In *Need and Desire in a Post-material Economy*, Heartfield suggests that the description of a Post Material Economy is not made by those who are working in the increasing global manufacturing industries, but by the people who are in a position to reflect upon the lives of others. Heartfield suggests that the narrative of the Post Material Economy is:

a description of the world of work in which the future belongs to writers, administrators and the intelligentsia – the very people who are writing the advertising copy.⁴⁵

He continues suggesting that the 'information age might be a good pitch for consultants who have nothing to sell but information, but it does not necessarily describe the world.'⁴⁶ Heartfield's comment suggests both the inaccuracy of the concept, but that it is also one that is based upon class. He suggests that there is a divide between those who directly experience manufacturing and those who have the time and opportunity to make the

⁴⁵ Heartfield, *Need and Desire in the Post-Material Economy*, p.10. Heartfield also suggests: 'The business pages of the Sunday papers prognosticate that work will take place at home, in the electronic cottage industry of the future, in the electronic cottage industry of the future, equipped with fax and Internet. Should these writers not widen their circle of friends? It seems that more people are making a living writing about the electronic cottage than actually working in one.'

⁴⁶ Heartfield, *Need and Desire in the Post-Material Economy*, p.11.

social commentary about it. In both *Jimmy's Food Factory* and de Botton's *The Pleasures and Sorrows of work* – it is not those who are directly involved in production – and therefore do not see it as part of their daily lives, who generate the discourses about its invisibility. This phenomenon, where those not directly involved in manufacture have the desire to make visible processes they cannot see, can be seen in other examples within *The Archive* explored within this chapter. For example, Isobel Armstrong's discussion of Victorian Factory narratives, made by writers including Charles Dickens and Harriet Martineau (page 57), or Diderot Encyclopédie, the product of French intellectuals (page 68).

2.2.2 Summary: why and how concern creates visibility

Marx and Heartfield provide a deep understanding of the political and social shifts that affect the relationship between an individual and production. Marx describes the alienation and trauma that results from the separation of labour, object and worker. Whilst Heartfield illuminates the current political context in which despite the global increase of manufacturing, it has moved out of sight. In the examples above two significant forms of visibility result: in *Glass Works* processes that are about to disappear are recorded and made visible, and secondly examples from popular culture describe and mourn a disconnected relationship with process.

In these examples different concerns such as the invisibility of production (de Botton & Baker), anxiety (iPad suicides and Glass Works), loss of autonomy (Doherty) are the 'drivers' that produce these 'points of visibility'. The forms through which process is made visible include: single photographs (iPad suicides, and de Botton & Baker), sequences of photographs (de Botton & Baker), and televised demonstrations (Doherty). De Botton's and Doherty's concern with disconnection drives a desire for first hand experience – the journey of de Botton, or the experiments of Doherty. By placing the writer /

presenter in direct contact with global production, these examples attempt to make a personal connection to production and reassert the autonomy of the individual that is perceived to be under threat.

Unlike Marx's or Heartfield's deep understanding of the political or social context, these examples offer an emotional reaction and often made by those who are not directly involved in manufacture. In their desire to express concern for our disengagement / distance to production these examples do not bring us closer to process, and may in some cases obfuscate it further. The photographs from the *Daily Mail* for example, emphasise both the product (the iPad) and the people making it, as a way to illustrate the 'angle' of the newspaper article itself. In Figure 4, the iPad is seen during its production, but very close to completion. In the photograph, it is recognisable as a product that you know, or might own. This creates the possibility for an empathic link to form between 'your' product and the person producing it. It seems crucial for this link to work that the iPad is recognisable, and in this respect what the photograph visualises is the very end point of the object's production, not its sequential making process.

In a similar way many of Richard Baker's single photographs of factories are limited in their articulation of process. Instead they function to reinforce the sense of disconnection that de Botton describes. Both the photographs of production at the Foxconn factory, and de Botton & Baker's images produce 'glimpses' of specific moments of process not its sequential development. In comparison, de Botton's and Baker's sequence of images of tuna production describe a more complete narrative. Finally, while Doherty's experiments produce engaging and accessible explanations, they do not approach the sealed vats themselves, but offer metaphors of production, which are not equivalent.

2.2.3 How celebration creates visibility

This subsection explores celebration as a 'driver' that propels and shapes the way in which making process is made visible.

A number of recent newspaper articles have suggested increasing public interest in a range of craft activities that offer the individual an intimate experience of making process.⁴⁷ *Guardian* columnist Libby Brooks discusses the recent rise in knitting clubs and speculates on the motives of this 'resurgence' of interest in making:

We are producers frustrated with never seeing the end product of our efforts; consumers weary of being bullied into buying stuff we don't need, that is badly made or doesn't fit; and would-be creators waking up to the fact that inspiration exists beyond the Sunday style supplements.⁴⁸

Discussing making in broader terms, journalist Monty Don makes similar claims, stating that an allotment offers 'liberation from the tyranny of supermarkets, the tyranny of this anonymous food supply.'⁴⁹ Numerous terminologies have emerged to capture an alternative stance to industrial production and attitudes of resistance: 'neo-craft, craftivism (or craftism), DIY culture, micro-revolt, and subcultural craft'.⁵⁰

Both Brooks and Don suggest that making is an antidote to the alienating effects of industrial production. Brooks describes industrial production as a

⁴⁷ To demonstrate increasing public interest, Don states that 100, 000 have joined waiting lists for allotments and Brooks describes that we are witnessing a resurgence of interest in making.

⁴⁸ Libby Brooks, Amid the economic rubble, a revolution is being knitted, the *Guardian*, <<http://www.guardian.co.uk/commentisfree/2009/jul/09/william-morris-arts-craft-knitting>> [accessed: 29 December 2010].

⁴⁹ Monty Don, 100, 000 join waiting list for allotments, the *Guardian*, <<http://www.guardian.co.uk/lifeandstyle/2009/feb/19/national-trust-allotments>> [accessed: 29 December 2010].

⁵⁰ Glenn Adamson (ed.), *The Craft Reader*. Oxford: Berg. P. 585.

dominating and bullying presence, and it is described by Don as a form of 'tyranny'. They suggest a direct connection with production (knitting, food production) offers the individual an opportunity to be both productive and gain autonomy.

Individual agency and autonomy

Behind these public celebrations of making, research by a number of academics suggests potential benefits from a connection to making, both for the individual and society at large.

In his examination of the value of the 'experience of making and fixing things', Matthew Crawford argues that there is a direct connection between our involvement in making process and our relationship to things. Crawford explores two examples where we are separated from first-hand contact with making process: first, a decreased value of the education of making in schools in the US, and secondly, the design of goods such as the car engine which limit or even stop the owner carrying-out maintenance or repair.⁵¹

Crawford examines the consequences of a disconnected and 'depersonalized' relationship, stating: 'the disappearance of our tools from our common education is the first step toward a wider ignorance of the world of artifacts that we inhabit.'⁵² The impact of this loss is a relation of 'passivity, dependence and infantilism.'⁵³ For Crawford, doing and thinking are inherently connected, he states: 'If thinking is bound up with action, then the

⁵¹ Crawford, *The Case for Working with Your Hands or Why Office Work is Bad for US and Fixing Things Feels Good*, p. 3. 'Class rooms were emptied of lathes and milling machines during the 1990's to make way for the education of 'knowledge workers.'

⁵² Crawford, *The Case for Working with Your Hands, or Why Office Work is Bad for Us and Fixing Things Feels Good*, p. 1.

⁵³ Matthew Crawford, Blackwell Podcast.

task of getting an adequate grasp on the world, intellectually, depends on our doing stuff in it.’⁵⁴

Andrew Jackson’s study of amateur makers echoes Crawford’s description of ‘passivity’, which results from a disconnection to making process. Jackson’s study of the ‘intrinsic rewards’⁵⁵ that these makers experience suggests that the connection with process provides amateur makers with a ‘motivational force that transcends material and social rewards [...] allowing them to regain a sense of personal agency and well-being’⁵⁶ and ‘escape the alienating characteristics of constrained work.’⁵⁷ Jackson suggests that without a personal connection to making we cannot:

recognise the world as made by us. If we fail to see this, then we comprehend our material surroundings literally as alien to us. Our agency, our ability as an autonomous and creative power, is reduced to our capacity simply to choose and consume from a range of predetermined objects and practices.⁵⁸

Richard Sennett’s *The Craftsman* has a number of parallels with Crawford and Jackson. Sennett states: ‘We can achieve a more humane material life, if only we better understood the making of things.’ However, in contrast to Crawford and Jackson, his definition of craftsmanship is wide and inclusive: ‘Craftsmanship cuts a far wider swath than skilled manual labor; it serves the

⁵⁴ Crawford, *The Case for Working with Your Hands, or Why Office Work is Bad for Us and Fixing Things Feels Good*, p. 164.

⁵⁵ Andrew Jackson, *Men who make: the flow of the amateur designer maker*, in, *Extra / Ordinary craft*, Maria Elena Buszek, (ed.), Durham: Duke University Press, 2011, p. 271.

⁵⁶ Andrew Jackson, *Men who make: the flow of the amateur designer maker*, p. 272.

⁵⁷ Andrew Jackson, *Men who make: the flow of the amateur designer maker*, p. 273.

⁵⁸ Andrew Jackson, *Men who make: the flow of the amateur designer maker*, p. 273. ‘Put simply, in order to assimilate the objective world into our subjective consciousness we have to recognise the world as made by us. If we fail to see this, then we comprehend our material surroundings literally as alien to us. Our agency, our ability as an autonomous and creative power, is reduced to our capacity simply to choose and consume from a range of predetermined objects and practices.’

computer programmer, the doctor, and the artist; parenting improves when it is practiced as a craft, as does citizenship.⁵⁹

Sennett argues against the separation of thinking and making, suggesting that 'we are inherently part of the material world, and can only truly operate within it, if we know it.'⁶⁰ He situates his investigation in the context of grave threats to humanity, such as the atomic bomb or global warming. He hopes that craftsmanship, with its inherent understanding of the material world offers solutions to these threats.

The celebration of skilled making: Craft

Within *The Archive*, the visibility of making process as the result of celebration is particularly evident within examples from the crafts sector. Three major forms of visibility result: 1) still photographs of skilled making, 2) live demonstrations and 3) exhibitions which forefront and celebrate craft process.

The first, photographs of makers in their workshops, emphasise the intimate relationship between maker and tool, material and artefact (Figure 10).⁶¹ These images seem very important to the craft sector, as a way of promoting the crafts' identity and the unique circumstances in which the object is made.⁶²

⁵⁹ Richard Sennett, *The craftsman*, New Haven: Yale University Press, 2008, p. 9

⁶⁰ Sennett, *The craftsman*, pp. 8-14. Sennett states: 'Pandora can never be laid to rest; the Greek goddess represents inextinguishable human powers of mismanagement, self-inflicted harm, and confusion. But these powers can perhaps be caged if understood materially.'

⁶¹ For example, the Craft Council's 1980 *Makers* catalogue contains a total of twenty-eight colored photographs that document the making processes of six makers, or the 1997 *Objects of our Time* catalogue contains six photographs of makers at work in their studios.

⁶² Glenn Adamson, *Thinking Through craft*, Oxford: Berg, 2007, p. 168.

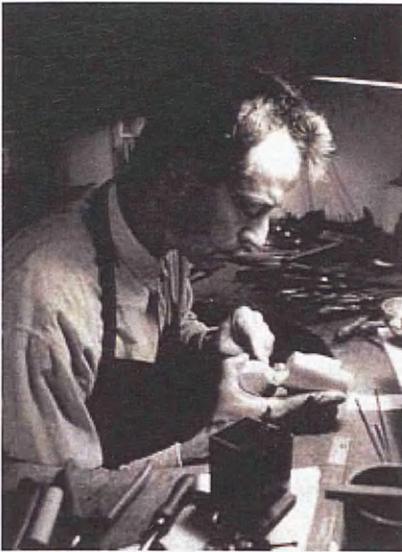


Figure 10: (Left) Robert Marsden, Robert Marsden, *On the edge*, (1993), Kettles Yard and Aberystwyth Arts Centre; (right) Keiko Mukaide, *Objects of our time*, Crafts Council, (1997)

This is a relationship often described and celebrated within craft writing. Jivan Astfalk for example, discusses the impact of a one to one contact between object and maker on the finished piece:

Hardly any other object exists as 'close to the hand' as the craft object where the notion of making or coming –to – be is ever so dominant and where thinking has taken shape in the physical nature of the objects.⁶³

While Gloria Hickey suggests that the craft object is:

special or rare because it is hand made and perhaps customized; sophisticated because the making of the object required skill; it is precious due to the materials or time invested in labour.⁶⁴

'The romance of the work space, having been comprehensively dismantled (or at least critiqued) elsewhere in contemporary art, is still alive and well in the crafts. This is partly due to the fact that crafted objects are by their very nature evocative of the way in which they were made.'

⁶³ Jivan Astfalk, 'The Hand That Thinks', in *Obscure Objects of Desire - Reviewing the Crafts of the 20th Century*, Tanya Harrod (ed.), London: Crafts Council, 1997, p. 280.

Through the depiction of skilled maker, these photographs celebrate the particularity of the craft objects production in comparison to other types of object.

The second form of visibility within in the craft sector is the live demonstration, an event that provides the general public an opportunity to witness the skill invested in the craft object. This can be seen in large-scale events such as *Art in Action*, where over four hundred artists and craftspeople show their making processes in studio spaces temporarily fabricated within tents (Figure 11),⁶⁵ or *The Skills Demonstration Area* at The Wedgewood museum which present demonstrations of making processes which have specific historical and regional significance.⁶⁶ The latter is particularly interesting as it celebrates a historical making process and one that is regional specific. Online, *The Skills Demonstration Area* is described as an opportunity to:

Marvel at the skills on show in our crafts demonstration area. Take the opportunity to see how it is done at close quarters and talk to the artisans at work. They will be happy to answer your questions and you will come away with a wealth of knowledge. The skills demonstrated by these elite craftspeople are truly breathtaking. Some of the processes they use remain unchanged since the days of Josiah Wedgwood.⁶⁷

⁶⁴ Gloria Hickey, 'Craft within a consuming society', in *The Culture of Craft*, ed. by Peter Dormer, Manchester: Manchester University Press, 1997, p. 85.

⁶⁵ Art in Action states that it is 'Inspired by the simple principle that people are fascinated when artists and craftsmen openly demonstrate their skills and discuss their work'. <<http://www.artinaction.org.uk>> [accessed 10 June 2014].

⁶⁶ The Wedgewood Museum in Stoke-on-Trent is in an area 'officially recognised as the World Capital of Ceramics.'

Welcome to Stoke-on-Trent, the World Capital of Ceramics, <<http://www.visitstoke.co.uk/potteries/>> [accessed 5 October 2013].

⁶⁷ Visit the home of Wedgwood, <<http://www.wedgwoodvisitorcentre.com/What-to-See/Craft-Demonstration-Area>> [accessed 5 October 2013].

Visitors can watch live making processes, but always in the presence of Wedgewood's products originally developed during the 1780's. Images and copies of the 1789 *Portland vase* can be seen on the walls and corridors, as well as on the table of the ceramicist who demonstrates the process of throwing (Figure 12) anchoring the skills we see in action to the ancestry of Josiah Wedgewood.

In The *Skills Demonstration Area*, there is an interdependence between the celebration of the legacy of Josiah Wedgewood and economics which directly effects how process is made visible.⁶⁸ Skilled making takes place alongside a cabinet of items for sale (Figure 13) and the skills displayed are the 'highlights' of the ceramic process - they are the visible highly skilled and laborious making processes. The focus upon these high-end skills increases the economic value of the commodities being sold, but hides the full process.

Finally, within the same sector a broad range of exhibitions celebrate artworks and commodities in which craft process is central.⁶⁹ For example, the V&A's 2011 exhibition *The Power of Making*, brought together over one hundred objects produced both by amateur and professional makers across a wide range of disciplines and approaches, 'to present a snapshot of making in our time.'⁷⁰

⁶⁸ In her essay, *Craft within a consuming society*, Gloria Hickey discusses the effect of being able to witness production first hand. She states: 'The sale that takes place at the craft person's studio stands apart from other retail environments [...] the consumer forms his or her own associations with the craft product through direct experience. As a result, the object takes on enhanced significance and is valued as authentic.'-Gloria Hickey, 'Craft within a consuming society', in *The Culture of Craft*, ed. by Peter Dormer, Manchester: Manchester University Press, 1997, p. 97.

⁶⁹ Other examples include: *Material Intelligence* at Kettles Yard in 2009, <<http://www.kettlesyard.co.uk/exhibitions/mi/>> [accessed 23 November 2012]. *Undone - Making and Unmaking in Contemporary Sculpture*, at the Henry Moore Institute, 2010. Or Michael Petry, *The Art of Not Making: The New Artist / Artisan Relationship*, London: Thames & Hudson, 2012.

⁷⁰ V&A, *The Power of Making*, <<http://www.vam.ac.uk/content/articles/p/powerofmaking/>> [accessed 23 November 2012].

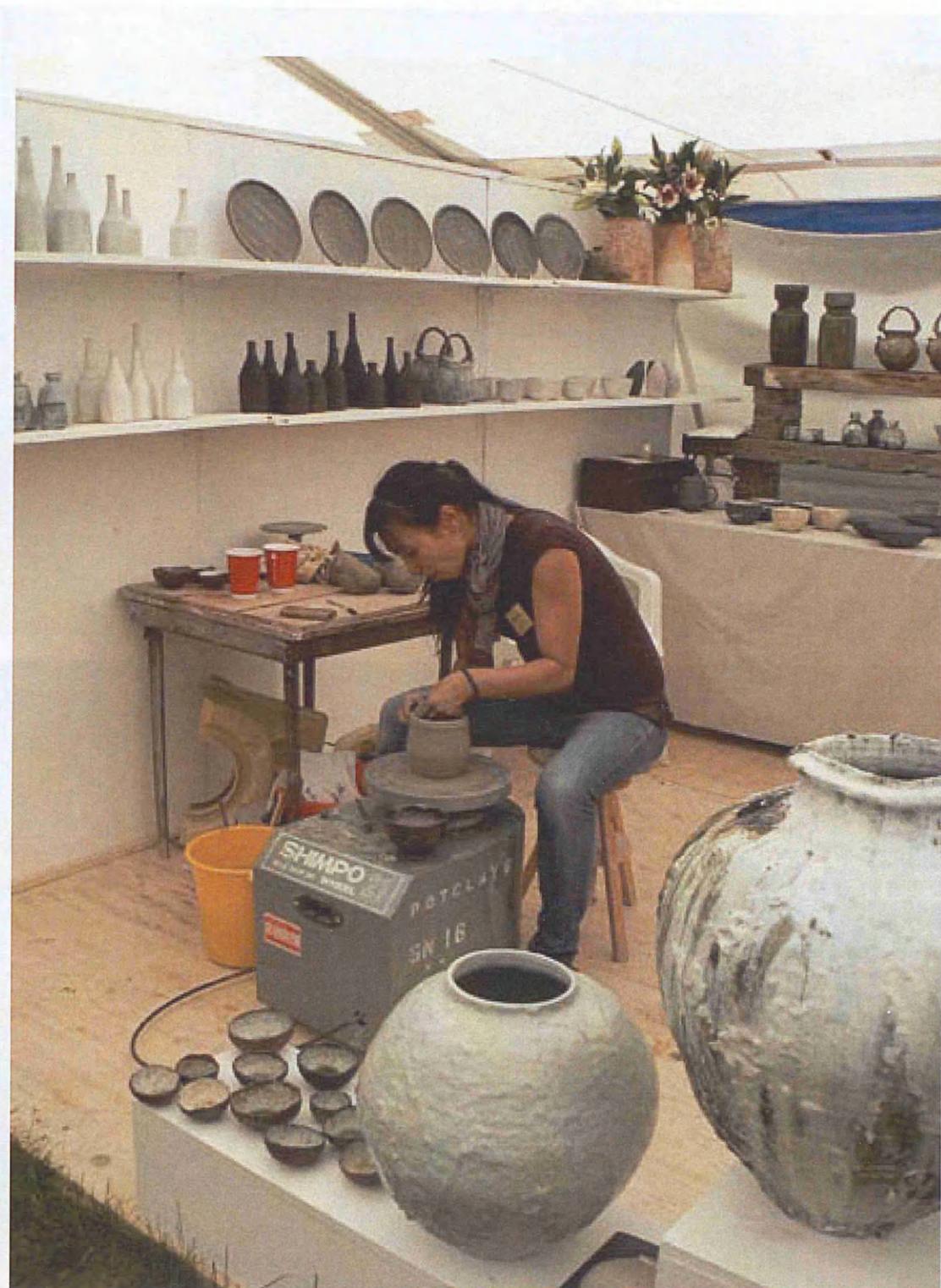


Figure 11: *Art in Action*, (2013). Photograph: Sonia Hawes



Figure 12: Craft skills demonstration area, Wedgwood Museum. Photograph: Jerome Harrington, (2010)



Figure 13: Craft skills demonstration area, Wedgewood Museum. Photograph: Jerome Harrington, (2010)

The celebration of skilled making: beyond craft

Although the relationship between maker and artefact is particularly evident within the crafts sector, it is not unique to this sector, but can be seen more broadly, in both advertising and industrial production. However, in these fields whilst skill and individual work are celebrated, the drivers that produce these points of visibility are quite different.

Figure 14 (left) a Louis Vuitton advertisement has a striking similarity to the Crafts Council's photograph of Robert Marsden (Figure 14, right). This fictional depiction of the craftsman at work would seem cynically poised to take advantage of the 'sophistication' (Hickey) and 'close to hand' nature of the craft object (Astfalk) to add economic value to their product. In common with the photograph of the iPad production at Foxconn, the Louis Vuitton image emphasises an object at the end of its production (the final rivets being

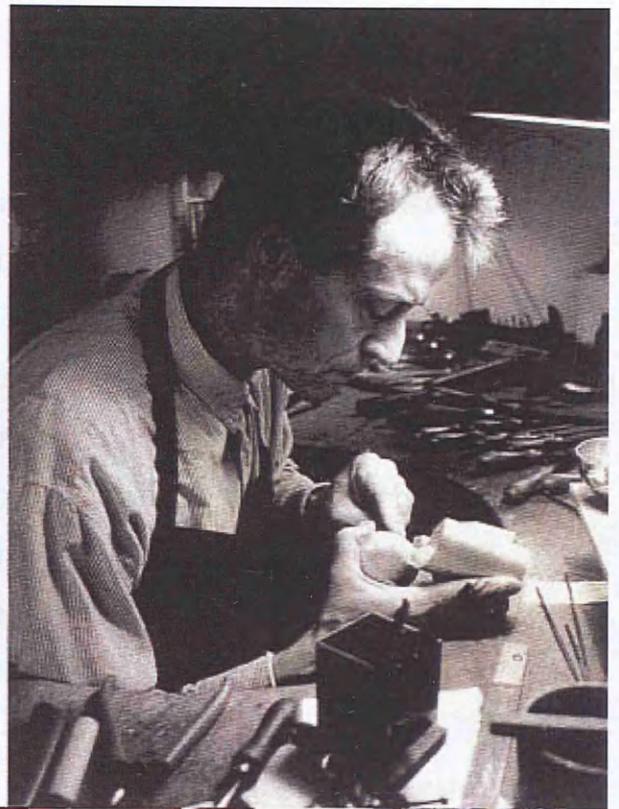
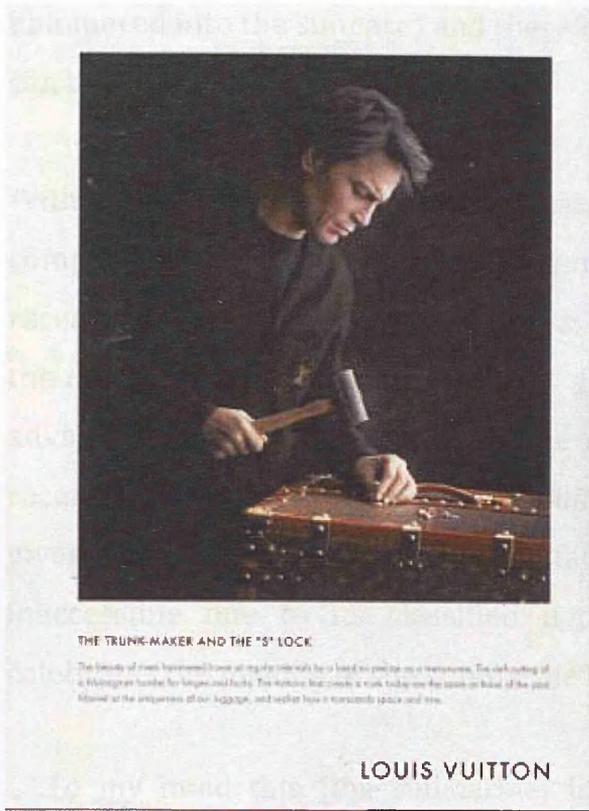


Figure 14: (left) Louis Vuitton advertisement, (circa 2010); (right) Robert Marsden, *On the edge* (1993), Kettles Yard and Aberystwyth Arts Centre

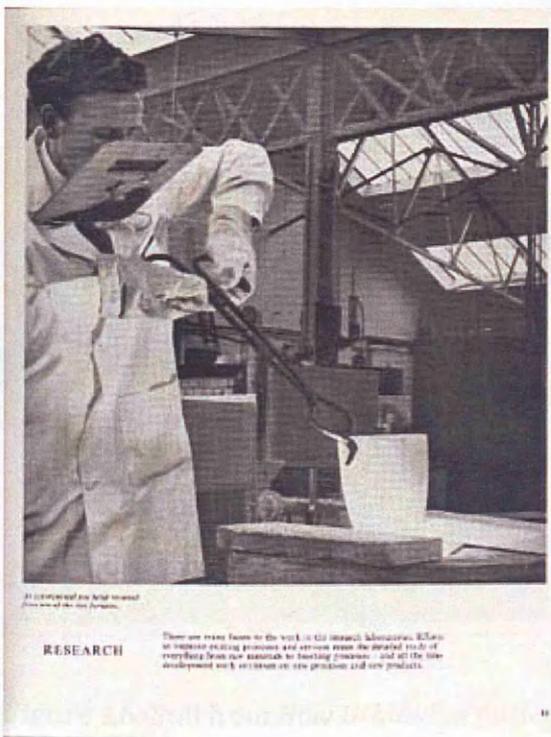


Figure 15: *The Pilkington Organisation* (1959). Photograph: Pilkington Glass

hammered into the suitcase) and therefore recognisable as a product that you can buy and own.

Within *The Archive* images and film that emphasise the skill and expertise of a company and its workforce are also common. Figure 15 for example, shows a research laboratory at Pilkington Glass; an image not dissimilar to those from the crafts sector. The image provides a 'glimpse' of process to celebrate the advanced research that underlies the company's success. Similarly in the recent BBC2 documentary *How to build... a nuclear submarine*, celebration gives rise to the visibility of a manufacturing process normally hidden and inaccessible due to its classified nature (Figure 16). The programme celebrates the making of the submarine in the following terms:

To my mind this [the submarine] is a seven thousand ton Swiss watch. There's an extraordinary amount of expertise involved in putting one of these submarines together. There are stages when it's like blacksmithing and there are stages when it's like brain surgery.⁷¹



Figure 16: Still from *How to build...a nuclear submarine*, BBC2, (2010)

⁷¹ How to build... A nuclear submarine, BBC 2, (2010).

By exploring 'how one of the world's most complicated machines is built and of the people who build it', the programme celebrates the skilled jobs and production that remain and flourish in the UK.⁷² However, in comparison to the of anonymous worker portrayed in Figure 15, this documentary emphasises the personalities of the people who work within this hidden space of manufacture as much as the making process. This emphasis on personality rather than process can be seen in other TV programmes that examine our relationship with manufacturing processes such as *Blood, Sweat and Luxuries* explored on page 52.

2.2.4 Summary: Why and how celebration creates visibility

The celebration of making process by commentators such as Brooks, Don, de Botton or Crawford, is often asserted in opposition to the alienating affects of industrial production. This relationship between celebration and concern demonstrates a dialectical relationship, 'whereby each thinks through the other'.⁷³ In these discussions what is perceived to be in danger of being lost is asserted: the autonomy of the individual - skill - local production - a one to one connection to process. Within *The Archive*, where making process is made visible through celebration, these issues can be seen. These ideas are particularly evident in craft production and this results in points of visibility that emphasise an intimacy between maker and object, as well as the increasing visibility of artefacts in exhibitions (*The Power of Making*) and

⁷² This celebratory enthusiasm is reminiscent of Leonard E Read's 1957 essay *I Pencil* which details the complexity of a pencils production in terms of geographical locations of production, chemistries and complex knowledge, as a demonstration how a free market allows such complexity to thrive.

⁷³ John Plunkett, 'From Optical to Digital (and back again)', 19: *Interdisciplinary Studies in the Long Nineteenth-Century*, vol. 1.6, no. Forum on Digitisation and Materiality, 2008, <<http://www.19.bbk.ac.uk/index.php/19/article/viewFile/479/339>> [accessed 1 May 2014].

public demonstrations of making process (*Art in Action*). However, the celebration of an intimate relationship with process occurs throughout a much broader field - and can be observed in industrial production where a company's skilled workforce is made visible (Pilkington research), or in advertising (Louis Vuitton) where quality and care are emphasised.

The photographs that depict craftspeople at work provide a glimpse of a very different type of production to those that depict industrial production. However, despite the obvious importance of these images in defining craft's identity, as single images they are unable to depict the complexity of the process taking place and therefore share some of the same limitations as those that depict industrial production.

At times in their celebration of making process, these authors over-express a sense of concern and thereby present an idealistic or nostalgic view of making process. De Botton for example, suggests that 'our forebears would have known the precise history and origin of nearly every one of the limited number of things that they ate and owned'.⁷⁴ His statement is a simplification which could be critiqued as a nostalgia 'for a non-existent past'⁷⁵, or as a form of 'technological pessimism', a term which describes a 'sense of disappointment, anxiety, even menace, that the idea of technology arouses in many people'.⁷⁶ These ideas of idealistic, nostalgic or reactionary view of making process are also present in examples from *The Archive*. For example, the Louis Vuitton advertisement that presents a romanticised narrative of the object's production (Figure 14, left), or *Glass Works* which ignores the issues that have led to the closure of the factory (Figure 5 & 6).

⁷⁴ de Botton *The Pleasures and Sorrows of Work*, p. 29.

⁷⁵ Moore, Hollis Frampton (nostalgia), p. 62.

⁷⁶ Leo Marx, *The Idea of "Technology" and Postmodern Pessimism* – in *Technology, Pessimism and Postmodernism*, Yaron Ezrahi, Everett Mendelsohn and Howard P. Segel (eds.), Dordrecht: Kluwer Academic Publishers, 1994, p. 11.

Finally, it is important to state that although it is only within this section where concern / celebration are specifically examined as drivers of visibility, the effect of these to both make and shape points of visibility can be seen throughout this chapter. For example, on page 55 the documentary *Blood in the Mobile* is driven by a concern for the ethical sourcing of materials that are incorporated into our everyday products such as mobile phones. Whilst on page 68 Diderot and d'Alembert's *Encyclopédie* is explored as a product of the Enlightenment, which celebrates and asserts human-made knowledge and agency.

2.3 Near / far

This subchapter explores how the visibility of making process is affected by our proximity to the site of production. The first two sections examine making processes that take place in a global context and are distance to us. The first examines newspaper photographs of production that are inaccessible to us. The second examines two documentaries in which the presenter / filmmaker undertakes a journey overseas to witness sites of production previously invisible. The third section considers how different levels of knowledge affect an understanding of process, by considering the understanding of the stranger and the expert.

2.3.1 Far: visibility in a system of distributed knowledge

The use of the opposition near / far has been informed by Peter Dormer's distinction between craft and non-craft production and the degree to which the individual is connected to the making process of an object. Dormer describes two distinct and binary relationships: 'personal know-how'⁷⁷ to describe craft production, and 'distributed knowledge' to describe non-craft production.⁷⁸ Dormer describes 'personal know-how' as a

knowledge of a 'how to' kind which you have and can call upon whenever the need arises. You not only know that you know but you feel that you know [...] Such personal knowledge is a characteristic of experts that novices do not have – it comes with experience.⁷⁹

His definition accounts for types of production where the individual is intimately connected. Personal know-how has a limited sphere of influence.

⁷⁷ Peter Dormer, (ed.), 'Craft and the Turing Test for practical thinking', in *The Culture of Craft*, Manchester: Manchester University Press, 1997, pp. 137- 158.

⁷⁸ Dormer does not use the term industrial production.

⁷⁹ Dormer, 'Craft and the Turing Test for practical thinking', p.139.

It is the knowledge of the expert not the novice, and that the majority of objects are made through a system of distributed knowledge.

Dormer describes 'distributed knowledge' through two interlinked ideas. Firstly that the knowledge needed to make the majority of objects which surround us, is distributed over vast networks in which production takes place, he states:

We live in an age in which the majority of objects exist only because of the coming-together of a variety of disciplines and industries. For example, whilst many people could learn to assemble a television set, the idea of any one person making a television is absurd. You would need a metallurgist, an expert in plastics, and much else besides. [...] The knowledge needed to make any piece of product design is spread over many systems of production and thought.⁸⁰

The second defining feature of distributed knowledge is the increasing existence of tools and technologies⁸¹ which 'allows us to make things without ourselves possessing the know-how to make them.'⁸² While Dormer recognizes that those with personal know-how can successfully 'take charge of technology'⁸³ he points to the adverse of this situation where 'one of the common effects of distributed knowledge is to do away, as far as possible, with the need for personal know-how.'⁸⁴

Individual as actor or receiver

⁸⁰ Dormer, 'Craft and the Turing Test for practical thinking', p.139.

⁸¹ Dormer gives the examples of instant cameras, or computer software as tools and technologies of distributed.

⁸² Dormer, 'Craft and the Turing Test for practical thinking', p.139.

⁸³ Dormer, 'Craft and the Turing Test for practical thinking', p.140.

⁸⁴ Dormer, 'Craft and the Turing Test for practical thinking', p. 141.

Dormer's terms describe two possible relationships between the individual and production. The first: personal know-how, where the individual can effect production, and the second: distributed knowledge where they cannot.

Figure 17 visualises these two possibilities. Personal know-how is described on the left of the diagram, and emphasises the close relationship between the individual and the site of production (represented by a single blue circle). Here the experience of making process is first hand and intimate as it is to a craft practitioner. The close proximity of the individual with the site of production emphasises their ability to act and to affect the outcome.

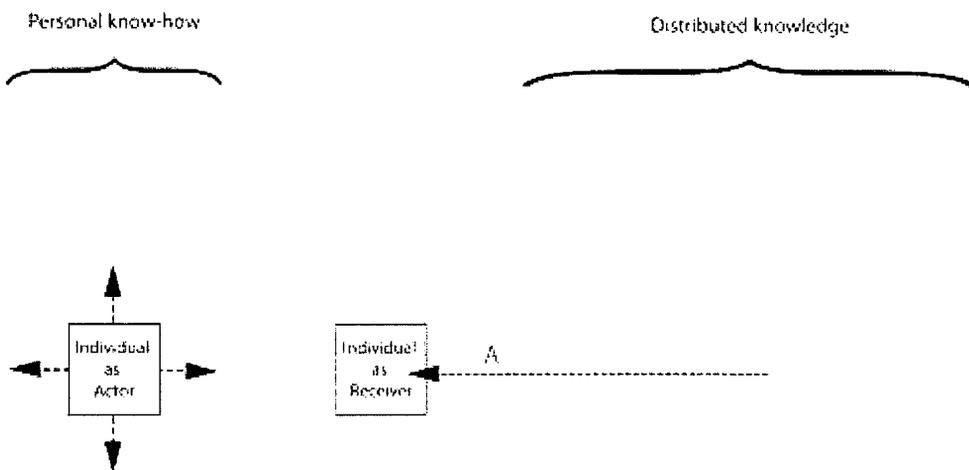


Figure 17: (left) Personal Know-how; (right) distributed knowledge. Diagram: Jerome Harrington

In contrast Figure 17 right, describes production in a system of distributed knowledge. This diagram visualises production fragmented across disciplines, geographical space and, specialist types of knowledge (described by the distribution of multiple blue circles). While the individual would in reality be embedded within this system as a 'component' of production, this diagram represents the relationship an individual might have with production, where

making process is often experienced through secondary sources, predominantly images and film. In Figure 17, the arrow [A] describes how points of visibility mediate process across a distance.

2.3.2 Glimpses into unfamiliarity

Dormer's description of production in a system of distributed knowledge describes the distance at which production takes place. It suggests a situation where production potentially becomes inaccessible. This description aligns with a number of writers (including Crawford, De Botton, Brooks, or Don) who link the distance at which production takes place with the degree of disconnection or estrangement.

The image is a screenshot of the BBC News website's Technology section. At the top, the BBC logo is on the left, and navigation links for 'Sign In', 'News', 'Sport', 'Weather', 'iPlayer', 'TV', and 'Radio' are on the right. Below this is a red banner with 'NEWS TECHNOLOGY' in white text. A secondary navigation bar lists various news categories: 'Home', 'World', 'UK', 'England', 'N. Ireland', 'Scotland', 'Wales', 'Business', 'Politics', 'Health', 'Education', and 'Sci/Env'. The main content area shows the date '17 April 2013' and 'Last updated at 12:08'. The headline reads 'Microsoft signs Android patent deal with Foxconn'. A sub-headline states: 'Microsoft has secured a patent deal with the world's biggest consumer electronics manufacturer to receive fees for devices powered by Google's Android and Chrome operating systems.' To the right of the text is a photograph of a worker in a white lab coat in a factory setting, with the caption: 'Microsoft had begun legal action against Hon Hai over the Android and Chrome patent dispute'. Below the main text, there are several paragraphs of text: 'Hon Hai - the parent company of Foxconn - said the deal would help prevent its clients being caught up in an ongoing intellectual property dispute.', 'Microsoft says that Google's code makes use of innovations it owns.', and 'Google alleges its rival's claims are based on "bogus patents".' A 'Related Stories' section on the right lists: 'Alibaba steps up battle with Android', 'Microsoft wins text patent fight', and 'Microsoft claims patent milestone'. At the bottom, a paragraph states: 'According to the Foss Patents blog, which tracks such matters, this is the nineteenth announced patent licence deal Microsoft has secured since 2010 from companies whose products use Google's mobile and...'

Figure 18: BBC News website, (17 April 2013)

Within *The Archive of Manufacture*, the visibility of production in a system of distributed knowledge often occurs through newspaper or marketing material. In the majority of these examples, making process is made visible through a single photograph. Figure 18, for example shows a photograph from the Foxconn factory (explored above on page 17) in an article about Microsoft patent rights. However, whilst the photograph visualises production that we do not have access to, it does little to clarify process. The single photograph is only able to visualise one instance of production – a fragment of production in a system of distributed knowledge. The photographs function within the news article is revealed by its caption that does not clarify the process that we see, but is used to refer to other aspects of the accompanying news story.⁸⁵ This lack of contextual information leaves the moment of process open to speculation or confusion. Ultimately the photograph leaves the viewer at a distance, a sense of unfamiliarity as much as a sense of understanding.

In *Orientalism*, Edward Said describes the role of distance in the construction of otherness.⁸⁶ He introduces the term ‘imaginative geography’ to describe the construction of an imaginary idea or fiction of an unknown space.⁸⁷ He states:

So space acquires emotional and even rational sense by a kind of poetic process, whereby the vacant or anonymous reaches of distance are converted into meaning for us here [...] For there is no doubt that imaginative geography

⁸⁵ For example in Figure 18, the caption states: “Microsoft had begun legal action against Hon Hai over the Android and Chrome patent dispute”.

⁸⁶ In *Other / Otherness* (2008), Jean-Francois Staszak states: ‘Geography is remarkably effective producer of otherness.’ Jean-Francois Staszak, *Other/Otherness*, p. 7. <<http://www.unige.ch/ses/geo/collaborateurs/publicationsJFS/OtherOtherness.pdf>> [accessed 2 June 2012].

⁸⁷ Edward Said, (1978) *Orientalism*, London: Penguin, 1991, p. 54.

and history help the mind to intensify its own sense of itself by dramatizing the distance and difference between what is close to it and what is far away.⁸⁸

In a system of distributed knowledge where manufacture is spatially separated from the individual, Said's discussion of how distance affects interpretation and understanding becomes particularly relevant. These photographs, made visible for reasons other than clarification of process (drama, spectacle or intrigue) place the viewer in an unfamiliar space, a space of otherness and in doing so reinforce the sense of disconnection.⁸⁹

2.3.3 An attempt to witness global production

This section examines two examples from *The Archive* where journeys are made to sites of production in a system of distributed knowledge. These are: BBC3's 2010 documentary *Blood Sweat and Luxuries*, and Frank Poulsen's 2011 documentary *Blood in the Mobile*. These films are driven by moral and ethical concerns and informed by wider debates concerned with sustainability.⁹⁰ In both films the filmmaker / presenter attempts to gain first

⁸⁸ Said, *Orientalism*, p. 55. Said suggests that an imaginative conception of the other – likewise I am suggesting an imaginative conception of making process. Said, discussing 'imaginative geography states: 'It is perfectly possible to argue that some distinctive objects are made by the mind, and that these objects, while appearing to exist objectively, have only a fictional reality.'

⁸⁹ Adrian Snodgrass and Richard Coyne, *Interpretation in Architecture – Design as a way of thinking*, Routledge, 2006, p. 147. Snodgrass and Coyne's definition of the other is particularly relevant, they suggest: 'The other is the strange, the different, that which is outside the experience of a particular group or individual... It is used to signify the dispossessed, the homeless, the traveller, the refugee and the alien.'

⁹⁰ For example: *Blood Sweat and Luxuries* follows the journey of six 'self-confessed consumers' as they visit sites of manufacture across Africa and Asia which produce our 'luxuries'. The six act as witnesses, visually observing, but more importantly physically engaging in this work, and translate this experience to the viewer. And in Frank Poulsen's documentary *Blood in the mobile*, Poulsen states: 'We love our mobile phones - they have become an integral part of modern urban life and selection between different models has never been greater. What most of us don't know is that there is a bloody secret hidden in each one with a majority of minerals used to produce phones

hand experience of the site of production in order to access knowledge that was previously hidden, with the aim that this will affect the ethical or moral position of the presenter and subsequently the viewer.⁹¹

In *Blood Sweat and Luxuries* six teenage consumers are taken to different parts of the world to work in specific manufacturing industries.⁹² In each episode, the teenagers visit sites of production that they would never normally have access to, and take part in the production processes – thereby experiencing the physicality of the work and its level of skill, danger, banality (Figure 19).

coming from mines in Eastern DR Congo. The Western world is buying these so-called conflict minerals and thereby financing Civil War that, according to human rights organizations, has been the bloodiest conflict since World War II.'

⁹¹ Each of the examples attempts to re-position us to our everyday things in a way which is accessible and easy to understand: for example empathising with the effort of a Western teenager who is mining gems in Africa or visualising the processes of bread manufacture with home made tools. They attempt to reconnect us in a number of ways: geographically by showing us the route of that tuna is imported from the Indian Ocean; materially by showing us how a 'J' shaped chip is extruded; socially, to the people employed in the production of our goods, by showing the children involved in recycling E-waste in Africa; or to expose the science behind these everyday things by showing us how different size air bubbles in super market bread allow it to last longer. And in one case study in *The Pleasures and Sorrows of Work*, the author traces and witnesses each stage of the production of tuna, embarking on a global journey traveling from the Indian Ocean, where the tuna is caught, through various stages of processing, to its final consumption by a specific family in the UK.

⁹² The programmes introduction states: 'In Britain today what was once considered luxuries are fast becoming everyday items, from our electrical gadgets to our leather shoes we consume - more and more these products become increasingly disposable. But would we care more if we knew the human cost of making our luxuries? In the next five weeks six British consumers will travel to Africa and Asia to live and work alongside the people who mine, manufacture and recycle our luxuries.'

The types of production examined include: Gem production in Madagascar, leather production in Addis Ababa, coffee production in Ethiopia, gold and the recycling of E-waste in Ghana and the production of electronic components for Mp3 players in the Philippines.

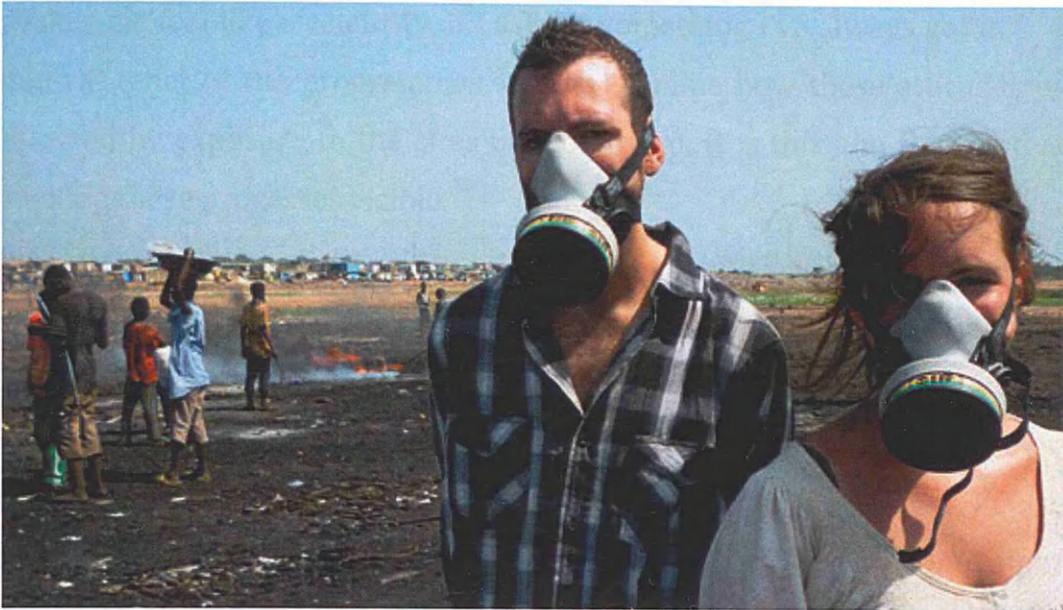


Figure 19: Still from *Blood Sweat and Luxuries*, BBC 3, (2010)

Although the products of these types of manufacture were familiar to the teenagers, the specifics of their manufacture were not. The disparity in the teenager's knowledge between the product and the mode of manufacture is used by the programme to link overconsumption with the invisibility of production. At the start of each episode the programme suggests that not understanding production leads to an indifference to products. The introduction states:

In Britain today what was once considered luxuries are fast becoming everyday items, from our electrical gadgets to our leather shoes we consume – more and more these products become increasingly disposable. But would we care more if we knew the human cost of making our luxuries? In the next five weeks six British consumers will travel to Africa and Asia to live and work alongside the people who mine, manufacture and recycle our luxuries.

At the beginning of each episode the teenagers are introduced by revelations of their consuming habits through statement such as: 'Having my luxuries

makes me feel like a celebrity, if I ask for something I've always got it.'⁹³ The central tenet of the programmes was to examine how these attitudes were affected by exposure to the sites of production. It is this aim that motivates making these processes visible.⁹⁴

In *Blood in the Mobile*, filmmaker Frank Poulsen makes a similar journey to visit and witness first hand a distance site of production. Poulsen travels to the Democratic Republic of Congo, to see the mining of 'conflict' minerals, Coltan and Cassiterite used in the production of mobile phones. Poulsen's film is motivated by his ethical concern that materials in his phone might be financing civil war in the D.R.C.⁹⁵

A major part of the film consists of Poulsen's attempt to gain access to the mines.⁹⁶ Bureaucracy, civil war, bribery and the geographical inaccessibility of the mines, makes access extremely difficult. Witnessing Poulsen's efforts to see the mines emphasises his absolute need to witness the site of production first hand, but equally demonstrates its inaccessibility.

After a two-day walk through dense jungle, Poulsen arrives at the Cassiterite mines (Figure 20), where he descends into one of the mines. This three-minute sequence is filmed on a hand-held camera, and lit by the miner's head

⁹³ The teenagers are described as 'self-confessed consumers'.

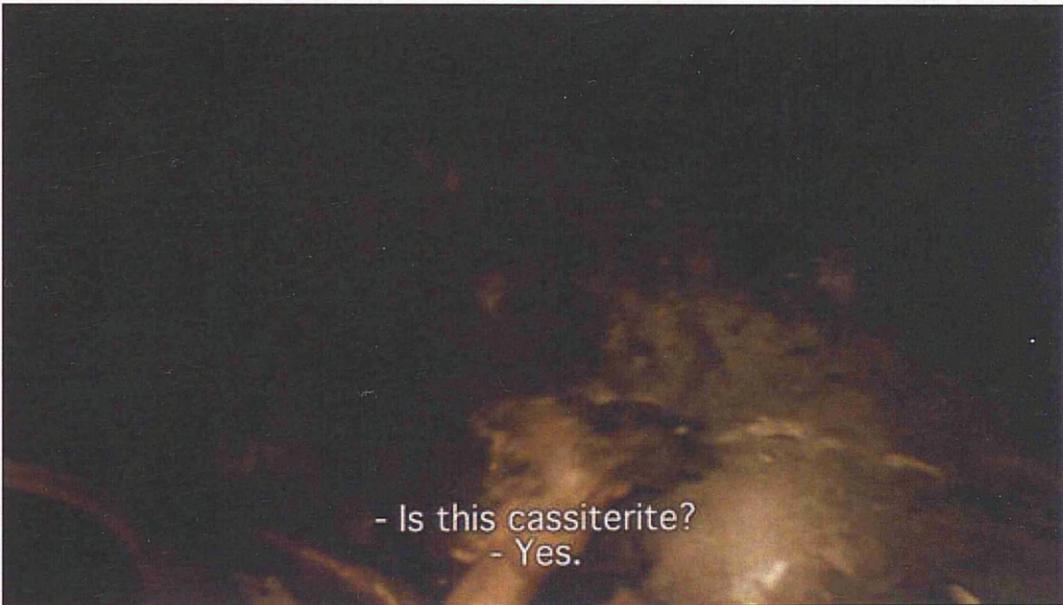
⁹⁴ Interviews taken before and after the five-week journey are contrasted to reveal the effect of witnessing the production of these different products upon their attitudes towards consumption.

⁹⁵ At the beginning of his film Frank Poulsen states 'Do our phones really contain minerals that finance war in the Congo? And if the world has known about this for ten years, why has nobody done anything about it? Or is the Congo just too far away? I can't live with the fact that my phone might be financing war. I can't keep sending loving text messages to my wife or talk to my daughters if it has cost lives in the Congo – if there's blood in my mobile.'

⁹⁶ This includes phone-calls, meetings with Nokia representatives and officials in the D.R.C and several plane journeys.



Figure 20: Still from *Blood in the Mobile*, Frank Poulsen, (2011)



- Is this cassiterite?
- Yes.

Figure 21: Still from *Blood in the Mobile*, Frank Poulsen, (2011)

torches. This view of the mines interior is claustrophobic and disorientating (Figure 21).

Having finally achieved access to the mine, Poulsen finds no clarification to his ethical questions at the site of production. This moment, suggests that due to distributed nature of mobile phones production answers to ethical concerns about mining in the Congo are situated elsewhere – throughout the complex system of distributed knowledge.

Factory Tourism

In *Victorian Glassworlds*, Isobel Armstrong, examines written descriptions of journeys into glass factories published in the 1850's, which she terms Victorian 'factory tourism'.⁹⁷ These Victorian descriptions of making process can be understood as the precedent to the two documentaries above. Armstrong describes the manifold ambitions of these texts:

Visits to factories were journeys of sociological discovery, spectacle, courses of instruction in new technologies, and anatomies of work... an attempt to both document and mythologise. Statistics combine with iconographical language that derives from the Arabian Nights, Dante, and the biblical fiery furnace.⁹⁸

Armstrong's suggestion that the Victorian production narratives both 'document and mythologise' implies a tension in their aims. Similarly both *Blood in the Mobile*, and *Blood Sweat and Luxuries* are marked by conflicting ambitions. They provide entertainment through a narrative of suspense,

⁹⁷ Isobel Armstrong, *Victorian Glass Worlds*, New York, Oxford University Press, 2008, p. 19. Armstrong's sources are 5 accounts of glass factory visits published in the mid 1800's: Penny Magazine 1841, Household Words 1851, Illustrated exhibitor and Magazine of Art 1852, Household Words 1852, and Leisure Hour 1853.

⁹⁸ Armstrong, *Victorian Glass Worlds*, p. 19.

whilst exploring a concern for working conditions and environmental impact of the processes.

Armstrong points to the constructed nature of these Victorian descriptions of making process, revealing what she describes as a 'morphology' that structures their narrative. She states:

The glass factory visit included a number of sequences, not invariably present or in the same order and sometimes conflated, but consisting of eight recognizable narrative phases. These eight phases were: '[1] Introduction, the entry into unfamiliar industrial territory by the stranger narrator [2] The journey through the factory space and the unfolding discovery of technological process [3] A short history of glass and its modern day constituents [4] The journey into darkness and the central drama or crisis of the furnace heat – this was the climax of the narrative, [5] and figured as a passion I have observed – the infernal choreography of the workers round the furnace [6] The magical skill of the glass worker [7] The emergence of a final glass artifact as commodity [8] The movement of safe return to familiar territory.⁹⁹

Although Armstrong's stages are based on historical and textual examples, in both of the contemporary examples similar morphologies can be identified. In Episode 2 of *Blood Sweat and Luxuries* we see the six teenagers move through various stages of leather production; moving from abattoir, tannery, to shoe factory. Armstrong's description of 'the journey into darkness' can also be identified. In *Blood Sweat and Luxuries*, it is the teenagers time in the abattoir, where they are confronted by the killing and skinning of the cows, or in *Blood in the Mobile*, when Poulsen descends into the darkness of the Coltan mine (Figure 21) that becomes the central drama or crisis. However, in contrast to Armstrong's examples where the narrator is a pure observer, at

⁹⁹ Armstrong, *Victorian Glass Worlds*, p. 22. Please note that I have introduced the numbers into Armstrong's text to ease identification of the eight stages she defines.

each stage of production the teenagers participate in aspects of production the tasks; a movement from written description to actual contact. In both examples there is return to familiar territory – in *Blood, Sweat and Luxuries* – the teenagers return home to reflect upon how their experience has affected their relationship to consumption, and in *Blood in the Mobile*, Poulsen returns home to reflect upon his journey and express his frustration at the limits of what he has been able to change.

2.3.4 The stranger and the expert

In *Blood, Sweat and Luxuries* the teenagers are the narrators who describe the processes they witness and take part in. Using Armstrong's term, they are 'stranger narrator's' – describing the processes of distributed knowledge, which they do not have a personal understanding of. In contrast, at the *Skills Demonstration Area* at Wedgewood, visitors able to observe highly skilled craftspeople with a high level of personal know-how demonstrating key aspects of ceramic production.

In the Skills Demonstration Area six making processes are demonstrated in booths (Figure 22). Three of the six processes link to one another through adjacent booths, each feeding into the next: throwing, turning, ornamenting. However, within the same space other skills do not have this direct linear connection. Processes such as figurine painting, hand painting, lithography, or enameling, are finishing processes that display and reinforce the very high skill levels of the end products. By presenting the 'highlights' rather than a complete making process, there is a break in the sequential development of the making process (as discussed in celebration, page 38).¹⁰⁰

¹⁰⁰ On the day I visited the Skills Demonstration Area, the casting section was not manned and so a key link in the process broken.

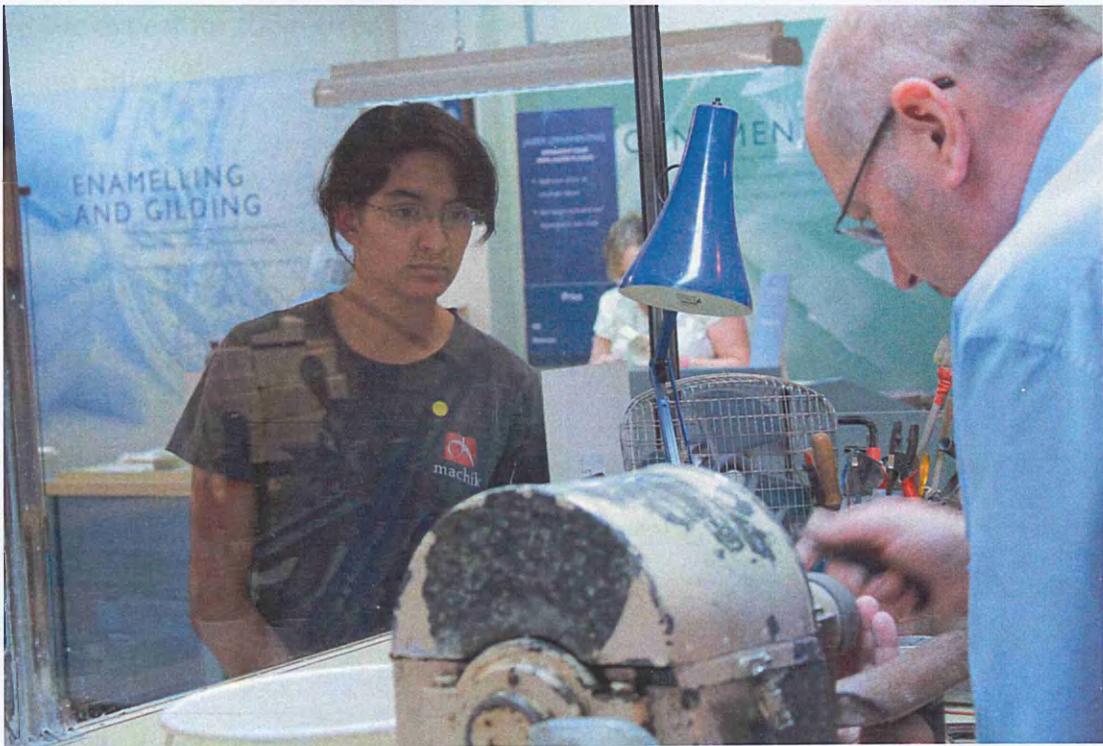
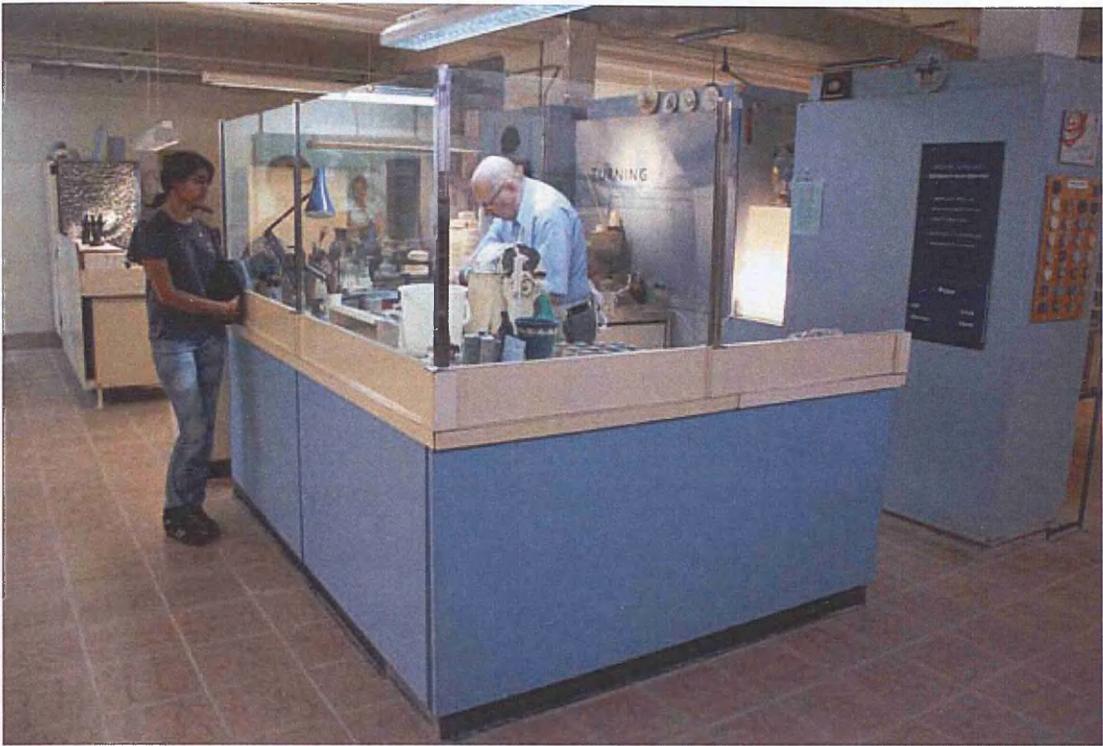


Figure 22: Wedgwood Museum, Skills Demonstration Area – turning booth.
Photographs: Jerome Harrington, (2010)

In comparison to the mediated experiences of making process seen in the two documentaries above, the visitor has more control of their experience. They can linger where they want and watch a demonstration multiple times. They can also question and converse with the makers, an important chance to ask questions and dispel misunderstanding. The viewer can also observe the material qualities of the clay and the skill needed to shape it.

However, the level of comprehension of the visitor to the *Sills Demonstration Area* is difficult to discern. In her thesis *Transmitting craft knowledge* Nicola Wood suggests that the knowledge of the expert is too advanced for the novice.¹⁰¹ Wood suggests that novices do not have:

sufficient knowledge of what they were observing to be able to interpret it themselves: there was too large a gap between their knowledge and that of the expert for them to be able to construct their own bridges across this gap unaided.¹⁰²

Wood's research suggests that the personal know-how is not easily understood, and that the understanding of the demonstration in part depends on their ability to translate what they are seeing – an ability which is dependent upon their own personal know-how.

In a recent episode of BBC2's *Restoration Home* (2013) demonstrates the potential of the trace of process that is sometimes visible in the object. Examining the marks on the surface of eighteenth century bricks, brick expert

¹⁰¹ Nicola Wood, *Transmitting craft knowledge*, PhD Thesis, Sheffield Hallam University, 2006, p. 143. Wood states: 'My experiments with use of established elicitation techniques based on the practitioner describing his actions revealed knowledge which was too advanced for a beginner and my attempts at probing into this knowledge were either dismissed or responded to defensively by him.'

¹⁰² Wood, *Transmitting craft knowledge*, p.126. Equally on page 150 Wood suggests that 'novices initially struggled to use what they has seen in either live or videoed demonstrations to inform their learning, demonstrating their need for the guidance phase.'

Tony Mugridge, illuminates the relationship between marks on the surface of the brick, and stages of its making process (Figure 23).



Figure 23: Still from *Restoration Home*, BBC 2, (2013)

Examining the bricks Mugridge states:

'[...] the bricks are like a fossil of 1780's life, you've got grass marks here, this shows that it was made in the summer this brick, you've got an autumn mark here with this leaf. These marks here are what are called "skink" or "hack" marks - and it shows that when the bricks were made, the next bricks on top were put on in line, but with a finger space in between [...] they are very chunky fingers, because you have to allow for the shrinkage of the brick as well, so when this was made it was ten percent bigger and it shrunk in drying and it shrunk in firing - so there's my fingers, I've got small fingers anyway, but here's my fingers and you can see that is about the same size as my fingers, but his hands were ten percent bigger than mine. I believe that's a child [hand pint], which shows the brick maker is employing children, employing his own children.'¹⁰³

¹⁰³ *Restoration Home*, Series 3, Episode 1, BBC2, 29 July 2013.

Mugridge's 'reading' of the bricks surface suggests the potential of information 'in' the object to illuminate the object's making process. However, this 'access' is dependent upon Mugridge's expert knowledge. His personal know-how gives provides a greater understanding of making process and demonstrates a very different narration to that of the 'stranger narrator' in *Blood, Sweat and Luxuries*.

2.3.5 Summary: Near / far

Figure 24 situates the examples explored above on a horizontal axis between the opposition of Near and Far. The diagram aims to illustrate the examples in relation to Dormer's terms: distributed knowledge (left) and personal know-how (right).

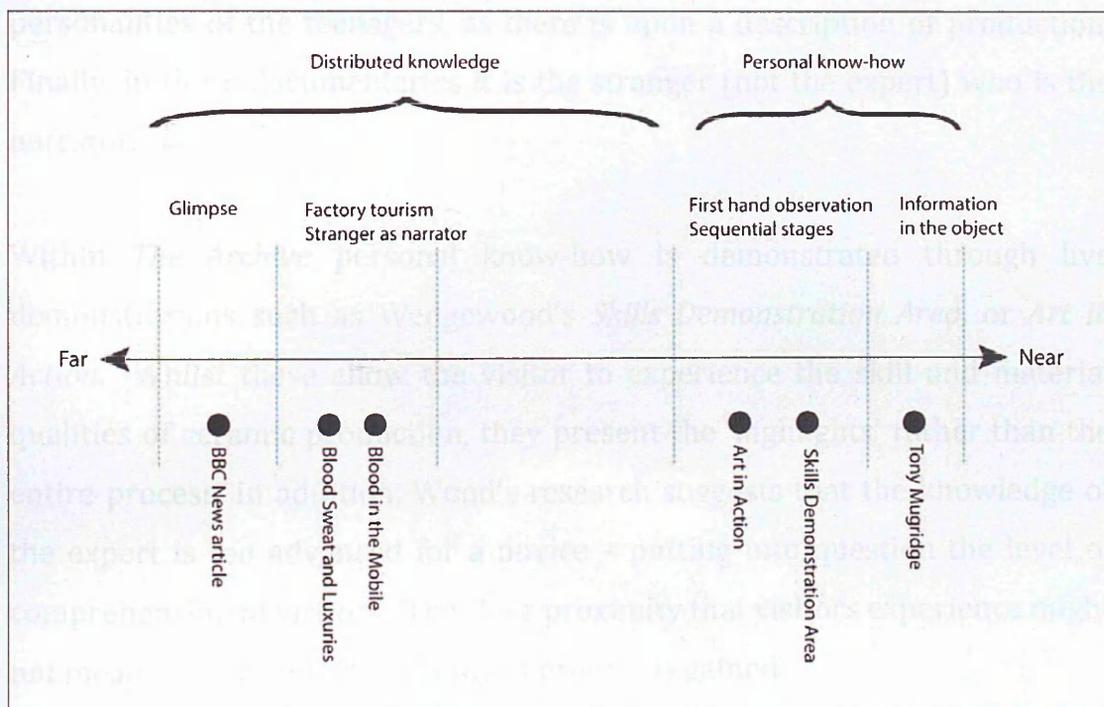


Figure 24: Near / far. Diagram: Jerome Harrington

Within *The Archive* examples that make visible making processes that take place in a system of distributed knowledge are most commonly glimpsed

through single photographs. These 'glimpses' of process have many limitations, this type of image is not primarily made to clarify process, but for other reasons - drama, spectacle or intrigue, in order to illustrate a specific news story. These glimpses are often not contextualised with captions, and place the viewer in an unfamiliar space, a space of otherness and in doing so reinforce the sense of disconnection.

In both *Blood Sweat and Luxuries*, and *Blood in the mobile*, first-hand experience occurs only for the presenters, participants and camera crew. For the audience, these examples provide a mediated description of process, one which the camera crew, or editor decide to present. Armstrong's discussion of the constructed nature and conflicted ambitions of Victorian descriptions of process, has many parallels with these contemporary examples of 'factory tourism'. In common with popular reality television shows such as *Big Brother*, in *Blood Sweat and Luxuries* there is as much emphasis on the personalities of the teenagers, as there is upon a description of production. Finally, in these documentaries it is the stranger (not the expert) who is the narrator.

Within *The Archive* personal know-how is demonstrated through live demonstrations such as Wedgewood's *Skills Demonstration Area*, or *Art in Action*. Whilst these allow the visitor to experience the skill and material qualities of ceramic production, they present the 'highlights' rather than the entire process. In addition, Wood's research suggests that the knowledge of the expert is too advanced for a novice – putting into question the level of comprehension of visitors. The close proximity that visitors experience might not mean a greater understanding of process is gained.

Finally, Mugridge's 'reading' of the brick suggests the potential of information 'in' the object to articulate process. However, within *The Archive* this type of information is rare, mainly limited to pre-industrial (as in the case of the

brick) and craft objects. Additionally Mugridge's knowledge is not a universal one, but specific to the expert.

2.4 Process / portrait

In 1845 William Henry Fox Talbot produced a calotype photograph, perhaps one of the earliest photographs depicting men at work (Figure 25).¹⁰⁴ The photograph's title: *Woodmen, Lacock*, refers both to the location (Lacock, Fox Talbot's estate in Wiltshire), and the occupation of the two men that we see at work.

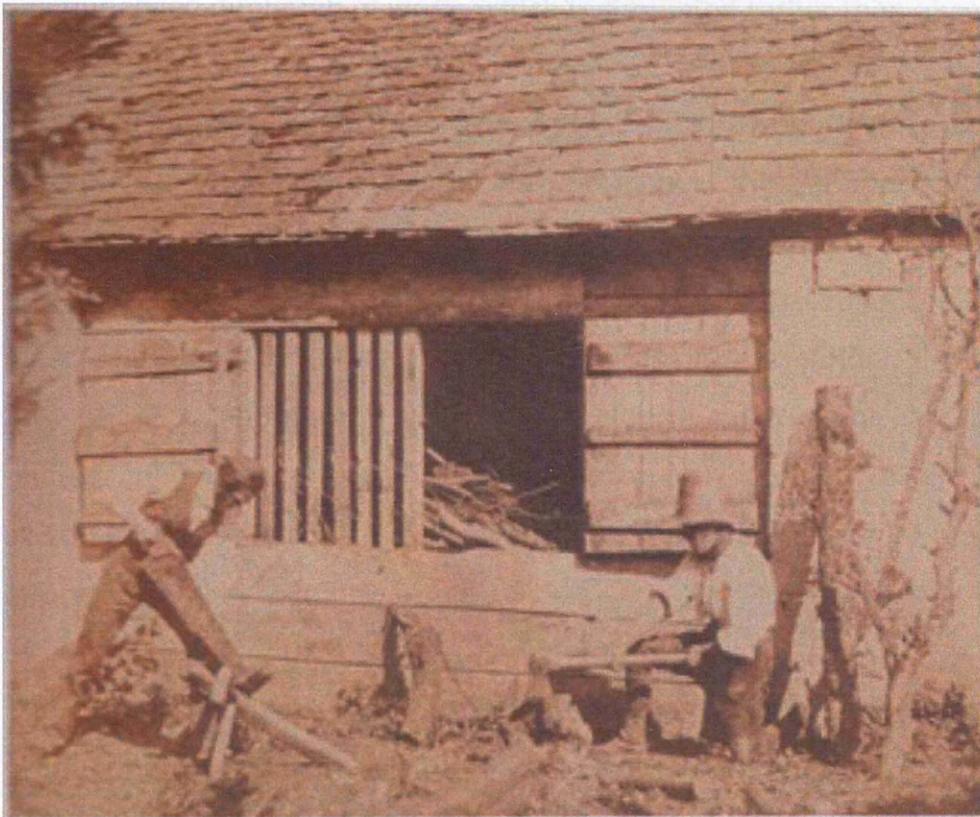


Figure 25: William Henry Fox Talbot: *Woodmen, Lacock*, (1845)

However, by revealing the identity of the 'woodmen', John Hannavy quickly undermines the photograph's documentary status. He observes:

¹⁰⁴ John Hannavy, *The Victorians and Edwardians at work*, Oxford: Shire Publications, 2001. p. 5. Hannavy suggests: 'Taking photographs of people at work is an application of the medium [photography] that is almost as old as photography itself.'

Talbot's pictures of 'woodcutters' were planned and carefully composed, the "workmen" positioned to convey a sense of animated activity while adopting poses they could hold for a long period of time. [...] the subjects were not woodcutters at all, but Talbot's assistant, Nicolas Henneman, on the left, and his groom, Samuel Pullen, on the right.¹⁰⁵

This knowledge quickly destabilises an understanding of the photograph, which is no longer viewed as a documentation of men at work, but instead as a fictionalised depiction of work, which is simulated rather than observed.

This subchapter uses the oppositional terms process / portrait to explore the different ambitions which can be seen in many of the examples contained in *The Archive of Manufacture*. Whilst these 'points of visibility' have the potential to provide access to spaces and processes that might be otherwise inaccessible, they are often conflicted sources of information. In the case of Fox Talbot's photograph it is the technical restrictions of this early photographic process that dictates the outcome.¹⁰⁶ In many of the examples examined below, it is the ideological structure in which they were made which informs how they visualise process.

The conflict between the desire to document making process, and the production of a portrait, is explored through three sections. The first looks at *Diderot and d'Alembert's Encyclopédie* from 1751 to explore the context in which the *Encyclopédie* was produced and how this influenced the ways in which the worker and making process is depicted. The second examines

¹⁰⁵ Hannavy, *The Victorians and Edwardians at work*, p. 6

¹⁰⁶ Fox Talbot's photograph epitomises a conflict that can be observed in many examples of the documentation of making process contained in *The Archive*. In Fox Talbot's photograph, there is a conflict between the ambition to document work and process (chopping wood in this instance) and the restrictions of this very early photographic process. The long exposure, would be one that Fox Talbot's assistants would be much more likely to be aware of and willing to accommodate, than the woodcutters themselves. In this example, it is the technical requirement, which dictates the outcome; making this not a documentation of work or a making process, but something closer to a portrait - a romanticised and constructed one at that.

David E Nye's research of General Electric's in-house photographic department, which documented the people who worked within the corporation and incidentally the making processes in which they engaged. The third examines examples from *The Archive* which illustrate opposite ends of the process / portrait opposition.

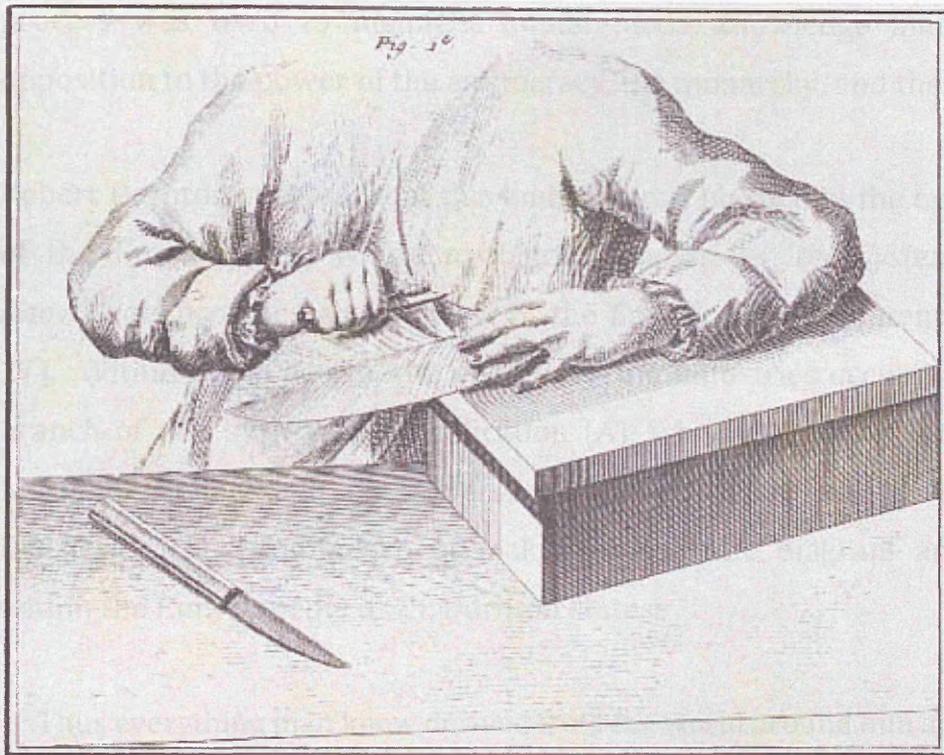


Figure 26: Diderot and d'Alembert's *Encyclopédie* – Feather trader, Volume VIII, Plate II, (1751)

2.4.1 A relationship between visibility and context

Although not the earliest example of an encyclopedic description of making process, *Diderot and d'Alembert's Encyclopédie*, forms the earliest example in *The Archive of Manufacture*.¹⁰⁷ First published in 1751, *Diderot and d'Alembert's Encyclopédie* consisted of thirty-two volumes; twenty-one

¹⁰⁷ For example Georgius Agricola's *De Re Metallica* was published in 1556.

containing 70,000 written articles, and eleven containing 2,569¹⁰⁸ engraved plates¹⁰⁹ (Figure 26).¹¹⁰

A number of authors examined below, have suggested that the *Encyclopédie* depicted manufacturing so prominently to assert the aims of the Enlightenment ideological project. They suggest that the visualisation of process was used to highlight human-made knowledge and agency, in opposition to the power of the aristocracy, the monarchy, and the church.

Robert Darnton suggests that this ambition can be seen in the opening pages of the *Encyclopédie*, where a diagram known as '*the System of Human Knowledge*' provides an overview of the *Encyclopédie*'s content (see Figure 27). Within this diagram, the manufacturing industries occupy a prominent branch of this system of classification (A), while religion is listed amongst forms of belief such as 'superstition, black magic and divination' (B). Discussing the prominence of making within the diagram and therefore within the *Encyclopédie* itself, Darnton states:

Thus everything man knew derived from the world around him and the operations of his own mind. [...] Diderot and d'Alembert had dethroned the ancient queen of the sciences. They had rearranged the cognitive universe and re-orientated man within it, while elbowing God outside.¹¹¹

¹⁰⁸ John Bender and Michael Marrinan, *The Culture of the diagram*, Stanford California: Stanford Press, 2010. p. 11.

¹⁰⁹ The Encyclopedia of Diderot & d'Alembert, Collaborative Translation Project, <<http://quod.lib.umich.edu/d/did/intro.html>> [accessed 2 July 2012].

Within the eleven volumes of engraved plates, the majority of French eighteenth century production processes were depicted, including paper-making, glass production, silver and gold-smithing, diamond cutting, wig manufacture, canon production, rope making and cutlery production.

¹¹⁰ While Dennis Diderot and Jean-le-Rond d'Alembert served as the principle editors of the *Encyclopédie*, over one hundred and forty people contributed articles to its pages.

¹¹¹ Robert Darnton, *The Business of the Enlightenment – A publishing History of the Encyclopédie 1775 - 1800*, Cambridge, MA: The Belknap Press of Harvard UP, 1979. p. 7.

MAP of the SYSTEM of HUMAN KNOWLEDGE

UNDERSTANDING

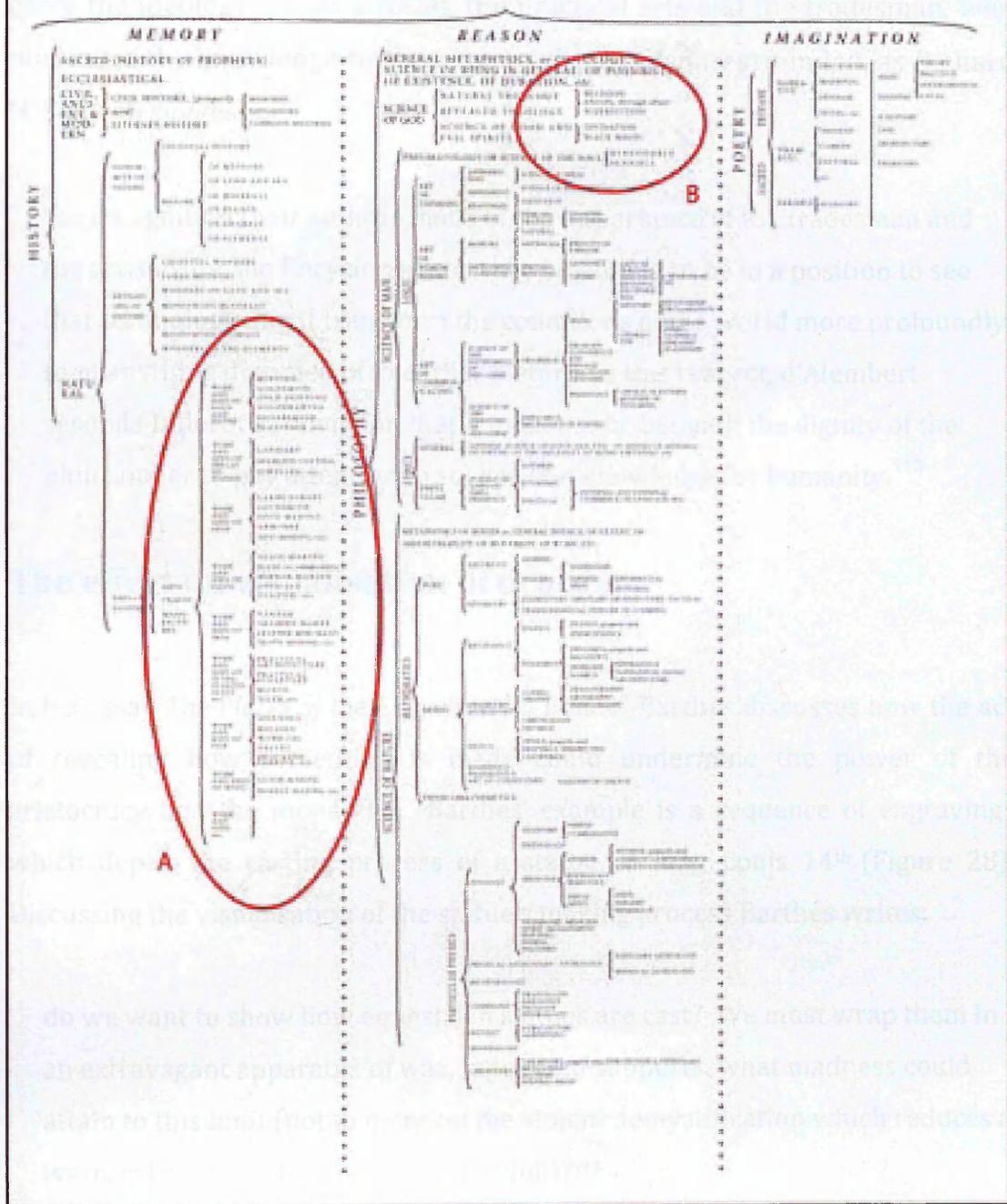


Figure 27: The System of Human Knowledge, Diderot and d'Alembert's Encyclopédie, (1751)

Similarly Charles Gillispie suggests the Encyclopedists harnessed the power of technology as a driver of the Enlightenment ideological project. Gillispie states: 'Diderot's brilliant and original conception was to make the technology carry the ideology.'¹¹² As a result, the practical arts and the tradesman, who possesses the knowledge to shape mans destiny, is foregrounded, as Richard N. Schwab suggests:

the recognition their authors made of the importance of the tradesman and the artisan, for the Encyclopedists were beginning to be in a position to see that technology might transform the conditions of the world more profoundly than anything dreamed of in earlier history. In this respect, d'Alembert seconds Diderot's conviction that it must not be beneath the dignity of the philosopher to pay attention to such useful knowledge for humanity.¹¹³

The effect on visualisation of process

In his essay *The Plates of the Encyclopedia* Roland Barthes discusses how the act of revealing how something is made could undermine the power of the aristocracy and the monarchy. Barthes' example is a sequence of engravings which depict the casting process of a statue of King Louis 14th (Figure 28). Discussing the visualisation of the statue's making process Barthes writes:

do we want to show how equestrian statues are cast? We must wrap them in an extravagant apparatus of wax, tapes, and supports: what madness could attain to this limit (not to mention the violent demystification which reduces a warrior Louis 14th to this monstrous doll)?¹¹⁴

¹¹² Charles C. Gillispie (1959), *A Diderot Pictorial Encyclopedia of Trades and Industry*, New York: Dover Publications, 1993, pp. 13–15.

¹¹³ Richard N. Schwab, *Translator's Introduction to the Preliminary Discourse*, <<http://quod.lib.umich.edu/d/did/schwab.html>> [accessed 18 April 2009]. p.15.

¹¹⁴ Roland Barthes (1964) 'The Plates of the Encyclopedia', in *New Critical Essays*, tr. by Richard Howard, New York: Hill and Wang, 1980, p. 39.

Barthes suggests that by detailing and making visible the statue's casting process, the Encyclopedists reveal the constructed nature of this symbol of power. The implication made by Barthes is that possessing this knowledge, equally provides an understanding that the statue's making process can be undone – that knowledge provides agency.

Barthes' discussion of the effect of revealing the making process of this object of power unites the material and the political. This union is echoed elsewhere in the *Encyclopédie*, where discussion of production and the material occur. The *Encyclopédie*'s entry on salt for example, is used to conduct an attack on the inequality of taxes upon the poor. As Gillispie states 'the article on salt is not confined to the properties of sodium chloride. It deals also with the injustice to the poor of levying taxes on the necessities of life.'¹¹⁵

In his discussion of the engravings, Richard Sennett suggests that this ideological agenda can be seen in the style and rendering of the engravings. Sennett explores how the Encyclopedists held the maker and the processes of production (human productivity and agency) in the highest esteem, suggesting that 'the craftsman's labours were icons of the Enlightenment'.¹¹⁶ He examines the way in which depiction of the worker is edited and manipulated in the engravings to visualise this ideology.¹¹⁷

¹¹⁵ Gillispie, *A Diderot Pictorial Encyclopedia of Trades and Industry*, p.12. Gillispie suggests: 'Although the "system of human knowledge" provided an overview of the content of the *Encyclopédie*, within the *Encyclopédie* itself the content was arranged alphabetically and connections between entries, linked through a complex system of cross-referencing. This system of cross-referencing, allowed the authors to indirectly conduct concealed attacks against the monarchy and church, and state their case for social progress whilst evading strict censorship.'

¹¹⁶ Sennett, *The Craftsman*, p. 91.

¹¹⁷ Sennett, *The Craftsman*, pp. 92 – 98.

Casting A Statue IV

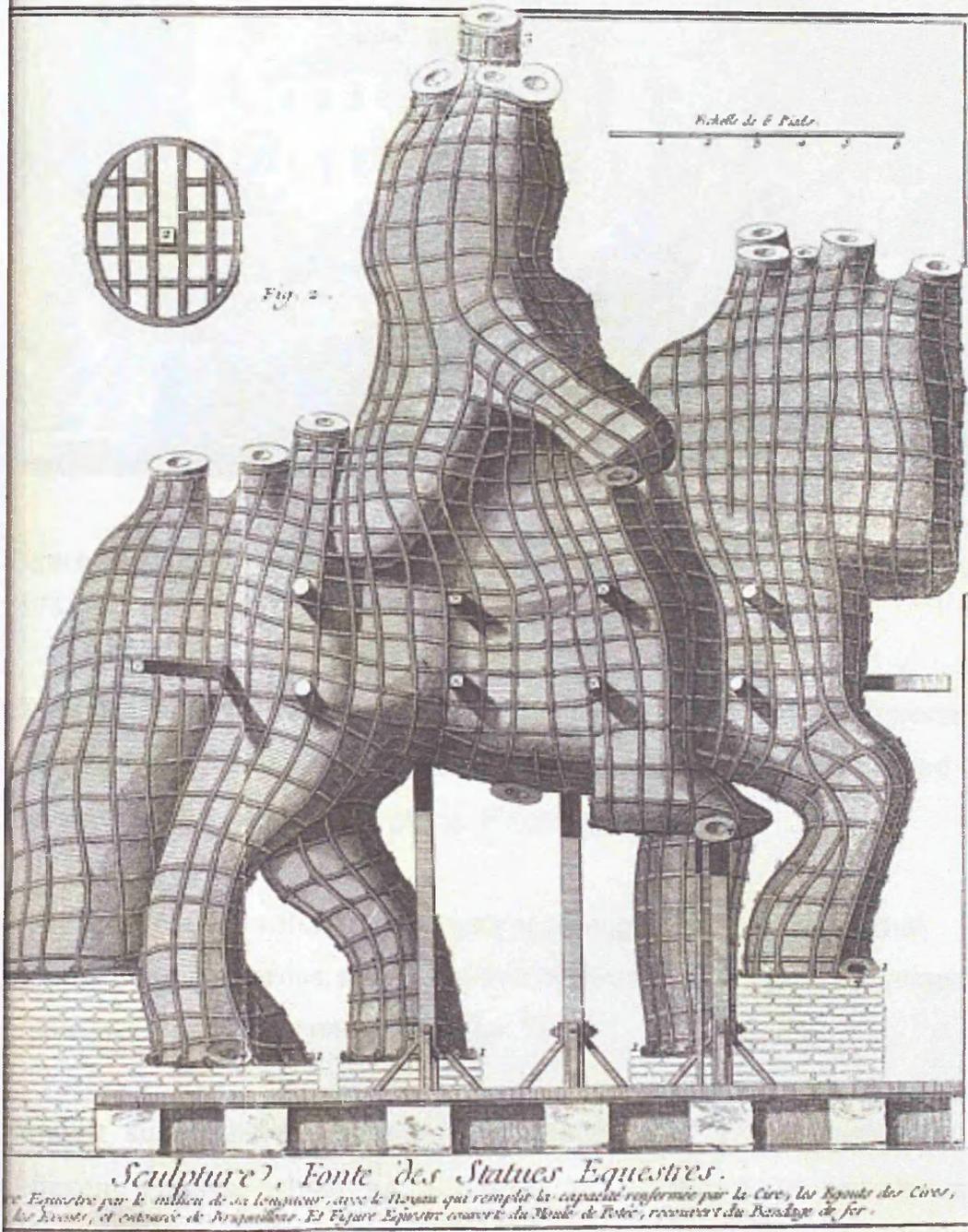


Figure 28: Diderot and d'Alembert's Encyclopédie - Casting a statue, Volume VIII, Plate I, (1751)



Figure 29: Diderot and d'Alembert's *Encyclopédie* - The Tailor, Volume IX, Plate I, (1751)

Sennett details the ways in which the depiction of the worker ignores their daily reality. The engravings often excluded dirt or sweat and instead depict the worker with dignity and grace. He observes:

Throughout, the volumes illustrate people engaged sometimes in dull, sometimes dangerous, sometimes in complicated labor; the expressions on all the faces tends to be one of serenity.¹¹⁸

Sennett subsequently examines the depiction of a relationship between different classes, which he describes as a relation of 'usefulness and uselessness'; usefulness referring to the worker and uselessness referring to the upper classes who rely upon the worker to maintain their luxury (Figure 29). Examining the depiction of a maid, Sennett states that the skilled maid 'radiates purpose and energy while her mistress languishes in ennui; the skilled servant and her bored mistress compose a parable of vitality and decadence.'¹¹⁹

¹¹⁸ Sennett, *The Craftsman*, p. 93.

¹¹⁹ Sennett, *The Craftsman*, p. 92.

Sennett's analysis mirrors Darnton's discussion of the reordering of knowledge in the *Encyclopédie's* system of human knowledge diagram (Figure 27). Sennett reveals how the imposition of this new hierarchy affects the visualisation of process, in particular an elevation of the status of worker and the importance of their work to a secular society.

Summary

The visualisation of making process in *Diderot and d'Alembert's Encyclopédie* needs to be viewed as part of the political context in which it was produced. The extent to which manufacture and the worker were featured, and the specific ways in which the depiction of process were framed, should be understood in the context of the political or ideological motivations of the Enlightenment. However, this knowledge should not be used to dismiss the hundreds of engravings that describe process through detailed sequences and accompanying written text. The ways in which the engravings communicate process is explored in more detail in chapter 4 (page 165).¹²⁰

2.4.2 Process and corporate ideology

In *Technology and Post-Modern Pessimism*, Leo Marx states that the Enlightenment was marked by 'a new confidence in humankind's capacity', and was a period where the belief that an understanding of the basic laws of nature would provide a 'steady, continuous, cumulative improvement in all conditions of life.'¹²¹ Marx cites the Enlightenment as the period in which this

¹²⁰ Within the research the *Encyclopédie* functions as a key example of the visibility of making process that can be seen throughout the research.

¹²¹ Marx, *The Idea of "Technology" and Postmodern Pessimism*, pp. 12-13.

idea of the continual progress of mankind was linked particularly to the practical arts¹²², he states:

What requires emphasis here, however, is that advances of science and the practical arts were singled out as the primary, peculiarly efficacious agent to progress.¹²³

However, Marx suggests our contemporary relationship with technology has dramatically shifted. He explores how we now occupy a conflicted relationship with technology, which shapes our lives both positively and negatively.¹²⁴ This section explores this dramatic shift away from the Enlightenment framing of manufacture as a progressive force, by examining David E. Nye's *Image Worlds*, his study of General Electric's archive of photographs produced between 1890 and 1930. Nye's study of photographs produced by General Electric's in-house photography department,¹²⁵ demonstrates how the corporation initiated and controlled the documentation process in order to promote a positive public image of the company; a 'corporate ideology'.¹²⁶

Visualisation of process for specific audiences

Nye's analysis focuses upon the distribution of the photographs within General Electric's own publications and the specific audiences that they were

¹²² Marx, *The Idea of "Technology" and Postmodern Pessimism*, p. 12.

Marx states that the term 'practical arts' was a precursor to the term 'technology'.

¹²³ Marx, *The Idea of "Technology" and Postmodern Pessimism*, p. 13.

¹²⁴ Marx, *The Idea of "Technology" and Postmodern Pessimism*, p. 13. Marx describes our contemporary relationship as equally shaped by innovation and disaster, hope and anxiety, benefit and threat.

¹²⁵ David E. Nye, *Image Worlds – Corporate Identities at General Electric, 1890 – 1930*. MIT Press, Massachusetts, 1985, p. 28. Nye suggest that by the '1920's General Electric possessed an in-house photographic department that processed more than a million prints a year.'

¹²⁶ David E. Nye, *Image Worlds*, p. 3.

designed to address.¹²⁷ Nye identifies four specific audiences, which he describes with the term 'receivers', these are: workers, engineers, managers and consumers. By examining the types of image from each publication he explores how these different publications emphasise different aspects of production at General Electric.

In a magazine called the *Works News* for example, aimed at the blue-collar worker (Figure 30, left), no image of the production line appears, but only images of individual workers, which emphasise 'the worker's individuality and the importance of the job.'¹²⁸ Whilst in the *Monogram* (Figure 30, right) published for the management of General Electric, images of the production line were published, which Nye states: 'transformed factory space into an orderly realm where the manager's rationality was concretised.'¹²⁹

Nye traces depiction of workers through the chronological study of images from the 1880's to the 1930's. In doing so he demonstrates the change in workers status and nature of work in which they engaged (from skilled to unskilled), and a changing relationship between manager and worker. By the 1920's Nye demonstrates that photographs produced within *The Review* (which was published for engineers) separated the worker from the product of their work, as Nye states: 'Its articles contemplated either theory or finished systems, but not the work required to transform theory into practice.'¹³⁰ In extreme cases in the *Review* the worker is used to provide scale (Figure 31). He states:

The men function as units of measurement, not as individuals, and so are never identified by name. Usually between two and five workers appear, but

¹²⁷ General Electric published seven publications to reach specific audiences: *The Review* (engineers, 1903), *Works News* (blue collar workers, 1917), *Monogram* (managers, 1922), *General Electric News Graphic* (appliance salesmen, 1922), *Light* (lighting specialists, 1923), and *G.E. Digest* (overseas personal, 1924).

¹²⁸ David E. Nye, *Image Worlds*, p. 82.

¹²⁹ David E. Nye, *Image Worlds*, p.104.

¹³⁰ David E. Nye, *Image Worlds*, p. 67.

they never pose as central subjects. They do not hold the tools used to create the machines, nor do they seek to dominate it with their postures. Often they stand with their backs to the camera, with the machine the center of attention [...] These postures, which executives and inventors never take, express subordination [...] There are no images of engineers with dirty hands.¹³¹

Undermining the documentary appearance

Through comparison with other contemporaneous photographs, Nye is able to undermine the apparent documentary appearance of the images of General Electric's in-house photographers. He compares the General Electric photographs with the work of Lewis Hine, a socially motivated documentary photographer. Nye examines the way in which each photographer framed the same subject, the Southern textile mills, but described very different environments. Describing the photographs by Hine (Figure 32, top), Nye states:

He [Hine] often used long perspective views, in which the rows of looms with their repetitive spindles create lines that recede toward a distant wall. A child stands midpoint of this line, all of which he or she must continually tend and keep in running order [...] Hine depicts the scene from the child's eye level, showing the dominance of the boss, the safety hazards and the repetitiveness of the task.¹³²

Nye then compares these photographs by Hine to the General Electric photographs of virtually the same mills (Figure 32, bottom), stating that the photographs:

eliminated the workers and emphasized the machinery, usually the electric motors that the company had installed. Their images emphasized property

¹³¹ David E. Nye, *Image Worlds*, p. 67.

¹³² David E. Nye, *Image Worlds*, p. 54.

rather than persons, progress rather than social problems, managerial rather than working class perspectives.¹³³

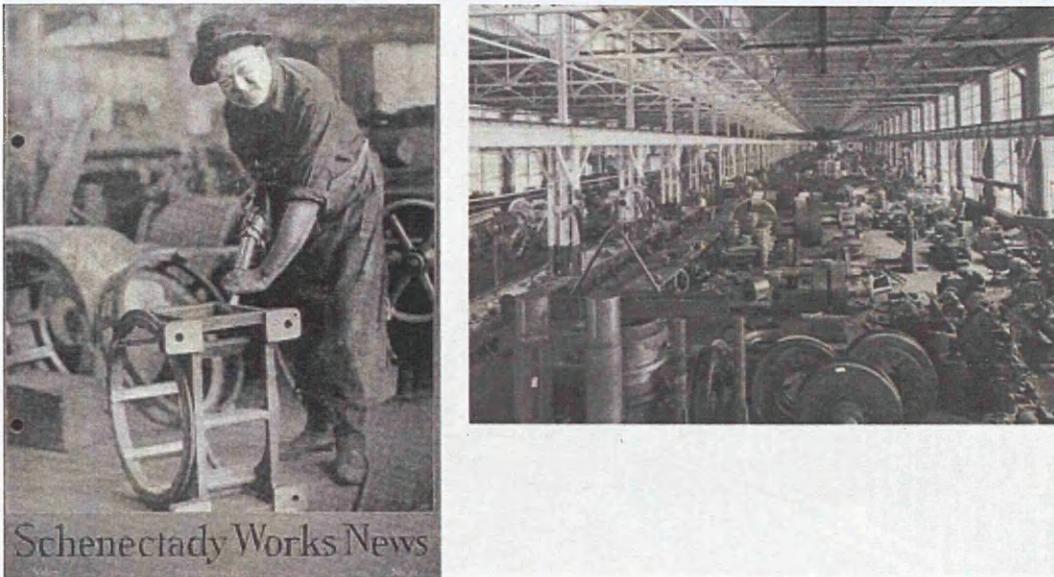


Figure 30 (left) Schenectady Works News, General Electric, (2 November 1923), (right) Interior View of Building 85, Schenectady, (1919). Photographs: General Electric Archive

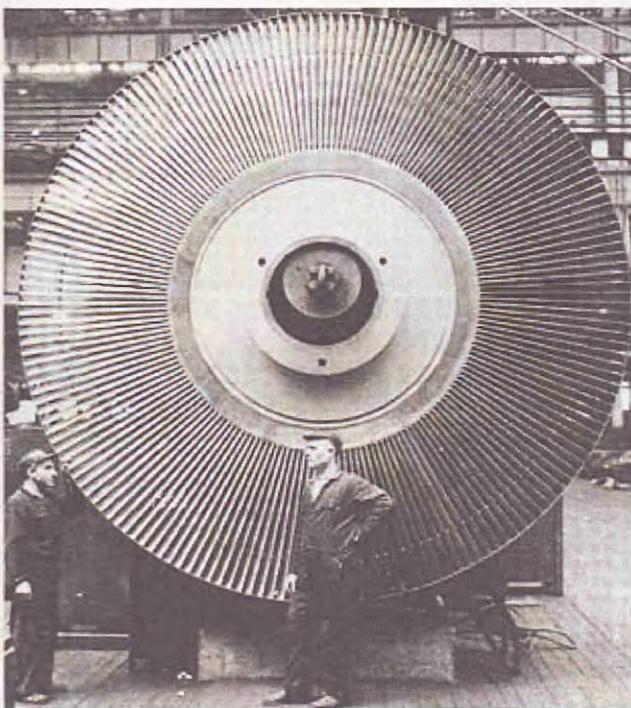


Figure 31: Bucket Wheel for General Electric Steam Turbine, Assembled for factory inspection, (1931). Photograph: General Electric Archive

¹³³ David E. Nye, *Image Worlds*, p. 56.

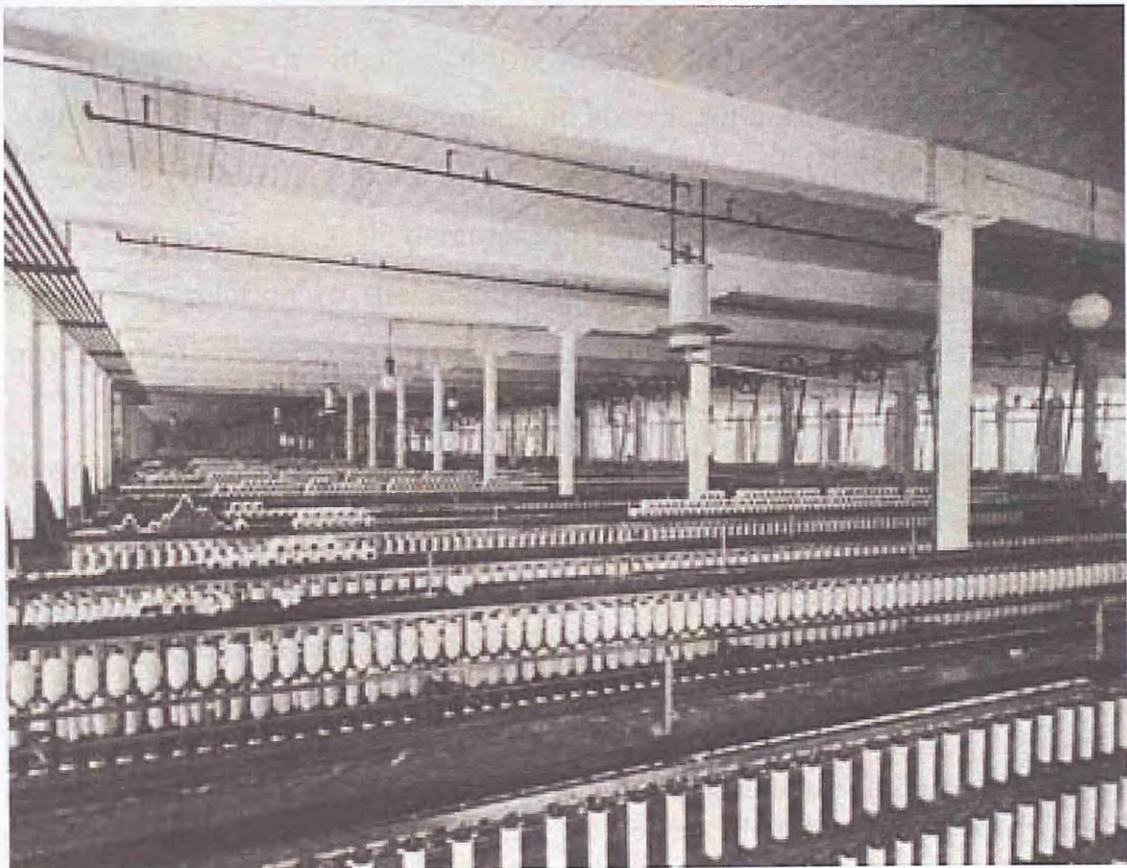
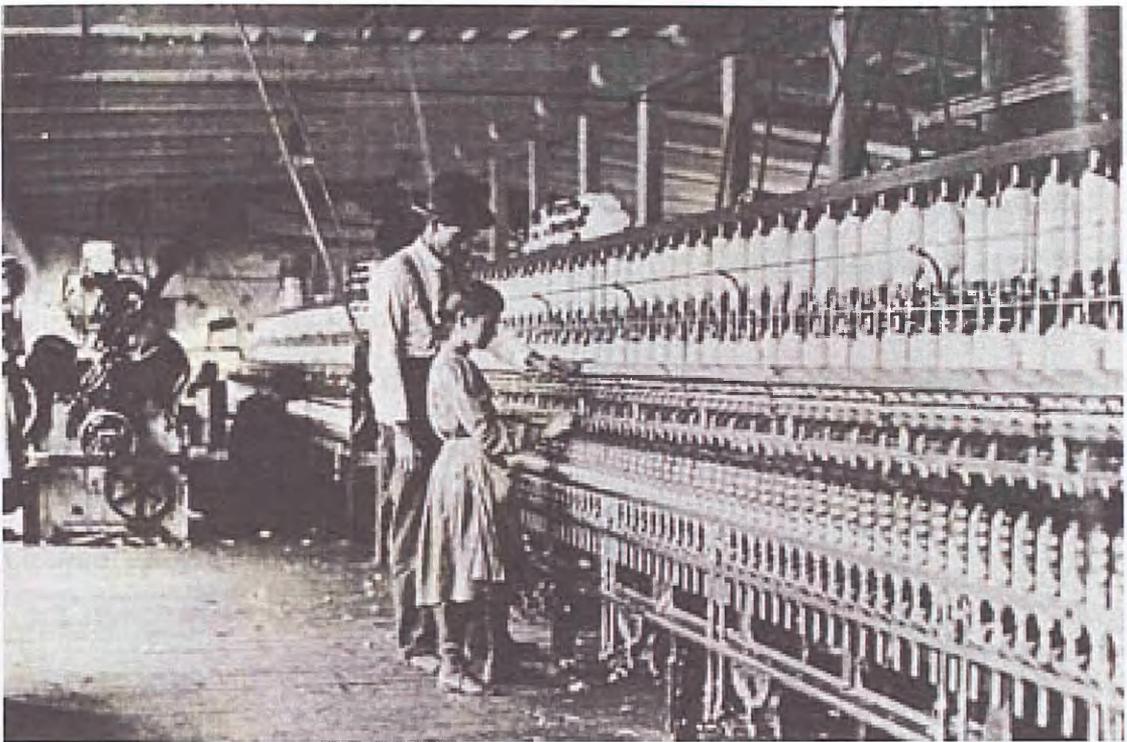


Figure 32 (top) Lewis Hine, *The Boss Teaches a Young Spinner in a North Carolina Mill* (1908); (bottom) Cotton Mill interior, (before 1908). Photograph: General Electric Archive

Nye's contextualisation of the General Electric photographs within the wider social context in which they were produced helps to demonstrate their constructed nature. This approach has many parallels with how Isobel Armstrong in *Victorian Glassworlds* situates Victorian written descriptions of process in the historical context in which they were published. Armstrong demonstrates that by focusing on the prowess of the maker and the 'crisis' of process¹³⁴, these texts do not acknowledge the wider social context. Through a comparison with Karl Marx's *Capital*, written during the same period, Armstrong is able to explore how 'the valorisation of prowess or collaboration bypasses the politics of the workplace.'¹³⁵

Summary

At first many of the images in *The Archive of Manufacture* seem to make visible the labour that is separated and abstracted in the process of exchange as suggested by Karl Marx. However, the discussion of the *Encyclopédie* above and Nye's research, demonstrate the need to examine the visibility of process in relation to the historical or cultural context in which it was produced – in order to understand why process has been made visible.

Nye's demonstration of the image as an ideological construct clearly relates to *Diderot and D'Alembert's Encyclopédie*. In both, the visualisation of process is an expression of the political or ideological context in which it is produced. However, Nye demonstrates a massive shift in what is made visible and how. His research suggests that the ways in which process is made visible are

¹³⁴ Armstrong, *Victorian Glass Worlds*, p. 20. Armstrong describes the term 'crisis' as 'a technical term, Apsley Pellat explained, for the moment when the molten glass or 'metal' reached the optimum heat for successful fusion and subsequent working, was seen by factory tourists as a climatic peak of endurance for the workers.'

¹³⁵ Armstrong, *Victorian Glass Worlds*, pp. 32- 36. Armstrong suggests '[Karl] Marx insisted, in his account of bottle glassmaking in *Capital*, that the social relations of the collective labourer had been turned into a machine and quotes a manager: "when once they begin, they must go on; they are just the same as parts of a machine."' Visit texts for the most part ignore this model.'

rarely neutral or purely objective, but constructed, staged and released for specific agendas.

2.4.3 Process / portrait

This section examines examples from *The Archive of Manufacture* which could be considered to illustrate opposite ends of the process / portrait opposition. It explores the relationship between the initiating ambition of the photographer and how this might effect how making process is made visible.

The first example is Lewis Hine's social documentation of working conditions in the early twentieth century, where the photograph is primarily concerned with the representation of the people in front of the camera. The second is the documentation of the silversmith Alistair McCallum in the Crafts Council's *Makers* catalogue, where a sequence of six photographs document the appearance of the object. In both instances, making process is made visible, however, in dramatically different forms. The first produces an incidental glimpse of making process, whilst the second forms a deliberate and considered articulation.

Lewis Hine: incidental glimpses

Lewis Hine's photographs, like many examples in *The Archive* were not primarily produced to document making process. However, in the context where direct contact with process is not gained first hand these photographs nevertheless provide 'points of visibility' otherwise inaccessible.

The photographic historian Alan Trachtenberg uses the term 'social work'¹³⁶ to describe the potential of Hine's photographs to expose social inequality and provide evidence for legislative change.¹³⁷ Working within the context of the Progressive Reform movement, many of Hine's photographs were printed in publications motivated by social reform such as *The Pittsburgh Survey*. This early sociological survey documented the 'working and living conditions of Pittsburgh steelworkers and the social challenges facing their community.'¹³⁸ In these publications, Hine's photographs were accompanied by broad range of contextual information including 'methodical investigation, scholarly analysis, and "diagnosis" of existing urban conditions'¹³⁹, as well as Hine's own statistical information gathered from site visits.¹⁴⁰

Between 1908 and 1924 Hine worked for the National Child Labour Committee, documenting illegal work being done by children in factories.¹⁴¹ His 1911 photograph of a "Carrying-in" boy (Figure 33) shows a young boy working in a Virginia glass factory. Although the boy remains anonymous, he is the central focus of the photograph, his image functioning as a representation of all child workers.

¹³⁶ Alan Trachtenberg, *Reading American Photographs, Images as History*, Mathew Brady to Walker Evans, New York: Hill and Wang, 1989, p. 206. Trachtenberg suggests that 'In 1909, Hine delivered a paper called 'Social Photography: how the camera may help in the social uplift.'

¹³⁷ Trachtenberg, *Reading American Photographs*, p.166. Trachtenberg suggests 'Hine performed his artistic labors within the institutional framework of the Progressive reform movements [...] which campaigned toward legislative change.'

¹³⁸ The Russell Sage Foundation and the Pittsburgh Survey, <<http://ocp.hul.harvard.edu/ww/rsf.html>> [accessed 9 January 2014].

¹³⁹ The Social Museum Collection, Harvard Art Museums, <<http://www.harvardartmuseums.org/study-research/research-tools/social-museum-collection/subjects/pittsburgh-survey>> [accessed 14 January 2014].

¹⁴⁰ Trachtenberg, *Reading American Photographs*, p.200. Hine's statistical information included: 'dates, names, places, ages, heights, hours of work, daily earnings' of the workers and factories he photographed.'

¹⁴¹ Library of Congress, Prints, photographs online catalogue, <<http://www.loc.gov/pictures/item/2004674308/>> [accessed 9 January 2014]. 'Working as an investigative photographer for the National Child Labor Committee (NCLC), Lewis Hine (1874-1940) documented working and living conditions of children in the United States between 1908 and 1924.'



Figure 33: Lewis Hine “Carrying-in” boy, in Alexandria Glass Factory, Alexandria, Virginia. Works on day shift one week and night shift next week, (1911)

Hine’s framing of the boy significantly effects any potential reading of the making process taking place: firstly, the boy is centrally located with the result that the glass making process taking place on the left hand side of the image is cropped. Secondly, the boy is sharply in focus while the background and the making processes taking place there are blurred and not clearly definable.

Hine’s use of photography to expose the hidden spaces of manufacture and those who work there can be seen in many examples in *The Archive*. The contemporary photographer Edward Burtynsky’s *Manufacturing* series, which documents mass production in Chinese factories is a case in point. Figure 34, shows the interior of a Chinese chicken processing plant.



Figure 34: Edward Burtynsky, *Manufacturing #17*, Deda Chicken Processing Plant, Dehui City, Jilin Province, China, (2005)

Burtynsky's visualisation of production explores how global production impacts upon the worker. Photographed from above, row upon row of anonymous workers disappear into the distance, each seemingly engaged in the same repetitive activity. Although each worker is anonymous, he is concerned with visualising the context in which they work. However, in addition, Burtynsky is also concerned with how the scale of production impacts upon the environment. He states:

mass consumerism and the resulting degradation of our environment intrinsic to the process of making things to keep us happy and fulfilled frightens me. I no longer see my world as delineated by countries, with borders, or language, but as 7 billion humans living off a single, finite planet.¹⁴²

¹⁴² Edward Burtynsky website, <http://www.edwardburtynsky.com/site_contents/Photographs/China.html> [accessed 9 January 2014].

Despite their different initiating agendas, both Hine and Burtynsky forefront the person and the context in which they work. These images are not made to document process, but do produce visibility of hidden making processes. However, the moment of process that is captured in the photograph is incidental and provides only a glimpse of the consecutive processual stages of process.

The appearance of the object

In comparison to the incidental glimpse of process produced by Hine or Burtynsky, the Crafts Council's 1980 *Makers* catalogue, contains a sequence of photographs which track the making process of an object. The catalogue was produced to promote the commissioning of craft objects.¹⁴³ It contains the profiles of six makers, which through a combination of colour photographs and an accompanying text visualises their individual making processes.¹⁴⁴ In many respects, these profiles could be considered a portrait of the maker detailing their individual workshops and processes, but in contrast to Hine or Burtynsky's images, the moments of process are not incidental but carefully chosen and framed.

One of these profiles introduces the work of the silversmith Alistair McCallum who is photographed engaged in the production a decorative metal bowl. This process is described through a sequence of six photographs, which are spread over three pages (Figure 35). This series of photographs visualises the

¹⁴³ Crafts Council, *Makers, An illustrated Guide to the work of more than 350 artist craftsmen*, London: Crafts Council, 1980, p. 4. 'All the artist craftsmen in this book will work to commission'. To this end, the catalogue contains images of the products of three hundred and fifty craftspeople, each represented by a single black and white image.

¹⁴⁴ Crafts Council, *Makers, An illustrated Guide to the work of more than 350 artist craftsmen*, p. 6. The catalogue's chapter heading states: 'Ways of working: six makers explain how they practice their craft.'

appearance of the object, describing the object's production as it moves from a flat sheet of metal, to a raised decorative bowl.



Figure 35: Alistair McCallum – *Makers* catalogue, Crafts Council, (1980)

The photographs work both individually and collectively. Individually each image emphasises different aspects of the making process. Image 4 in the sequence shows a close up of the effect of the careful actions of the maker upon the surface of the metal. Image's 1, 3 and 5, provide a sense of the larger studio space and the type of tools used. While each of the six images describe the movement of the maker's body and his interaction with the tools used. Each of these images functions in close relationship to the accompanying text that describes specific aspects of the making process.¹⁴⁵

Collectively, the group of photographs and their specific ordering suggests a time frame in which the object was produced, which 'animates' the narrative

¹⁴⁵ Crafts Council, *Makers*, An illustrated Guide to the work of more than 350 artist craftsmen, p.14. For example relating to photograph 1 and 3 in this sequence, the catalogue text states: 'He [McCallum] starts out with a small bundle of oblong sheets which have to be meticulously filed down to make them absolutely flat and clean. A coating of borax is applied to prevent oxidization, which would eat away the surface when the metals are heated, and to help the solder flow evenly.'

of the object's production. There is a clear relationship here to other examples in *The Archive* that employ multiple still images to describe specific stages of a making process. This can be seen, for example, in the sequence of eighteen engraved plates which describe the making of Crown Glass in *Diderot and d'Alembert's Encyclopédie* (Figure 36), or Richard Baker's twenty photographs which describe tuna production (Figure 8).

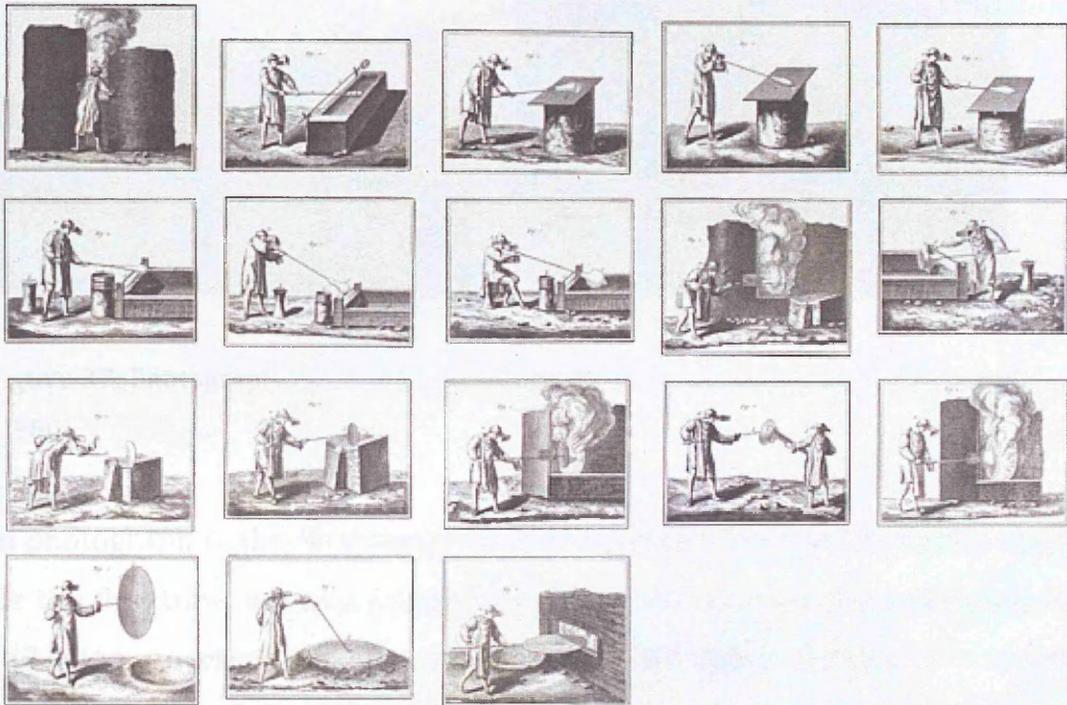


Figure 36: *Diderot and d'Alembert's Encyclopédie*, Crown Glass, Volume X, Plate XV, (1751)

In comparison to the incidental 'glimpse' of process offered by Hine or Burtynsky, this sequence of images of McCallum is able to describe the consecutive, processual stages of making. However, there is a significant gap between images 5 and 6 where the flat sheet of metal becomes a bowl (Figure 37).

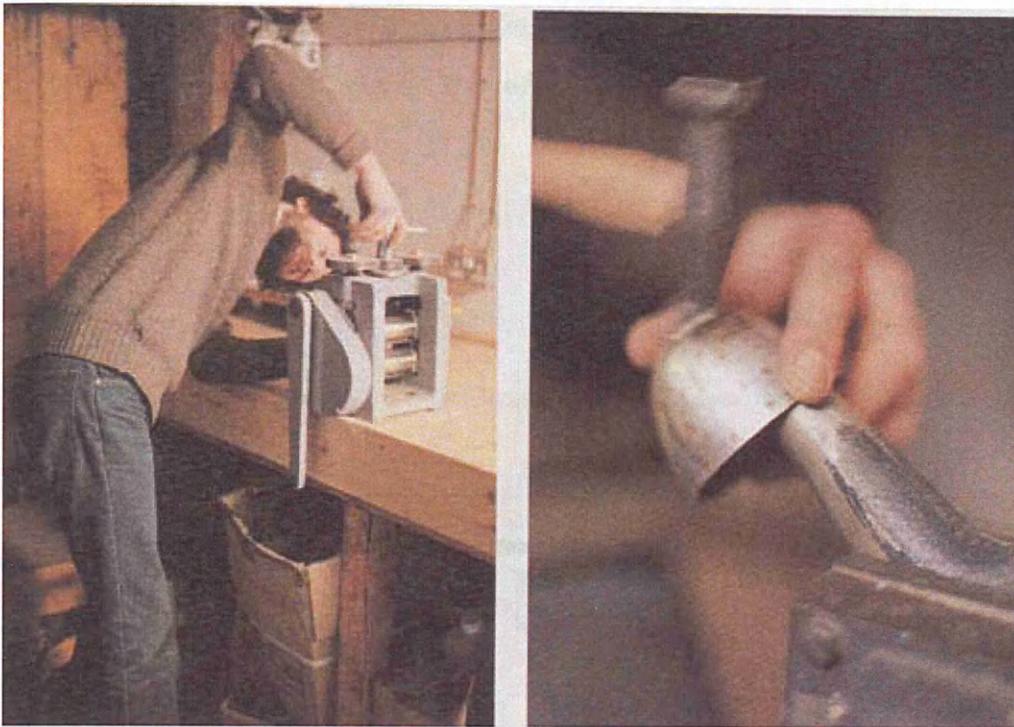


Figure 37: Photographs 5 + 6: Alistair McCallum – *Makers* catalogue, Crafts Council, (1980)

In photograph 6, the final image in the sequence, the object becomes visible for the first time, not as a finished product removed from the workshop, but still being processed and manipulated (Figure 37 right). Between this and the previous image, a transformation of the object has occurred which is not seen or visualised by the sequence of photographs. This careful articulation of making process is only able to provide a partial description – significant information is missing in the gaps between images.

2.4.4 Summary – process / portrait

Figure 38 visualises the examples explored above occupying points between the process / portrait opposition. The diagram describes the relationship of the motivating ambition or ‘drivers’ of each example (whether to document process or make a portrait) and the effect of this upon the articulation of process. The horizontal axis describes ‘degrees of visibility’ - from Fox

Talbot's fictional depiction on right, to the articulation of making process through consecutive stages on the left (*Makers catalogue*).

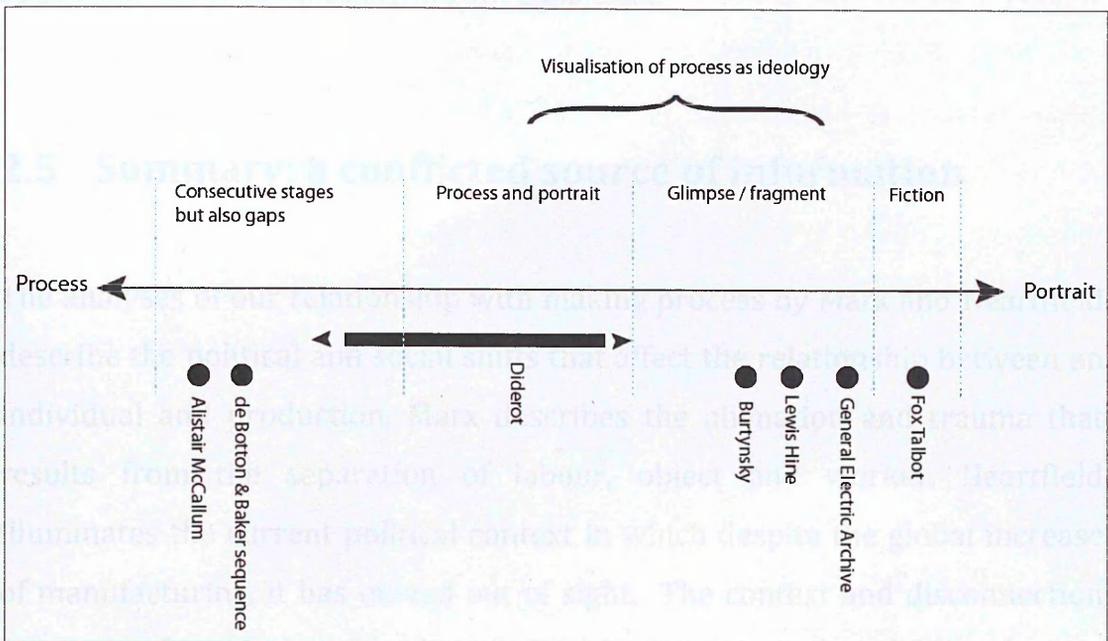


Figure 38: Process / portrait. Diagram: Jerome Harrington

Located in the centre of the diagram is the *Encyclopédie*, where the visualisation of process serves a dual purpose. The engravings provide a detailed visualisation of process, whilst at the same time the depiction of the worker functions as a portrait of a class of people and their productive work.

In comparison to the *Encyclopédie*, the photographs of General Electric archive reveal little about process. They provide incidental 'glimpses' of process. The photographs are essentially portraits, although as Nye demonstrates the people themselves are often not deemed important. Instead where the worker appears their representation functions as a portrait of the corporation. In this way they are located to the right of the diagram, adjacent to Fox Talbot's fictionalised depiction of work.

The sequence of photographs of documenting Alistair McCallum has been located at the left hand side to recognise the visualisation of the consecutive stages of his process.¹⁴⁶ However, in these sequences that visualise the appearance of the object, significant gaps exist.

2.5 Summary: a conflicted source of information

The analyses of our relationship with making process by Marx and Heartfield describe the political and social shifts that affect the relationship between an individual and production. Marx describes the alienation and trauma that results from the separation of labour, object and worker. Heartfield illuminates the current political context in which despite the global increase of manufacturing, it has moved out of sight. The context and disconnection from manufacture that they describe results in its limited visibility, which in turn is the key driver for the points of visibility collected in *The Archive of Manufacture*.

By examining material from *The Archive* this chapter identifies a number of potential limitations that effect the articulation of making process.

1 Drivers (why)

Many of the examples in *The Archive* were not primarily produced to clarify making process. Instead, the visibility of process in these examples is the result of other motivating factors, or 'drivers'. For example: a concern with the ethics of global production and as an expression of disconnection produced by commentators who are not directly involved in production – cannot see it and therefore generate the discourses about its invisibility (de Botton, Jimmy's Food Factory, *Blood Sweat and Luxuries*); to promote and celebrate a corporation's

¹⁴⁶ This example is located next to Richard Baker's depiction of tuna production and the Encyclopédie's depiction of Crown Glass production.

products or ideology (General Electric, Pilkington Glass, or Louis Vuitton); or as an illustration of a specific news story (Figure 18).

In addition, reflecting Armstrong's description of Victorian factory narratives which both document and mythologise, in some instances the visibility of process is the result of competing and in some instances contradictory drivers: heritage and economics (Wedgewood); entertainment and exploration of ethics of global production (Blood Sweat and Luxuries); or an ideological project and an encyclopedia of human made knowledge (Diderot's *Encyclopédie*).

2 Context and form (how)

Further, the drivers that produce visibility can influence how process is articulated: as an incidental glimpse (Lewis Hine's photographs made to promote child labour reform); posed and constructed (the aim of Diderot's *Encyclopédie* to assert human made knowledge), a fictionalised account of the maker (Luis Vuitton ambition to emphasis skill and care of its products), or a nostalgic description of process (*Glass Works* in its reference to Diderot's *Encyclopédie* as a way to emphasis loss).

3 Fragments, gaps and glimpses (how)

Single still images make up the vast majority of *The Archive's* content. These images provide glimpses of process that are separated from its sequential narrative, thereby providing a partial or fragmentary view. At times these glimpses of process appear without contextual information (such as captions), or are printed outside of their original intended context (Lewis Hine), or printed for their intrigue, or composition. Equally these images often place the viewer in an unfamiliar space and in doing so reinforce the sense of disconnection – prompting what Said describes as 'poetic processes' of interpretation.

Finally, although sequences (both photographic, film and live demonstrations) are able to describe a more complete narrative, gaps between images or stages result in significant information missing (Wedgewood, Alistair McCallum, Diderot Encyclopédie, de Botton & Baker).

4 Objects and images (how)

Whilst the visibility of process can be seen in and outside the object, the vast majority of examples in *The Archive* are photographs. Within *The Archive*, information in the object is rare, appearing mainly in pre-industrial or craft objects.

Tony Mugridge's reading of the eighteenth century brick suggests the potential of this type of information to articulate process, however in this example, it is the expert who can make this interpretation. Despite its rarity, within this research one object has provided a key example of information in the object and has been pivotal in the development of this research, this is discussed in chapter 4 (page 151).

5 Levels of knowledge

A number of examples examined in this chapter demonstrate how different levels of knowledge allow different degrees of understanding. For example, in *Blood, Sweat and Luxuries* it is the teenagers who are the narrators, a position which fits with Armstrong's description of the narrator as stranger. Although these films explore production processes which are distanced from us, live demonstrations such as *Art in Action* or the *Skills Demonstration Area* at Wedgewood provide a first hand experience of making process where the audience can observe material qualities of clay and relationship between different stages of the process. However, as Wood suggests, some forms of craft knowledge are too complex for the non-expert which raises questions about levels of comprehension of visitors to these live demonstrations.

These observations lead to the conclusion that despite being surrounded by a cacophony of images, discussions, films about making and the made, there are limitations to the extent to which this material is able to contribute to an understanding of making process. Whilst the points of visibility in *The Archive* provides access and information about process which would otherwise be inaccessible - this material is a conflicted form of information, as likely to be misunderstood as it is able to provide objective information about how things are made. I am interested in the potential failure of this information and what understanding of process might emerge.

In order to drive this investigation an additional question is introduced: What is understood? - What do these sources of information communicate about making process? The following chapter introduces how the methods of art practice will be used to explore this question.

3.1 Method introduction

As discussed in the summary of Chapter 2, in addition to the two research questions How and Why is process made visible, a third question: 'What is understood' was introduced. This chapter outlines through three sections the methods and methodological approach used in the exploration of these questions.

Section 3.2 contextualises *The Archive* as a method of art practice described by Hal Foster as an 'archival artwork', and outlines the process through which it was formed and analysed. This includes detailing how content analysis was employed to identify and draw out key ideas within *The Archive*. Subsequently these ideas lead to the writing of Chapter 2, where the context of the research is established by examining examples from *The Archive* in relation to key theoretical descriptions of our relationship to making and the made.

The following two sections 3.3 and 3.4 reflect two distinct phases of the research, the first where my relationship with the material was central and the second where my position was decentralised. These two phases were conceived to both utilise my own knowledge and background as a maker, and in Phase 2, decentralise it in order to generate an understanding of the material outside of my own position.¹⁴⁷

Section 3.3 introduces Phase 1 of the research where the methods of studio based art practice were used to make a critical analysis of specific examples from *The Archive*. In this phase, the material and visual practices inherent to

¹⁴⁷ It is important to emphasise the extent to which the research is informed by my position as a maker. I learnt how to blow glass for three years at Edinburgh College of Art and later worked as a glass technician and as a glass blowing assistant, as well as studying in the glass department at Gerrit Rietveld Academie. My observations are made from the position of having an intimate understanding of material and its making processes.

studio based art practice (including, drawing, the making of new objects, photography, video, writing and exhibiting) were used to examine the formal, structural and material aspects of these examples. Within this analysis, my own understanding of this material was central. Whilst the specific methods of the individual artworks are discussed in detail in Chapter 4, this section provides an overview of these methods.

Section 3.4 introduces Phase 2 of the research, where groups of students were enrolled to explore how artefacts from *The Archive* are understood, and their feedback was incorporated into two new artworks. In Phase 2, I moved from a solitary studio based researcher, to 'design' and implement creative methods (including discursive group discussion and tracing) to get the students to examine material and 'record' their feedback. This work was informed by a number of artworks where participants produce artefacts in response to parameters established by the artist. Within this section, a number of these artworks are reviewed in order to clarify my own ethical position towards the student participants involved.

3.2. The Archive of Manufacture

In his text *An Archival Impulse* from 2004, Hal Foster describes a number of artists who have produced artworks that 'seek to make historical information, often lost or displaced, physically present.'¹⁴⁸ Foster suggests that this 'archival impulse' has seen a resurgence of artist's interest in 'unfulfilled beginnings or incomplete projects – in art and history'.¹⁴⁹

By bringing together a broad range of material (historical – craft / industrial manufacturing) about making process which is largely available in the public realm, but not in one place, *The Archive of Manufacture* aligns with Foster's description of an archival artwork.

Within his text Foster suggests that these archival artworks function on two levels: firstly that they collate and display material in the form of an artwork, usually as an installation, and secondly that in doing so, they 'might offer points of departure again.'¹⁵⁰ Foster's term 'points of departure' suggests the critical potential of archival artworks to ignite debate, or shed light upon overlooked or forgotten histories. Within this research *The Archive of Manufacture* has produced 'points of departure' in the form of analysis of the examples within the thesis, and through the production of new artworks.

3.2.1 Assembling The Archive of Manufacture

The Archive of Manufacture contains over one hundred still images, including photographs and engravings, fifteen films and animations and two objects. The material was gathered from a wide range of sources, including existing archives (such as the Pilkington Glass archive) and museums (such as

¹⁴⁸ Foster includes Tacita Dean, Thomas Hirschhorn and Sam Durant in his description of archival artists.

¹⁴⁹ Hal Foster, *An Archival Impulse*, (2004) in, *The Archive*, Charles Merewether, (ed.), London: Whitechapel Art Gallery, 2006, pp. 143 – 148.

¹⁵⁰ Foster, *An Archival Impulse*, p. 144.

Wedgewood Museum); magazine articles and advertisements that show still photographs of making processes; and television documentaries and newspaper reports. Collecting the material for *The Archive* began at the earliest stages of the research and was compiled through a number of processes detailed below.

Initially *The Archive* was formed by incorporating material used within my art practice prior to the PhD. Accordingly it built upon a number of pre-existing bodies of work, thereby extending and capitalising upon, previous research interests. Within this initial material, three distinct collections can be identified. The first, a group of photographs collected from craft publications which were used within my 1998 dissertation examining the identity of the crafts at the end of the 20th century. This research explored how the crafts were presented through publicity material, including exhibitions, publications and other promotional material such as posters and leaflets.¹⁵¹ An important aspect of this research was the examination of photographs of craftspeople at work in their studios, such as the image of Alistair McCallum (Figure 35). These photographs emphasise an intimacy between maker and artefact, a particularly important quality in asserting the authenticity of the craft object and a unique identity for craft. In retrospect, this early research can be understood as the first tentative attempt to make a reading of the importance of the visibility of making process, although specifically in relation to the crafts sector.¹⁵²

The second group was gathered as part of a 2004 Master's dissertation, examining how the use of glass within a work of art can affect meaning. This

¹⁵¹ Catalogues across the period from 1980 to 1997, such as: Crafts Council, *Makers*, London: Crafts Council, 1980; Crafts Council, *The Makers Eye*, London: Crafts Council, 1981; Crafts Council, *Making It*, London: Crafts Council, 1982; Crafts Council, *Objects of Our Time*, London: Crafts Council, 1997.

¹⁵² Within *The Archive* this includes entries such as: *Makers*, Crafts Council, 1980; *Making It*, Crafts Council, 1982; *On the edge*, Kettles Yard and Aberystwyth Arts Centre 1993; *Objects of Our Time*, Crafts Council 1997.

research aimed to understand how ideas of glass are formed and an important aspect of this was the examination of images of high technology glass production processes.¹⁵³

The third collection was a series of images used in the production of a film called *Meaning Escalator* in 2009. The film used images depicting glass objects or glass making processes to form a narrative sequence.¹⁵⁴

These three small collections formed the initial body of *The Archive*, to which further material was added. However, as well as adding new material, further contextual information about specific examples within this initial collection was gathered, a process which led to some important shifts in understanding. The engravings from Diderot and d'Alembert's *Encyclopédie* were initially used in my film *Meaning Escalator*. Within the film these images were used purely because of their aesthetic 'fit' with the film's narrative and not with an understanding of the context in which they were made.¹⁵⁵ Further research elucidated the motivation of the Encyclopedists revealing, in this instance, how the description of making process was an expression of Enlightenment ideology. This contextual understanding of the relationship between an entry in *The Archive* and its own context of production became particularly important and the impact of this can be clearly seen within Chapter 2.¹⁵⁶

¹⁵³ Within *The Archive* this includes entries such as: Quality inspection in the clean room SCHOTT glass C.2000; Philips LCD production (caption in Dutch) ITEMS 2, 2003.

¹⁵⁴ Within *The Archive* this includes entries such as: Float Glass (1959) Pilkington invents cost-effective process to make high-quality flat glass Photograph (publication) Jack Challoner, 1001 Inventions: that Changed the World; Diderot and D'Alembert's *Encyclopédie*, 1751.

¹⁵⁵ This was compounded by the fact that these examples were often not accompanied by titles or other contextual information. This began to confirm that we were surrounded by this circulation of images but we don't know what they are – because they are separated from contextual information.

¹⁵⁶ In the case of the Diderot images, this led to the realisation that Diderot and D'Alembert's *Encyclopédie* was a vast series of volumes – that these images were often part of a series and that the Encyclopedia is both a written and visual document.

After the initial collection was in place, a number of different methods were used to gather new material and expand *The Archive*. This involved intuitive and 'open' processes, but also deliberate and targeted searches.¹⁵⁷

In this period other people suggested many of the examples collected. This included both academic and non-academic colleagues and friends, who on hearing an initial outline of my research would suggest 'something they had just seen'. For these people, these examples formed important points of visibility and explanation of making process.¹⁵⁸ Often a recommendation would lead me to conduct further research to find similar examples. The recommendation of *Jimmy's Food Factory* for example, led me to search for other popular television programmes and films where making process became the focus.¹⁵⁹ Such recommendations opened *The Archive* to other concerns that weren't present in the initial collection such as descriptions of alienation or disconnection, which are explored in chapter 2. This process facilitated the incorporation of examples that were outside of my own knowledge, and allowed *The Archive* to become greater than a summary of my own specific knowledge of making process.

Although this research has a particular focus on glass and its making processes, *The Archive* encompasses a much broader consideration of making. It reflects an experience of making not segmented by professional concerns (such as material type, or scale), but is reflective of a more open and holistic

¹⁵⁷ At other points in assembling *The Archive* I very consciously searched for images connected to particular concerns. A good example is when I wrote a paper called *Fantasies of Making*, which investigated perceptions of flat glass. At this point the writing of this paper directed the search. Other examples were found much less consciously and in the course of pursuing everyday tasks, reading the newspaper, or going shopping (for example the BQ plant pot).

¹⁵⁸ *Jimmy's Food Factory* and Alain de Botton's *The Pleasures and Sorrows of Work*, were two early examples.

¹⁵⁹ This includes *How to Build a nuclear submarine* and *Blood Sweat and Luxuries*. The photographs of Edward Burtynsky was another example found as the result of a recommendation.

influx of information that contributes to an understanding of making process. This has allowed the research to incorporate and examine a broad range of material, both contemporary and historical forms of manufacture, as well as encompassing very different scales of making: from the intimate processes of personal knowhow, to the global manufacturing processes of distributed knowledge (as defined by Dormer on page 47). It has also allowed *The Archive* to incorporate more contentious production processes – such as the production of minerals for mobile phones in the Democratic Republic of Congo, as part of a broad range of making processes, from building nuclear submarines, to food production.

Finally, whilst the majority of entries were available in the public domain and therefore easily sourced, other examples were much more inaccessible due to their location within specialised publications or archives which required permission to access. There were also several examples that I was unable to access.¹⁶⁰ However, these are listed within the content of *The Archive* in order to reflect the difficulties of accessing the material and to illustrate how these examples of the visibility of process are in fact invisible.

3.2.2 Developing Chapter 2

Although the majority of *The Archive* was gathered during an early period of activity detailed above, new material was also added over a period of four years. However, in July 2013 *The Archive* was ‘closed’ and no further additions were made. This decision was made so that an analysis of *The Archive’s* entire content could be made, a process that contributed directly to Chapter 2.

¹⁶⁰ For example: a 1959 film called *The Manufacture of Glass*, directed by Frank Worth and Len Lee, or Peter and Zsóka Nestler’s 1970 film *How to make glass (manually)*.

The decision to close *The Archive* was informed by Gillian Rose's discussion of content analysis, a process that can be used to identify patterns within large collections of photographs. As Rose points out, content analysis requires 'a clearly defined sample of images'.¹⁶¹ Whilst the decision to 'close' *The Archive* allowed an analysis to be made, it equally meant that no new examples could be added, which has resulted in some omissions.¹⁶²

With *The Archive* now closed, each entry was listed in the order that it had been found and then numbered. Subsequently each entry was processed using five questions:

- 1 What is the form of the entry? For example: still image, sequence of images, film, object.
- 2 How was the entry found? What was its location? What contextual information accompanies it? Did someone else suggest it?
- 3 Does it have similarities with other entries in *The Archive*?
- 4 What key words can be used to describe the entry?
- 5 What is my initial understanding of the entry? How does it describe or record making process?

Whilst the first 3 of these questions are self-explanatory and were essentially used to log the entries, questions 4 and 5 require some further explanation.

¹⁶¹ Gillian Rose, *Visual Methodologies*, London: SAGE Publications Inc, 2007, pp. 59-73. Rose quotes from a 1993 paper by Lutz and Collins and their analysis of the covers of National Geographic magazine. Discussing content analysis, Lutz and Collins suggest it allows the 'discovery of patterns that are too subtle to be visible on casual inspection and protection against an unconscious search through the magazine [National Geographic] for only those which confirm one's initial sense of what the photos say or do'. (Lutz and Collins, 1993:89).

¹⁶² The impact of this process upon the research is explored in the conclusion.

Question 4: key words

The key words, a list of 69 words or short phrases, were generated through two processes. Firstly, key ideas discovered within key literature were incorporated into the list. Secondly, an initial examination the visual / structural and material aspects of the entries was made and key words were generated to reflect my initial understanding of the entry, with particular emphasis on how it describes or records making process.

Although the full list of Key Words is in Appendix 1, an example of these helps to clarify how they were generated and used. Figure 39 shows a group of nine key words which are attempt to identify the 'position of commentator / documenter'. Figure 39 is composed of two parts, the top section (7A - 7D) are terms which were used to identify the knowledge or competency of the photographer or commentator, using oppositional terms such as 'naive' or 'informed'. Within this set of nine key words, the term 'stranger' is an example of how ideas from key literature were incorporated. The term comes from Isobel Armstrong's description of the position of the narrator in Victorian descriptions of factories, which is examined in Chapter 2. The terms in the lower section (8A - 8E) aim to describe the motivation or 'driver' which prompted the images to be made, whether as a 'celebration' of making process, or as an expression of concern, for example: moral, or environmental.

Position of documenter / commentator			
7A	Naive	7B	Informed
7C	Stranger		

7D	The witness		
8A	Celebration	8B	Concern (Anxiety / paranoia)
8C	Moral	8D	Ethical / environmental
8E	The idea of 're-connecting'		

Figure 39: Key Words: position of documenter / commentator. Diagram: Jerome Harrington

As Figure 39 shows each key word had a code (7A to 8D) that were used to log all the entries in *The Archive*. This process facilitated the identification of similar examples within *The Archive* and ultimately led to the structure of chapter 2.

Question 5: written reflection

Following the application of the key words across all the entries in *The Archive*, short written reflections were produced in order to explore in greater detail my understanding of the entry and how it makes process visible (this process is detailed in Close Reading page 116). However, although all entries were processed in response to questions 1 – 2 – 3 – 4, a much smaller selection of entries were processed in response to question 5. These examples were selected because they were similar to other entries and were used as key examples of process within *The Archive*.

It was not the intention that this 5 stage process would produce a statistical output and in this way, this stage differs from Rose's outline of content analysis. Instead, this process functioned to identify key ideas within *The Archive* and ultimately aid the writing and structure of Chapter 2. In many

instances, the short written reflections that were produced functioned as starting points for the text within Chapter 2.

3.3 Phase 1: Studio based art practice

This section introduces Phase 1 of the research where methods of studio based art practice were employed to make a critical analysis of specific examples from *The Archive*. In this phase, the material and visual practices inherent to studio based art practice are used to examine the formal, structural and material aspects of these examples. Within this analysis, my own understanding of this material is central.

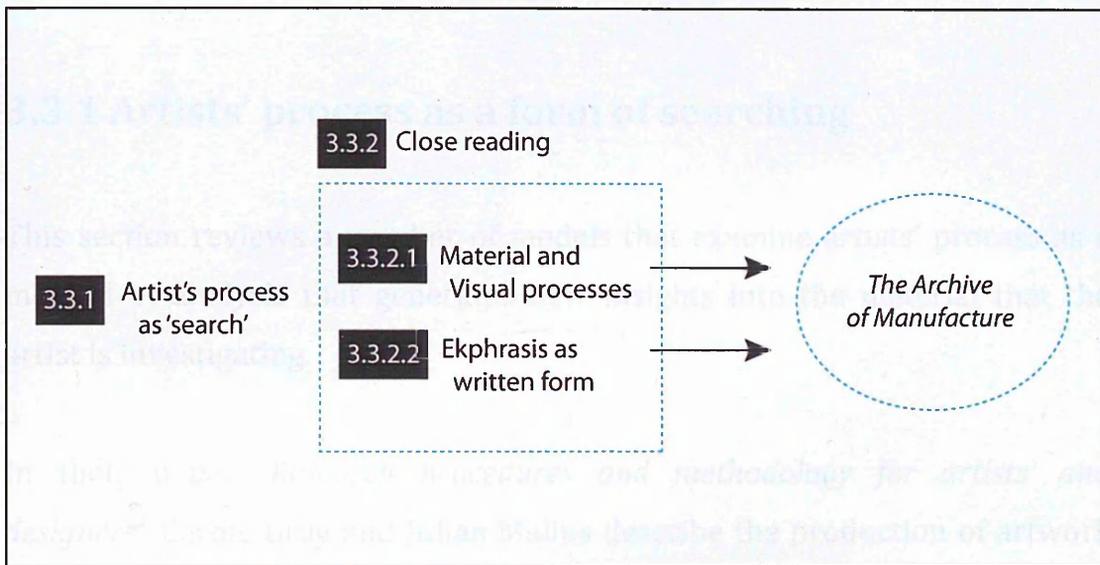


Figure 40: Phase 1: studio based art practice. Diagram: Jerome Harrington

This section consists of two subsections the relationship of which is visualised in the diagram above. The first, 'Artists' process as search' (identified as 3.3.1 on Figure 40) begins by reviewing theoretical discussions of how artists' process functions to drive thinking and generate new insights. Within this section I reflect upon a period of my own research project to demonstrate how a dialogue and interchange between different activities (including drawing, making, writing), functions to drive the research forward, generating thinking, experimentation and new artworks.

Section 3.3.2 details methods of visual analysis that are brought together under a broad definition of close reading. Whilst this definition of close

reading includes the critical processes of looking and deconstruction normally associated with the term, I expand this definition to include critical material and visual processes that have been vital in the analysis of content of *The Archive*, where both the image and object are sites of knowledge. This expanded definition of close reading is detailed through two further sections: 3.3.2.1 explores the use of material and visual processes as methods of critical looking and 3.3.2.2 ekphrasis as a written form employed to both evidence and explore my understanding of examples from *The Archive*.

3.3.1 Artists' process as a form of searching

This section reviews a number of models that examine artists' process as a method of analysis that generates new insights into the material that the artist is investigating.

In their paper '*Research procedures and methodology for artists' and designers*', Carole Gray and Julian Malins describe the production of artwork through a cyclical process made up of six stages (Figure 41). They point to two distinct periods in this cycle, a 'generative' phase (stage 1 - 3) and an 'analytical and reflective' phase (4 - 6).¹⁶³

Crucial to the cyclical nature of Gray and Malins' model is the link between the generative phase and the analytical / reflective phase. This occurs in stages 5 and 6, where through the presentation of the artwork (stage 5), feedback is generated through 'critical discussion' (stage 6) and this information is fed back into the generative stages (stage 1 - 3).¹⁶⁴ This process involves an internal phase, where a practitioner develops work

¹⁶³ Carole Gray and Julian Malins, *Research Procedures / Methodology for Artists and Designers*, 1993, p. 7, <<http://carolegray.net/Papers%20PDFs/epgad.pdf>> [accessed 15 May 2015].

¹⁶⁴ Gray and Malins, *Research Procedures / Methodology for Artists and Designers*, p. 7.

through studio based experimentation and an external phase where the artwork is shown to an audience and feedback is generated. This on-going cycle of generation, reflection, articulation and feedback, drives the thinking of the artist forwards.¹⁶⁵

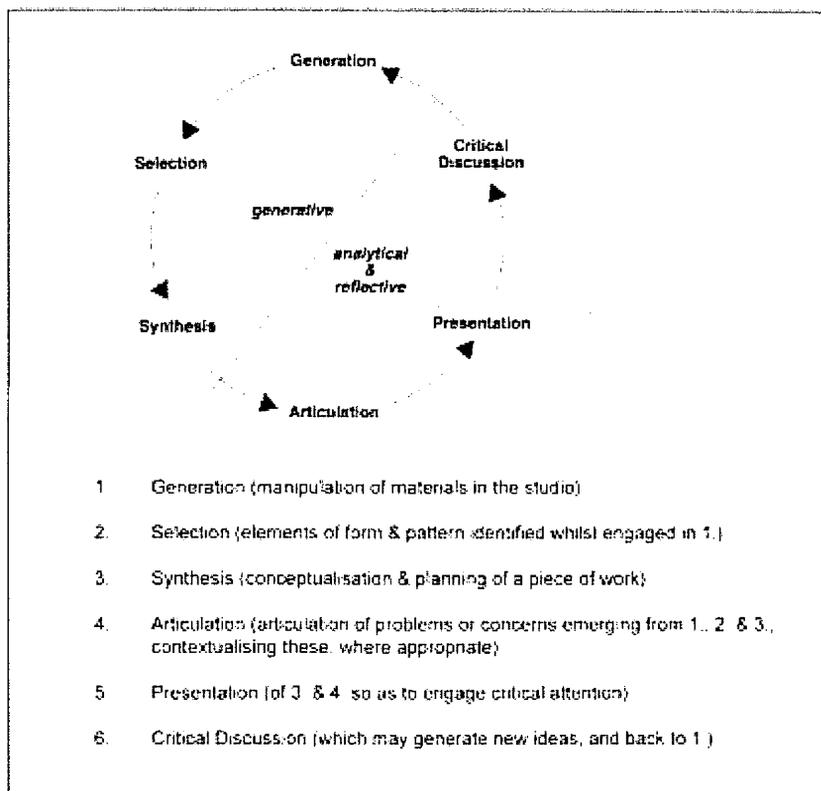


Figure 41: Generative and analytical / reflective phases of artistic process (adapted by Carole Gray from Stroud Cornock’s earlier work on artists’ methodology, 1984)

¹⁶⁵ It is important to state that Gray and Malins based their description of process on research into artists’ process of fine art students by Stroud Cornock. They state that: ‘Although Cornock’s research concerned student learning, this pattern will seem familiar to practitioners in Fine Art (and probably Design) as a general procedure - practice and reflection on practice. Within this general procedure lies a personal one, intimately linked with the artist’s particular intentions, and reflecting the idiosyncrasies of the individual’s working process.’ Their description above must therefore be understood as a general, rather than a specific one, and one that is based upon observation of fine art rather than design.

<<http://carolegray.net/Papers%20PDFs/epgad.pdf> > [accessed 15 May 2015].

In *An alternative model of "knowledge" for the arts*, Linden Reilly similarly places emphasis on artists' process as a period of thinking and discovery, which she describes as a form of 'searching'. She states:

The practitioner may go through successive stages of planning, acting, reflecting, revising the plan, then acting again...The work does not merely emerge in the world, it simultaneously emerges in the practitioner who may see that which has been dimly felt as the work, may see clearly what they have been feeling, only at that point where it "feels right", only as it emerges as a physical form. The making process can be a search. A very careful search. And it can reveal unexpected things, more or other than was searched for.¹⁶⁶

By placing emphasis upon artists' process as a form of searching, Reilly moves the discussion away from thinking of artists' process as a means of making a final work, to instead conceive artists' process as a period of thinking through which new insights emerge.

Reilly's philosophical discussion is extended through Rebecca Fortnum's more recent empirical research into the potential of artists' process. In, *What is visual intelligence and how do artists use it?* Fortnum sets out to reveal and understand 'the decisions taken during the making of an artwork.'¹⁶⁷ Her research is based upon material generated through a series of seminars, where ten artists discussed their artistic process.¹⁶⁸

¹⁶⁶ Linden Reilly, *An alternative model of "knowledge" for the arts*, Working Papers in Art and Design 2, 2002, < http://sitem.herts.ac.uk/artdes_research/papers/wpades/vol2/reillyfull.html > [accessed 30 April 2013].

¹⁶⁷ Rebecca Fortnum, *What is visual intelligence and how do artists use it?*, Visual Intelligences Research Project, Lancaster University, 2005, p. 8. <<http://www.visualintelligences.com/visual-intelligence-how-artists-use-it.html>> [accessed 15 Jan 13].

¹⁶⁸ Fortnum employs a transcript of the seminars as primary research and uses quotations from these discussions to provide specific evidence to drive her argument. The artists who took part were; Maria Chevska, Colin Crumplin, Michael Ginsborg, Beth Harland, Paula Kane, Ian Kiaer, Rachel Lowe, Mary Maclean, Rebecca Sitar and Alison Wilding. These artists all have established practices, exhibit regularly, are from different

Fortnum employs the term 'visual intelligence' to describe the 'interconnection between thinking and making' that takes place during the development of an artwork. In contrast to the preconception that an artwork is conceived and then made, she reveals the gestation period of an artwork as a rich period of discovery where a 'dialogue' between artist and artwork occurs, through which genuine new insights are made by the artist.¹⁶⁹ Summarising this process, Fortnum states:

These artists then adopt strategies that not only allow them to be surprised by the results of their processes, but also revise their aims and approaches in the light of their 'discoveries'. [...] it also reflects a very real gap between hypothesis and result. [...] even though the work's final evolution is unknown, the unforeseen can be used strategically within the process.¹⁷⁰

Within Fortnum's transcript the participating artists describe this interconnection between making and thinking in a number of different ways, each pointing to the potential of this period as a generative process. Ian Kiaer states 'that in the making there is something being found'¹⁷¹; Michael Ginsborg describes a "helplessness before the object" as he makes and speculates'¹⁷²; and Beth Hartland describes 'drawing meaning "out of" its physical nature and mode of making' rather than 'conferring meaning "onto" the work.'¹⁷³

generations (age range 34 to 63) and work in a range of media (video, painting, drawing, collage, sculpture, installation, photography).

¹⁶⁹ Fortnum, *What is visual intelligence and how do artists use it?*, p. 16. Fortnum discusses a prejudiced view of process where the work is thought of and then made. Fortnum uses the term 'dialogue' to describe this interchange between artist and artwork: 'For some artists this is a useful dialogue and sets up a conversation from which the work develops.'

¹⁷⁰ Fortnum, *What is visual intelligence and how do artists use it?*, p. 13.

¹⁷¹ Fortnum, *What is visual intelligence and how do artists use it?*, p. 13.

¹⁷² Fortnum, *What is visual intelligence and how do artists use it?*, p. 14.

¹⁷³ Fortnum, *What is visual intelligence and how do artists use it?*, p. 10.

In contrast to Gray and Malins, both Reilly and Fortnum focus upon the 'generative' phase of artists' process (stages 1 – 3 of Gray and Malins model). Reilly's and Fortnum's discussion highlights the relationship that develops between the artist and the emerging artwork, during the process of its making or gestation. Crucially, their discussion highlights how artists' process functions as an active period of discovery through which new knowledge is generated prior to, or even despite the artwork's public presentation.

3.3.1.1 Practice as dialogue

Within my own research project, in alignment with Fortnum and Reilly's description of artist's process, feedback generated through my own dialogue with the developing work has been crucial in Phase 1. However, in contrast to the procedural clarity suggested by Gray and Malins model, this took place through a more complex and 'messy' reality.¹⁷⁴ This is demonstrated by Figure 42, which visualises the development of the research over the period of the first eighteen months, a period in which six outputs were produced.¹⁷⁵

The diagram describes this period of time as a timeline running from left to right along the bottom of the diagram. It illustrates how these outputs were the result of the dialogue and interchange between different activities, including drawing, making, research visits, direct application of textual sources, writing, each of which is described by a separate colour (see key).¹⁷⁶

It is also important to point out that at least four projects that were not

¹⁷⁴ Throughout this chapter, Gray and Malins description of the cyclical nature of artists process serves as a basic model to discuss the use of art practice within this research. However, whilst it serves as a basic model, it is equally used to demonstrate difference and to facilitate a discussion of divergence and complexity that occurred in this research, in contrast to the procedural clarity that this model suggests.

¹⁷⁵ From October 2009 to February 2011.

¹⁷⁶ The diagram has been based upon detailed recording of the works development from research sketchbooks, diaries and records of the works development.

concluded and remain unresolved in this period; these are marked by the symbol [END].

By visualising the interchange between different types of activity, I want to stress that these outputs were not conceived from the beginning as separate independent pieces, but emerged through the processes of 'searching' (Reilly) and 'dialogue' (Fortnum). The diagram demonstrates how the trajectory of each is interwoven, chronologically, conceptually and in terms of the material that is explored. It is the dialogue and interchange between these seemingly disparate activities that has driven the investigation. Within this interplay source material moves across the investigation, often being fixed or 'collaged' within a number of works.

In the period visualised six outputs were produced. On Figure 42, the points 1 - 2 - 3 - 4 - 5 - 6 - 7, provide an example of the relationship between different types of activity in the production of three of these outputs. The development of this work began with [1] the examination of the depiction of Crown Glass manufacture in the Diderot and d'Alembert's *Encyclopédie*. Subsequently, three specific activities were involved in the analysis of these engravings: this began with [2] reading Richard Sennett's analysis (as discussed on page 72). Sennett's text led to [3] my own written descriptions of these to explore my own understanding of them. Within my own writing I became fascinated by how material was described in the engravings and led to [4] a series of drawings made with the aim of understanding the visual quality of the engraving, these drawings were made not as final artwork but as a method of distilling and visualising information. Subsequently both these drawings and my written texts were incorporated into [5] a paper called *Fantasies of Making*. Finally, these drawings were employed within a film [7] *Untitled (Diderot)*. This artwork reflected upon both Sennett's and [6] Isobel Armstrong's analysis of process.

The six outputs produced in this period, are marked by two different colors, red squares indicate outputs which were made public either as a research paper, presentation or exhibition, which generated feedback from peers and audiences,¹⁷⁷ and black squares to indicate outputs which were not made public. This demonstrates the importance of both external feedback as described by Gray and Malins and internal development outlined by Fortnum and Reilly.

¹⁷⁷ The six outputs were: [1] *The Archive of Manufacture*, [2] *Fantasies of Making*, [3] *Untitled (edge)* (version 1), [4] *Untitled (Diderot)*, [5] PhD upgrade submission and presentation, [6] *Untitled (edge)* (version 2). Outputs such as *Fantasies of Making* and my PhD upgrade examination were crucial moments of feedback within this phase.

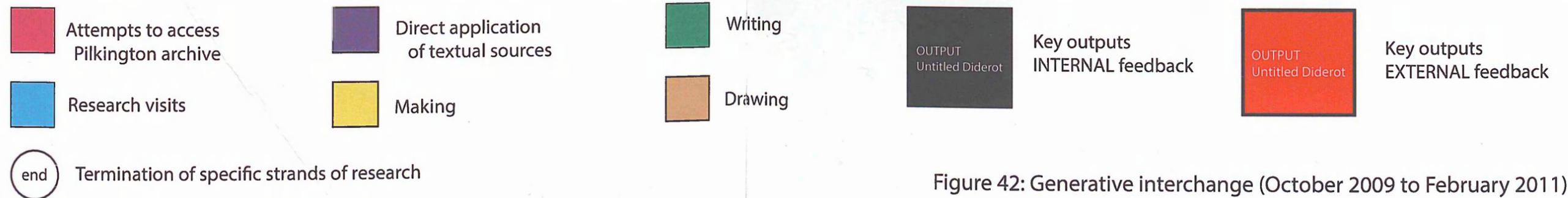
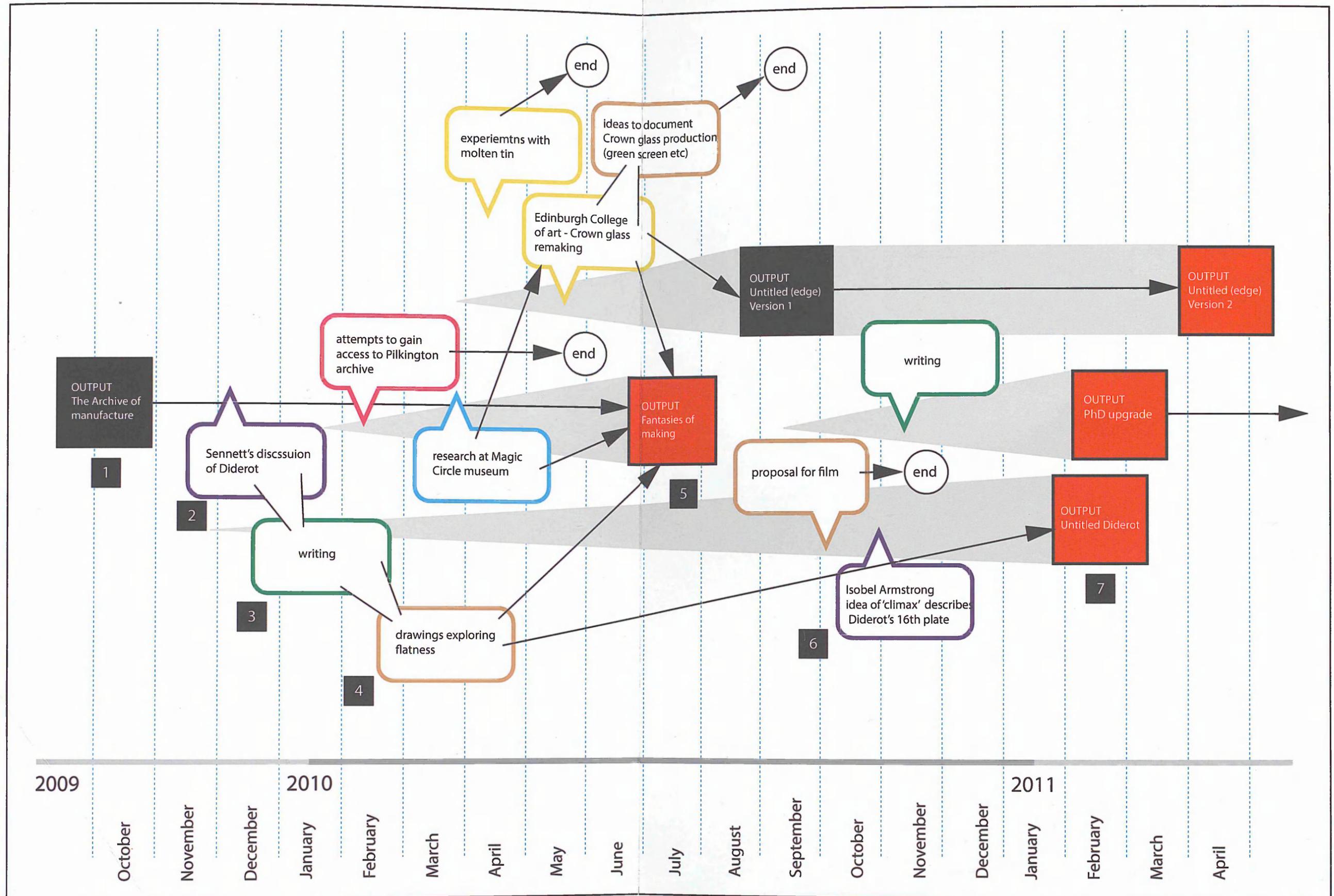


Figure 42: Generative interchange (October 2009 to February 2011)

3.3.2 Close reading

As described by Figure 40, 'Artists' process as search' forms the structure within which other specific methods have been incorporated. This section details these methods that are broadly described as forms of close reading. This discussion begins by examining definitions of close reading that include critical processes of looking and deconstruction normally associated with the term. This is followed by two subsections that expand this definition to include critical visual material and written forms that have been vital in the analysis of points of visibility in *The Archive*.

Close reading describes a critical method of interpretation that forefronts the visual nature of the artefact. Gillian Rose describes close reading as a way of 'looking very carefully at the content and form of images.'¹⁷⁸ According to Rose, close reading offers a 'way of describing the visual impact of an image [and] may also begin to say something about an image's possible effects on a spectator.'¹⁷⁹ The art historian T.J Clark's recent *The Sight of Death*, similarly examines the effect of the artwork upon on the spectator.¹⁸⁰ In his close reading of two Poussin paintings, Clark describes how through this process of looking:

astonishing things happen if one gives oneself over to the process of seeing again and again: aspect after aspect of the picture seems to surface, what is salient and what is incidental alter bewilderingly from day to day, the larger

¹⁷⁸ Rose, *Visual Methodologies*, p. 39.

¹⁷⁹ Rose, *Visual Methodologies*, p. 57.

¹⁸⁰ Although within this research, close reading is used to describe this method, a number of other terms exist. For example, Rose employs the term 'compositional interpretation' (Rose, *Visual Methodologies* pp. 35 – 38), and although T. J. Clark in *The Sight of Death* does not use the term this is exactly what his examination of the Poisson paintings entails.

order of the depiction breaks up, recrystallizes, fragments again, persists like an after image.¹⁸¹

Clark records the relationship between his looking and an unfolding understanding of the paintings through diary entries, which are a 'record of looking taking place and changing through time.'¹⁸²

Whilst Rose and Clark both discuss the insights close reading can produce, it is the photographic theorist Shepard Steiner who details the method most succinctly and whose definition is most relevant to this research. Steiner describes close reading as 'a method of reading an artwork by taking the object itself as starting point and guiding principle, and carrying out a meticulous visual analysis.'¹⁸³

Steiner's method can be clearly seen in his texts that evidence his confrontation with an artwork and detail his unfolding understanding. In his essay *Thinking Pictures* for example, Steiner examines a photograph by Jeff Wall entitled *Clipped Branches* (Figure 43).¹⁸⁴ Steiner's essay details his engagement with this image, as he examines it 'inch by inch, stumbling from one detail to the next in order to digest as much of the picture as possible.'¹⁸⁵ This can be seen in sections of his essay describing his process of looking and thinking in great detail:

¹⁸¹ T. J. Clark, *The Sight of Death: An experiment in art writing*, Yale University Press, 2008, p. 5.

¹⁸² Clark, *The Sight of Death*, p. 5.

¹⁸³ The Van Abbemuseum, Factsheet Plug In #46, Acts of Non-Aggression, <http://www.vanabbemuseum.nl/fileadmin/files/Pers/PDFs/PlugIn/Factsheet_Plug_In_46_EN.pdf> [accessed 1 March 2013].

¹⁸⁴ Shepard Steiner, Street Smart: 'Thinking Pictures' in the Tradition of Street Photography, *Image [&] Narrative* [e-journal], 18 (2007), p. 3, Steiner examines what he calls a 'modest' and atypical work by Wall, to demonstrate Close Reading in action. <http://www.imageandnarrative.be/inarchive/thinking_pictures/steiner.htm> [accessed 15 February 2013].

¹⁸⁵ Steiner, Street Smart: 'Thinking Pictures' in the Tradition of Street Photography, p. 7.

One turns to the title, but not before looking at the image, scrutinizing its details, following its diagonals; at one limit letting one's eye run along and up the sharp right hand edge of the tree trunk; at another limit, allowing oneself to follow the mounting intensity of white flecks that culminate at the top edge of the picture; at yet another limit, daring to track the three leaves that punctuate a pathway from sidewalk to road at upper right. Each moment encourages close reading, each pushes apprehension further toward the upper reaches of the right hand corner, but at the same time is sufficiently disorienting that the narrator returns to the certainties of the lower left hand side of the image, and ultimately the identity forged in the name of the title.¹⁸⁶

In his text Steiner attempts to reveal his experience of looking at the photograph, or rather, how his looking is effected by the photograph. In this way his text recognises the dynamics and trajectories of looking and thinking that occur in the encounter. This is a reading that acknowledges the photograph's logic and its agency.



Figure 43: Jeff Wall, *Clipped Branches*, (2001)

¹⁸⁶ Steiner, *Street Smart: 'Thinking Pictures' in the Tradition of Street Photography*, p. 7.

Steiner describes Wall's photograph as a work that cannot be 'closed off' and he aims to reflect this in his text, by developing a 'floating and mutable notion of untranslatability into a detailed point-by-point description of the image; to have untranslatability looming on the horizon.'¹⁸⁷ In suggesting that the photograph cannot be 'closed off', Steiner points towards a contingent understanding. In this way, the form of his text and the way in which the photograph functions reflect one another.¹⁸⁸ His text does not drive to a conclusion, but rather remains in the present, playing out an unresolvable dynamic.

An expanded definition of close reading

Although Steiner is primarily recognised as a photographic theorist, he suggests that close reading begins with the artefact in question and that rather than applying theory, a reading is developed through a specific encounter with the singularity of the work.¹⁸⁹ Steiner describes close reading as a 'variable approach to reading dictated by the text, object, or image itself.'¹⁹⁰ His emphasis on responding to the specific artefact, whether text, object or

¹⁸⁷ Steiner, *Street Smart: 'Thinking Pictures' in the Tradition of Street Photography*, p. 5.

¹⁸⁸ At the heart of Wall's photograph Steiner identifies a dynamic between apprehension of the photograph and comprehension of it, a dynamic which for Steiner reflects Kant's notion of the sublime. It is here, where Steiner collates a discussion how the photograph effects and structures his looking (the oscillation between apprehension and comprehension) and the discussion of Kant's sublime, that we see theory 'being used' rather than applied.

¹⁸⁹ The Van Abbemuseum, Factsheet Plug In #46, Acts of Non-Aggression, <http://www.vanabbemuseum.nl/fileadmin/files/Pers/PDFs/PlugIn/Factsheet_Plug_In_46_EN.pdf> [accessed 1 March 2013].

¹⁹⁰ Shepherd Steiner, *Other Uses: Boolean Searches in the Martha Rosler Library*, 2009, <<http://fillip.ca/content/boolean-searches-in-the-martha-rosler-library>> [accessed 27 Jan 2013]. Steiner suggests that: 'Close reading is not a theoretical method of reading that one can extract from the practice of reading, abstract from the work at hand, or know in advance. It is a variable approach to reading dictated by the text, object, or image itself. The crucial distinction for me is using theory, rather than applying theory. To use theory—and I think that every work of art has a theory of interpretation built

image is particularly important to the content of *The Archive*, where both the image and object are sites of knowledge and where there is such a broad range of image and object 'types'.

Through the following two sections, I expand Steiner's description of close reading as a 'meticulous visual analysis' to include critical visual, material and written forms. Section 3.3.2.1 examines how material and visual processes have been employed as methods of critical looking.¹⁹¹ Section 3.3.2.2 introduces ekphrasis as a written form that has been used to explore and evidence my understanding. Although these are explored in two distinct sections following one another, this sequential order is not reflective of how these methods were employed. In practice these methods were employed concurrently, overlapping one another in a manner similar to the interchange of different activities visualised in Figure 42.

3.3.2.1 Material and visual processes as a form of critical looking

The works of two contemporary practitioners are briefly reviewed below. These have functioned as important examples where artist's process is employed as a form of interrogation. I review these examples in order to

into it—one must respond to the singularity of the work confronted and let that determine what is to follow.'

¹⁹¹ In her artists statement the artist Penny McCarthy refers to close reading as a critical process, she states: 'The project evolved from on-going research using drawing as a device to disassemble and study the visual aspects of texts, documents and books that exist in multiple applications and editions in order to reflect on their cultural transmission. I use drawing as a form of close reading. Drawing functions as a mimetic practice that enables me to study a range of source material.'

Penny McCarthy, Sheffield Hallam University, Cultural, Communication and Computing Research Institute, <<http://www.shu.ac.uk/research/c3ri/people/penny-mccarthy>> [accessed March 2013].

extend close reading to encompass critical material, visual and written processes.

Simon Starling

In her analysis of the work of Simon Starling, Tag Gronberg employs the term *re-crafting* to describe the critical potential of his making process. Gronberg investigates Starling's 2002 work - *Blue, Red, Green, Yellow, Djungel*, where Starling remakes a fabric design called *Aralia* from 1928 by designer Joseph Frank (Figure 44). As Gronberg demonstrates, Starling's remaking of the *Aralia* fabric employs processes not connected to the manufacture of the original artefact. For example, the wood of the printing blocks used to reprint the fabric was sourced by Starling himself from the jungles of Trinidad, an act which reveals the discrepancy in Frank's original fabric, which was based upon images 'found in children's books rather than first-hand experience.'¹⁹² For Gronberg, Starling's remaking emphasises the 'exoticism' of the original fabric.¹⁹³ She states that: 'Remaking something is both a tribute to, and a means of exploring the original.'¹⁹⁴ Gronberg explores how Starling's remaking of this Modernist fabric employs 're-crafting' to evaluate the legacy of Modernism.¹⁹⁵

Gronberg's use of the prefix 're', relates to Adam Mendelsohn's discussion of art practices which 'interrogate history' through strategies of restaging or re-

¹⁹² Simon Starling: *Djungel*, South London Gallery, <<http://www.southlondongallery.org/page/simon-starling-djungel>> [accessed 17 May 2013].

¹⁹³ Tag Gronberg, Simon Starling: *Crafting the Modern*, *Journal of modern Craft*, Volume 1 – Issue 1, p106, <<http://www.bergpublishers.com/BergJournals/TheJournalofModernCraft/tabid/3254/Default.aspx>> [accessed: 1 February 2010].

¹⁹⁴ Gronberg, Simon Starling: *Crafting the Modern*, p. 106.

¹⁹⁵ Gronberg, Simon Starling: *Crafting the Modern*, pp. 101–116.

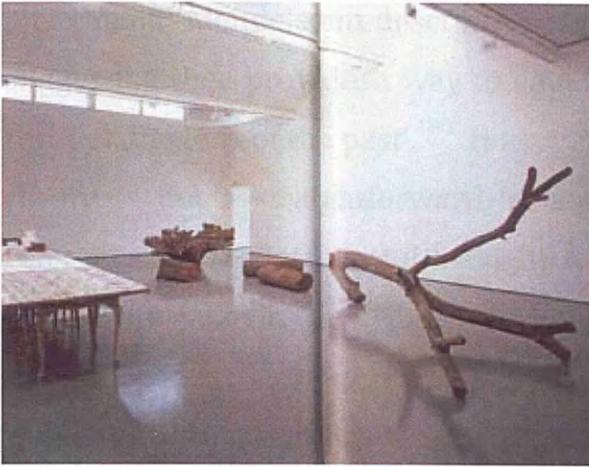


Figure 44: (left) Simon Starling - *Blue, Red, Green, Yellow, Djungel*, (2002); (right) *Aralia* fabric, (1928) by Joseph Frank



Figure 45: Elizabeth Price, *Bolder*, (1999)

enactment. Mendelsohn describes such approaches under the prefix of 'RE', suggesting they provide 'a way to gain further understanding of the present through the lens of the past'.¹⁹⁶ However, Starling's approach to the historical record is not a straightforward 're-enactment', but a fiction - events and references are selected and brought together to cause a collision of ideas. Daniel Kurjakovic describes Starling's practice as 'discontinuous and heterogeneous',¹⁹⁷ an approach playfully bringing together elements that are unrelated, or have no historical connection. In this way, Starling's work could be considered as a form of collage, bringing together seemingly unrelated bodies of information (geographies, times, people, ideas, materials) to critically interrogate the past.¹⁹⁸

Elizabeth Price

Unlike Starling's close reading of an existing object (the *Aralia* fabric), Elizabeth Price's project *Boulder and Sidekick* uses artist's process to expose how thinking develops and is affected by making.¹⁹⁹

Boulder is an on-going sculptural work made from brown packaging tape that is wound around itself to form a ball (Figure 45). *Sidekick* is a text, written as

¹⁹⁶ Adam, E. Mendelsohn, *Be Here Now*, Art Monthly, October 2006, pp. 13-16.

Mendelsohn explores how such approaches have been commonly employed to explore historical events and actions but does not discuss the potential of such an approach towards objects.

¹⁹⁷ Daniel Kurjakovic, 'Hide and Seek in Simon Starling's scenarios', in *Simon Starling: Cuttings*, Philipp Kaiser (ed.), Basel: Kunst Museum, 2005, pp. 27 - 36. Kurjakovic suggests that Starling 'treats things "real" things as elements of artistic montage, which take shape in a form (a combination, a syntax) that has no correspondence in reality.'

¹⁹⁸ Emma Cocker suggests that 'collage is used as a strategy for bringing things into proximity, to create moments of unexpected collision where two wholly unrelated things meet and acknowledge their difference, their unlikeness.' Emma Cocker, *Moves Towards the Incomprehensible Wild* (2011),

<<http://www.artandresearch.org.uk/v4n1/cocker.php>> [accessed 5 October 2014].

¹⁹⁹ Elizabeth, M. Price, *A demonstration of a relation between thinking and doing: sidekick; and other unfinished work*, PhD Thesis, University of Leeds, 1999.

a series of editions, each of which responds to the continuously growing *Boulder*.²⁰⁰

The method through which *Boulder* is made is significant. *Boulder's* process of making is an arduous task requiring thin layers of tape to be added, the addition of each layer contributing very little to the development of the form. This is a repetitive, simple, but time and labour intensive process.²⁰¹ The making method of *Boulder* presents an endless process that offers no conclusion. By resisting finish or conclusion, this '*unfinished work*' (referred to in the title of Price's thesis) positions itself away from potential formal or symbolic readings, instead placing emphasis on its own process and duration of making. As Price states:

As the sphere became larger and its surface area increased, the process became slower because the tape had a gradually decreasing relative impact. Each roll added to the sphere lessened the value of the next and after a while the addition of a roll was impossible to detect. At the present moment of time

²⁰⁰ Both *Boulder* and *Sidekick* are evolving forms. Every time *Boulder* is exhibited Price has applied new layers of tape, so that at each exhibition, it has changed and grown larger. Equally at these points of presentation *Sidekick* is updated and amended in response to the progress of *Boulder*; it is edited, revised, passages deleted and new passages inserted. At the publication of the most recent version of *Sidekick* (June 1999) *Boulder* had a diameter of something approaching 1 meter. At the submission of her thesis six versions exist dating from August 1998 to June 1999.

²⁰¹ Elizabeth Price, Excerpts from *sidekick*, National Association for Fine Art Education. Price states: '*Sidekick* is a descriptive text which annotates the incremental progression of a labor-intensive activity. This activity is fairly straightforward: packing tape is wound from the roll upon which it is commercially distributed, onto itself, to form a sphere. I call this sphere *boulder*. *Boulder* was started in 1996 and is ongoing. It was initiated with a simple task, yet the repetition of this task incited certain material inevitabilities. One of the critical problems of this work, has been knowing how to conclude it – the slippage of the labour out of the range of visible cause and effect, has made it difficult to know how to act. I have resigned myself to continuing it indefinitely. *sidekick* was initiated in 1997. It was started when the *boulder* began to slow down. It is ongoing.'

<<http://www.nafae.org.uk/journals/jvap-2-1/page-108/>> [accessed 27 September 2010].

the ratio of time-spent to visible result is so protracted, that it is difficult to perceive the effects of my action.²⁰²

Sidekick is written in the first person, its style or tone something between the intimate nature of a diary entry and an official but conversational report. Katy McCleod has described the nature of Price's text as a 'soliloquy' - a theatrical device that allows a character's thoughts and ideas to be conveyed to the audience.²⁰³

The contrast between the repetitive and mundane nature of the making process of *Boulder* and the intimate, in-depth nature of *Sidekick* is striking. Price makes evident the complexity of thinking that accompanies and is generated by even the simplest process. As 'soliloquy', the text provides a method that makes evident how thinking develops and is affected by making. Its durational nature illuminates an evolving understanding changing over time.

²⁰² Price, A demonstration of a relation between thinking and doing: sidekick; and other unfinished work, (*Sidekick*, May 1999), p. 23, Price states: "Tape is employed to attend to other things whilst they are in transit, and this dependence also precipitates a quite distinct interval of utility. The tape fulfills its proper function between the moments of application and removal. It continues to secure and enclose until that point. Because of this specific duration of action, I am not really sure whether the tape of which the sphere is made, has been used, or whether it is still in use. It has performed its material function of sticking, and cannot be used again for anything else. But whilst it has been applied, it has not been removed, and so its use does not conventionally expire. The equivocal nature of the boulder may have something to do with the incumbent possibility this state of suspension precipitates. The uncertain status of the tape upon the sphere may contribute to the boulder's general lack of plausibility. It is certain that if the boulder could be unwound many things would be, resolved, clarified and accounted for'.

²⁰³ Katy Macleod, 'Writing/Art' in *Studies in Material Thinking*. Vol. 1, No. 1, April 2007, <<http://www.materialthinking.org>> [accessed September 2010].

The 'liveness' of Price's text reflects Peggy Phelan's call for writing about performance art to embrace the act of writing towards disappearance and to become performative in itself. Phelan states: 'The challenge raised by the ontological claims of performance for writing is to re-mark again the performative possibilities of writing itself. The act of writing toward disappearance, rather than the act of writing toward preservation.' Peggy Phelan, *Unmarked the politics of performance*, London: Routledge, 1993, p. 148.

Summary

The work of Starling and Price have been important in informing the development of material, visual and written methods to approach the material in *The Archive*. Their work demonstrates methods of critical looking which echoes Steiner's description of close reading as a 'meticulous visual analysis'. Starling's work can be understood as a close reading of Frank's *Aralia* fabric, but crucially, one where material and making processes are used to interrogate aspects of the original object. In contrast, Price's close reading does not consider a pre-existing object, but involves the production of a new one. In the form of a 'soliloquy', her text reveals the complexity of her thinking as it shifts and grows during the making of *Boulder*. Price's 'meticulous analysis' exposes cognitive processes and in this way her use of text formed an important 'bridge' to my own use of ekphrasis as a written form to evidence my understanding of material in *The Archive*. This is detailed in the following section 3.3.2.2.

Early in the development of this research, Starling and Price functioned as important examples of the potential of art practice as a critical and interrogative process through which to analysis the material in *The Archive*. Their methods were explored in relationship to other fields that consider the object and its materiality, such as anthropology and Material Studies. Igor Kopytoff, for example, describes the importance of understanding an object's manufacture as part of its 'biography'.²⁰⁴ Similarly Lorraine Daston links our understanding of what things are with their 'becoming' – the process by which an object is formed materially and conceptually. Daston suggests that 'Shifting attention from being to becoming can undermine seemingly obvious

²⁰⁴ Igor Kopytoff, *The cultural biography of things: commodification as process*, in *The Social Life of Things: Commodities in cultural perspective*, Arjun Appadurai (ed.), Cambridge: Cambridge University Press, 1986, p. 66. Kopytoff suggests that an objects biography includes: 'information about an object's genealogy, its manufacture, use, possession, exchange, alteration, movement and destruction or preservation, obtained from a wide variety of sources'.

assumptions about thingness'.²⁰⁵ Whilst these theoretical considerations offer important insights into what things are, their predominantly textual form is marked by a separation between the textual consideration of the object and its materiality. In contrast, art practice, exemplified by Starling and Price is able to consider the object's 'becoming' actively, through its intimate connection to material and process.²⁰⁶

3.3.2.2 Ekphrasis as written form

Very early in the research I was browsing through books in the library trying to find images of making processes to incorporate in *The Archive of Manufacture*.²⁰⁷ I was not methodically searching, or trying to find something that I had identified in advance. Looking through a book about technological innovations I came across a photograph (Figure 46) that I had not seen before.²⁰⁸ As quickly as the pages opened and in the manner described by Roland Barthes as a 'fulguration', an understanding of the image formed.²⁰⁹

What I saw and understood at this 'first seeing' was only brought into sharp focus much later, when in conversation with someone else (person A) I realised how different our readings of the photograph were. Through this conversation, I came to the realisation that how I understood the photograph

²⁰⁵ Lorraine Daston, (ed.), *Things That Talk*, New York: Zone Books, 2004, p. 20.

²⁰⁶ Morris, *Notes on sculpture 4: Beyond objects*, p. 881. Morris writes 'Ends and means are brought together in a way that never existed before in art.'

²⁰⁷ Michael Rosen suggests that browsing 'is one of the key ways – if not the key way – in which we learn how to pick out what we want and need, and reject the stuff that we don't need.' Michael Rosen, *Good Ideas: How to Be Your Child's (and Your Own) Best Teacher*, London: John Murray (Publishers), 2014, p. 11.

²⁰⁸ Jack Challoner, *1001 Inventions: That Changed the World*, Cassell Illustrated, 2009.

²⁰⁹ The reflection on the glass surface changed my perception of what the men are holding. The effect of the reflection upon my reading of the image aligns with Barthes discussion of the punctum. Barthes acknowledges the rarity of this moment.

wasn't a universal understanding, but could be described as an 'accident of reading'.²¹⁰



Figure 46: The Float development team, (1959). Published in *1001 inventions that changed the world*, Cassell Illustrated, (2009)

Although not formally analyzed, the 'difference' between our readings seemed to hinge on how each of us understood the background grid, which the six men stand in front of. Trained as an engineer, the interpretation of person A was informed by his technical knowledge of the function of the background grid within engineering to check the flatness of surfaces. On hearing this, I felt a sudden sense of disappointment, caused by the truth of

²¹⁰ Jeff Wall, interview by Peter Galassi, in Peter Galassi and James Rondeau, Jeff Wall, New York: The Museum of Modern Art, 2007, p 157. Wall uses the term 'accident of reading' to describe a miss reading of literature not a photograph.

what I was hearing. And yet, this 'truth' only served to bring my own 'accident of reading' into sharper focus, highlighting its importance.

Prompted by this experience I attempted to describe my understanding of this photograph that formed through this 'accident of reading'. This short textual description attempted to detail my understanding of the photograph that occurred in the moment when the pages of the book opened. The description aimed to detail what I saw, rather than what I might later be able to find out, or what person A had told me. In this way this short text attempted to occupy the present tense of this fleeting moment of understanding.²¹¹

The text formed what was essentially the first use of ekphrasis in the research. Ekphrasis is a literary form often used to describe, in textual form, the visual characteristics of art. In *Narrating the Visual in Shakespeare*, Richard Meek describes ekphrasis as:

The verbal representation of visual representation [...] what distinguishes ekphrasis is its quality of vividness, *enargeia*, its impact upon the mind's eye of the listener who must be almost made to see the subject.²¹²

In *Writing About Art*, Marjorie Munsterberg suggests that one of the earliest ekphrasis texts is a description of the making process of Achilles' shield in Homer's *Iliad*. As Munsterberg points out, in Homer's description the real and imaginary sit side-by-side, combining:

elements that could not be part of a shield (like movement and sound) with things that could be (like physical material and visual details). This

²¹¹ This also prompted the speculation that this 'first seeing' is the one which subsequent knowledge is constructed. The description of this image through close reading has therefore attempted to occupy this first moment, a subjective encounter.

²¹² Richard Meek, *Narrating the Visual in Shakespeare*, Farnham: Ashgate Publishing Ltd, 2009, p. 5.

emphasizes the possibilities of the verbal and the limitations of the visual. Second, the thing being described comes to seem real in the imagination of the reader, despite the fact that it could not exist.²¹³

As Munsterberg suggests, in Homer's text, ekphrasis combines information that is physically present but also speculative or imagined aspects. In this way, ekphrasis provided a method to elucidate information through the act of making a description of material in *The Archive*, but crucially a method that acknowledges of personal interpretation and acknowledges the contingency of interpretation as described by Steiner.²¹⁴

In Phase 1 ekphrasis was employed to evidence my own understanding of material from *The Archive*. This can be seen in outputs such as *Fantasies of Making* (Appendix 2). In Phase 2 ekphrasis was used to produce two texts that were based upon the feedback from groups of students. This can be seen in works such as *Plasticine, ekphrasis and imagined making* (page 185) and *Delineating an understanding* (page 225).

²¹³ Marjorie Munsterberg, *Writing About Art*,
<<http://writingaboutart.org/pages/ekphrasis.html> > [accessed 16 February 2012].

²¹⁴ This discussion of the contingent nature of interpretation is extended in Chapter 4 through the examination of Susan Sontag's discussion of the fantasy inherent in interpretation and Roland Barthes fore-fronting his own experience of the photograph through a voice of 'élan'.

3.4 Phase 2: Generating evidence through provocation

This section describes the methods of Phase 2 of the research where groups of students were enrolled to explore how artefacts from *The Archive* are understood, in order to gain an understanding beyond my own position. The material generated through these projects was incorporated into two new artworks: *Plasticine Diderot* and *Delineating an Understanding*. Although the specific methods of the two projects are discussed in detail in Chapter 4 this section reviews a number of artworks and theories that informed the development of these two projects.

This subchapter consists of three sections: 3.4.1 explores how an artwork can be used to both provoke and record the viewer's response to material from *The Archive*, 3.4.2 briefly outlines the nature of the two projects made in Phase 2, 3.4.3 reviews a number of similar projects in order to explore the ethical considerations that have been made when working with the students.

3.4.1 Provocation and loss / provocation and recording

A major catalyst for the development from Phase 1 into Phase 2 was the evaluation made in my Confirmation of PhD stage of the artworks produced in the early period of the research. This identified that whilst these artworks encouraged the viewer's interpretation of the material they were encountering, I had no way of accessing and therefore understanding their response.²¹⁵ In effect there was a gap between the provocation of the artwork

²¹⁵ Although Gray and Malins model suggest the importance of the presentation of the artwork (stage 5), as a way to create feedback through 'critical discussion' (stage 6), there is not guarantee of feedback, nor do they suggest ways in which feed back might be recorded.

and the viewer's response, which meant that I was unable to understand how others interpreted this material.

This gap between provocation and response can be seen in the artworks of a number of contemporary artists. Simon Martin, for example, is an artist who is particularly relevant in the early stages of this research. Martin's work provides an example of a practice that directly explores both objective and subjective understandings of the object, through combined film and audio narratives.²¹⁶

Tom Morton describes Martin's practice as 'preoccupied with what – and perhaps more importantly how – things mean.'²¹⁷ Morton describes the affect of Martin's artwork upon the viewer, but in doing so highlights the potential problems of this form of work for practice led research:

Martin does not provide any answers, and perhaps that's the point. The very act of provoking questions reveals the complexity of our contemporary ways of seeing.²¹⁸

Morton describes how Martin's work functions as an open-ended provocation upon the viewer, where the function of the artwork is to raise questions, not to answer them. Martin's practice is just one example that begins to highlight

²¹⁶ Simon Martin's film, *Carlton* (2005) takes the form of a visual and audio description of a piece of Memphis furniture designed by Ettore Sottsass. It is the dual aspects of his film and the difference between the descriptions given by the visual and audio aspects, which allow Martin to explore the relation between object and its wider context. The film begins with the visual and audio description working in correlation. The piece of furniture is described visually through a series of close ups shots which show its surfaces, joints and materials, while the audio content, in the form of a voice-over provides a factual contextualisation of the object. Over the duration of the film, the visual aspect continues to carry out an objective examination of the object, however, the audio content becomes increasingly speculative and expansive.

²¹⁷ Lisa Le Feuvre and Tom Morton, *British Art Show 7 – In the Days of the Comet*, Hayward Publishing, London 2010, p. 106.

²¹⁸ Le Feuvre and Morton, *British Art Show 7 – In the Days of the Comet*, p. 106.

some of the differences between the objectives and methods of contemporary art and practice-based research.

In *Unstated contribution* Chris Rust highlights the existence of this problem in relation to practice-based research. Rust uses the term 'generative' to describe how an artwork produces an affect on the viewer – a provocation which makes them think or reflect differently.²¹⁹ However, Rust describes how this affect is not 'predictable and will have taken place "at a distance" in the understanding or imagination of the audience.'²²⁰ For Rust this raises a potential problem when the 'contribution to knowledge cannot be stated fully or precisely by the researcher.'²²¹ However, Rust suggests that the researcher needs to be aware of this affect and find ways to 'own it', without resorting to what he calls 'unnatural explicit scientific analysis.'²²²

Jeremy Deller's 2009 work, *It is what it is*, (Figure 47) where the audience's response to a provocation is recorded and subsequently becomes an explicit part of the art work, is a potential answer to Rust's concerns.

It is what it is - consists of the wreckage of a car destroyed in a suicide bombing in Iraq, which was taken on a road trip across America.²²³ Stopping

²¹⁹Chris Rust, *Unstated contribution: How Artistic Inquiry Can Inform Interdisciplinary Research*, *International Journal of Design* Vol.1 No.3 2007, p. 70-75. 'It is proposed that there can be valid research whose contribution to knowledge cannot be stated fully or precisely by the researcher. [...] some contributions are necessarily generative'.

²²⁰ Rust, *Unstated contribution: How Artistic Inquiry Can Inform Interdisciplinary Research*, p. 70.

²²¹ Rust, *Unstated contribution: How Artistic Inquiry Can Inform Interdisciplinary Research*, p. 75.

²²² Rust, *Unstated contribution: How Artistic Inquiry Can Inform Interdisciplinary Research*, p. 77. Rust states 'any researcher would be wise to attend to the consequences of their work. An artist may not predict the results of their contribution, but after the event they have the opportunity to inspect what has happened and own it.'

²²³ *It Is What It Is: Conversations about Iraq – Creative Time*. 'This particular car was destroyed in an attack on the crowded book market at Al-Mutanabbi street in central Baghdad on March 5, 2007. Thirty-eight people were killed and hundreds injured.'
<<http://creativetime.org/projects/it-is-what-it-is-conversations-about-iraq/>>

at cities along its route, the wreckage was presented in public spaces and became the catalyst for debate. Throughout its journey it was accompanied by Sergeant Jonathan Harvey (a veteran of the Iraq war), Esam Pasha (an Iraqi citizen) and Jeremy Deller.²²⁴ The car's dramatic change of context (Iraq to America), and the visibility of this previously invisible object functions as a provocation to ignite debate about the Iraq war. The resulting response of members of the public was documented as short video conversations, which were uploaded onto YouTube.²²⁵

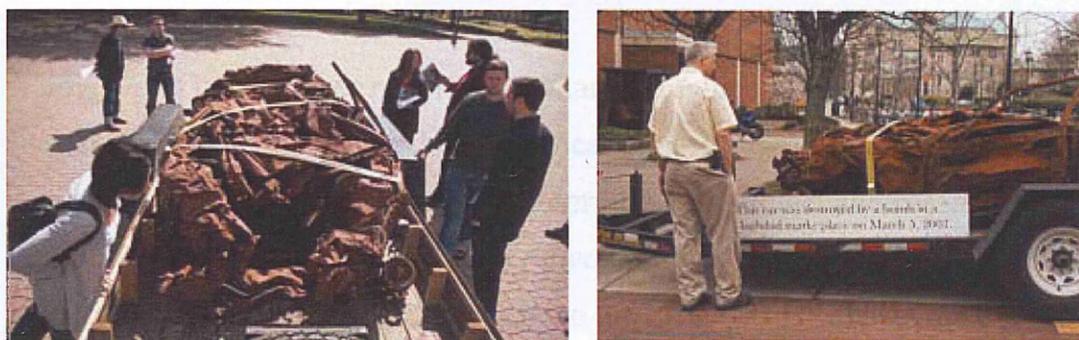


Figure 47: Jeremy Deller, *It is what it is*, (2009)

Deller's *It is what it is*, can be understood as part of a shift within contemporary art which offers a changed relationship between artwork and spectator. Claire Bishop uses the term 'participatory art' to describe this 'surge of artistic interest in participation and collaboration that has taken place since the early 1990s'. Bishop describes how in these works, the audience 'previously conceived as a "viewer" or "beholder", is now

[accessed 13 June 2013].

²²⁴ It Is What It Is: Conversations about Iraq – Creative Time.

<<http://creativetime.org/projects/it-is-what-it-is-conversations-about-iraq/>>

[accessed 13 June 2013].

²²⁵ Jeremy Deller, Projects, *It Is What It Is*, 2009. Video's that document members of the public expressing their reaction is available at

<<http://www.jeremydeller.org/ItIsWhatItIs/ItIsWhatItIs.php>> [accessed 22 May 2014].

repositioned as a co-producer or participant.'²²⁶ Similarly Grant Kester describes how through a 'dialogical' relationship the viewer can "speak back" to the artist in certain ways, and how this reply becomes in affect part of the work itself.'²²⁷ These methods which allow the viewer to 'speak back' are reflective of a much broader shift in research culture identified by Peter Reason and John Rowan in their 1981 discussion of New Paradigm research in which they describe research which works 'with people, rather than on people; working with people so that they might discover some truth about themselves.' Using the term New Paradigm research, they suggest this approach:

involves a much closer relationship than that which is usual between the researcher and the researched: significant knowledge of persons is generated primarily through reciprocal encounter between subject and researcher, for whom research is a mutual activity involving co-ownership and shared power with respect both to the process and to the product of the research.'²²⁸

In Phase 2, allowing the viewer to 'speak back' (Kester) and the ability of the artwork to both provoke and record (Deller), were used to gain rich feedback that revealed interpretations and understandings of the material in *The Archive* beyond my own position.

3.4.2 Generating evidence through provocation

My research project was undertaken through the post of *Teaching Researcher in Fine Art* at Sheffield Hallam University. This post involved teaching

²²⁶ Claire Bishop, *Artificial Hells – Participatory art and the politics of spectatorship*, London New York: Verso, 2012, p. 2.

²²⁷ Clare Doherty (ed.), *Contemporary Art - From Studio to Situation*, London: Black Dog Publishing, 2004, p. 12.

²²⁸ New Paradigm Research Manifesto, <http://www.peterreason.eu/Papers/New_Paradigm_Manifesto.pdf> [accessed 26 May 2014].

undergraduate students one day per week and undertaking my PhD research. The close relationship between teaching and research that the post afforded, allowed me to develop and conduct a number of projects with students in the Fine Art department. Although the specific methods of the two projects are discussed in detail in Chapter 4, pages 185 and 225, a brief overview of the projects is necessary at this stage:

- **Plasticine Diderot** involved the production of a new object which was deliberately marked by a visible trace of its making process. This object was shown to groups of students invited to make a close reading of the object.

To aid their close reading, the students were provided with five texts to prompt a response to the object. Working in small groups, the students were asked to use these prompts to speculate or extract the potential making process of the object and to describe its visual and material characteristics. The student's discourse was recorded and used as material to produce a short ekphrasis text. The text accompanied the object in an exhibition.

- **Delineating an understanding** presented students with a series of photographs from *The Archive* and asked them to trace particular aspects of the photograph in response to five questions. The tracings subsequently became the starting point for a discussion exploring what they identified and the 'difference' between how the photograph was seen or understood within the group. The tracings and transcript of this conversation formed the basis of the film (*Delineating an understanding*). The visual aspect of the film is constructed from forty-five tracings and the transcript was used as source for a new ekphrasis text which overlays and structures the film.

In some ways these projects can be understood as an extension of crit sessions, an established fine art teaching method for the discursive exploration of student's developing artworks. James Elkins describes the art crit as an 'activity that embraces analysing, inquiring, debating, finding fault and giving praise.'²²⁹ Within crits the visual aspects of the work and the interpretative understanding of both the tutor and participating students are explored. In my role as Teaching Researcher, I was facilitating / leading student crits on a weekly basis. The close proximity of teaching and research inherent in this role, afforded a natural crossover between using these discursive forums to examine student's work, and using this teaching method to examine material from *The Archive*.

This process was informed by discussions within educational literature of 'co-construction' that Rojas-Drummond et al. describe as a process through which 'knowledge and meanings are "co-constructed" as joint interactional accomplishments.'²³⁰ Rojas-Drummond et al. suggest that in this process 'meanings are negotiated through talk and other non-verbal cues indexing the creation of categories, which are embedded in the situated and dialogical nature of social action.'²³¹ In these sessions the students were involved in a process of dialogue and exchange where their contribution directly affected the development of the thinking of the session.

Whilst the crit formed the basic model for these projects there were also fundamental differences. First, crits are not usually recorded, however, in

²²⁹ James Elkins, *Why Art Cannot be Taught: a handbook for art students*, Urbana: University of Illinois Press, 2001, p. 112.

²³⁰ Sylvia Rojas-Drummond, Albarran, C. D and Karen Littleton, *Collaboration, creativity and the co-construction of oral and written texts*, 2008, *Thinking Skills and Creativity*, 3 (3), pp. 177-191.
<http://oro.open.ac.uk/12789/2/COLLABORATION_AND_CREATIVITY-_R-D_A_L_-TSC-_FINAL_VERSION_-04-08-08.pdf> [accessed 10 June 2015].

²³¹ Sylvia Rojas-Drummond, Albarran, C. D and Karen Littleton,
<http://oro.open.ac.uk/12789/2/COLLABORATION_AND_CREATIVITY-_R-D_A_L_-TSC-_FINAL_VERSION_-04-08-08.pdf> [accessed 10 June 2015].

these projects a conscious attempt was made to record this discursive process.²³² Acknowledging Rust's call for methods which are not 'unnatural explicit scientific analysis', the methods employed to 'record' the student's response included drawing, tracing, comparison and discussion; methods which were not 'foreign' to the students, but in fact close to their daily practice. The methods were developed as a way to make evident the student's individual understanding of the material they were encountering, by encouraging them to verbalise and visualise their thoughts.

Second, within in each project a specific set of questions and prompts were used to focus the discussion of the session. The questions and prompts were necessary for two reasons: First, because of the range of students involved (from first year to MA) the prompts and questions functioned to focus the discussion of the session. Second, because the projects took place within a limited teaching time (one and a half hours), the questions and prompts were designed to speed up the process. However, the potential impact of my selection of the questions and prompts is reflected upon in the conclusion (page 251).

3.4.3 Engaging the subjectivity of others

In their discussion of Situated Ethics, Helen Simons and Robin Usher describe how an ethical approach should be 'local and specific to particular practices.'²³³ They state:

²³² Elkins, *Why Art Cannot be Taught: a handbook for art students*, p.112.

²³³ Helen Simons and Robin Usher (eds.), *Situated Ethics in Educational Research*, London: Routledge Falmer, 2000, p. 2. 'Situated ethics is precisely that it is situated, and this implies that it is immune to universalization. A situated ethics is local and specific to particular practices.'

While ethics has traditionally been seen as a set of general principles invariably and validly applied to all situations, it will be argued that, on the contrary, ethical principles unmediated within different research practices and must take on different significances in relation to those practices.²³⁴

Simons and Usher's discussion of an ethical approach which is practice specific has been important in the development of the two projects conducted in Phase 2. The analysis of other artists projects which are 'local and specific' have been key to informing my own approach, particularly in regard to what ethical considerations need to be made when working with the students, and how can their input be credited.

Two artworks offer precedents for ethical relationships between artist and participant. These were selected because of a similarity to my own projects, where participants produce artefacts in response to parameters established by the artist. The first is Jeremy Deller's 1997 *The Uses of Literacy*, where Deller invited fans of the Manic Street Preachers to contribute 'material' for an exhibition and publication curated by Deller.²³⁵ The result was a collection of poems, drawings, paintings, photographs, objects and stories from fans of the Manic Street Preachers (Figure 48, top).²³⁶ The second Roman Ondák's 2007 *I'm only acting in it*, involved a process where members of the public were asked to draw Ondák based upon the verbal description of him provided by the curators of the exhibition in which the drawings were shown (Figure 48, bottom).

²³⁴ Simons and Usher (eds.), *Situated Ethics in Educational Research*, p. 1.

²³⁵ Jeremy Deller, *The Uses of Literacy*, London: Book Works, 1999. Deller asked for contributions through a flyer handed out at a Manic Street Preachers gig. The flyer's text said: 'Dear Friend / Fan, I'm currently collecting material for a Manics exhibition next year. If you are interested in taking part or you need more information please get in touch. Thanks Jeremy'.

²³⁶ Bookworks, THE USES OF LITERACY, Jeremy Deller, <<https://www.bookworks.org.uk/node/63>> [accessed 15 June 2015].

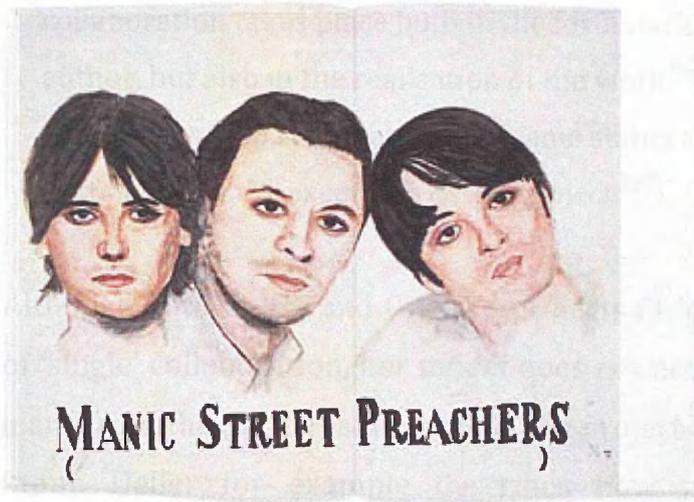


Figure 48: (top): Painting of the Manic Street Preachers by Sara Jayne, in Jeremy Deller's *The Uses of Literacy*, (1997); (bottom) Roman Ondák, *I'm only acting in it*, (2007)

Although these two projects have many differences in their conceptual ambition and context, both artists have instigated projects where artefacts made by participants are incorporated into an artwork, then authorised by the artist. These projects could be described as 'single' collaborations, a term used by Maria Lind to define the nature of the relationship between artist and participant. Lind states:

It is warranted here to distinguish between 'single' and 'double' collaboration. In the former, the author remains alone and others contribute towards realizing an idea that is already more or less formulated. In the latter,

collaboration takes place both in the formulation of the idea on the part of the author, but also in the realisation of the work. The idea is developed together with others who are awarded the same status as the author who also all participate in the execution of the project.²³⁷

Although both Deller and Ondak's projects fit loosely with Lind's description of 'single' collaboration, her model does not account for how the artist might learn from the participants, or how the project might shift as a result of their input. Deller for example describes how participants 'improve on or improvise' an idea in ways which surprise him.²³⁸ The curator Jessica Morgan points to an openness that can be seen in Ondák's practice when working with participants. She suggests that Ondák's projects create a 'space for the performer / producer to contribute a personal interpretation of his instructions', the result of which is the production of works which are a 'dense network of interpretations and communication between the artist, performer / producer and viewer.'²³⁹

Claire Bishop describes the process of working with participants with the term 'outsourcing authenticity'.²⁴⁰ She describes how in this process the artist 'both relinquishes and reclaims power', and in the process of finalizing the work returns to 'select, define and circulate its representation.'²⁴¹ This description leads to questions regarding ownership and how the input of the

²³⁷ Maria Lind, *The Collaborative Turn*, in Johanna Billing, Maria Lind, Lars Nilsson (eds.), *Taking the Matter into Common Hands: On Contemporary Art and Collaborative Practices*, Black Dog Publishing, 2007, pp. 15 – 31.

²³⁸ Doherty (ed.), *Contemporary Art - From Studio to Situation*, p. 94. Doherty quotes Jeremy Deller who states: 'I'm always interested in seeing what other people can bring to the work, how they can improve on or improvise with an idea. [...] The best moment is when you are surprised by what someone can do to your idea'.

²³⁹ Jessica Morgan and Catherine Wood, *The World as a stage*, London: Tate Publishing, 2007, pp. 58-59.

²⁴⁰ Bishop, *Artificial Hells – Participatory art and the politics of spectatorship*, p. 219.

²⁴¹ Bishop, *Artificial Hells – Participatory art and the politics of spectatorship*, p. 239. Bishop describes making an artwork from a collaborative process as 'wrestling a work of art from this event'.

collaborators should be credited; questions which have been vital to the ethical approach of my projects in Phase 2. In Deller and Ondák's projects there are significant differences between how they credit the contribution of their participants. Within *The Uses of Literacy*, participants are credited in relation to their specific contribution (Figure 48, top).²⁴² In the publication this is done through an index that lists the title and name of the contributor – although in some cases only their first name.²⁴³ In contrast, although Ondák details the involvement of others within his work, the individual identity of the participants is not credited.²⁴⁴

By not revealing the identity of the participants, or detailing the interaction through which their contribution is made, Ondák oversimplifies the complexity of the relationship between artist and participant. Morgan makes reference to the 'dense network of interpretations' that occur in Ondák's work, however these are in fact largely hidden from the viewer. In contrast, in her collaboration with dementia patient Michael Gill, the artist Becky Shaw reflects upon the problematic questions of ownership that emerge through such collaborations. In her text, *Twelve Museums*, Shaw states:

The relationship between artist and collaborator remains. Did I shape or create Michael's material? Is this work a joint communication or a work that I made about Michael with his input? These questions remain open, though it is also interesting to assess the worth of the questions themselves.²⁴⁵

Shaw's text reveals the complexities of collaboration highlighting the discursive nature of this process, which in Ondák's work remains hidden. Her

²⁴² Jeremy Deller website,

<<http://www.jeremydeller.org/TheUsesOfLiteracy/TheUsesOfLiteracy.php>> [accessed 22 May 2014].

²⁴³ This omission was presumably by their choice – although this is not stated.

²⁴⁴ For example, in *Passage*, a work by Ondák from 2004 in which 500 Japanese steel workers produce small sculptures made of the tin foil wrappers of chocolate bars.

< <http://www.cca-kitakyushu.org/english/voices/#ondak> > [accessed 22 May 2014].

²⁴⁵ Doherty (ed.), *Contemporary Art - From Studio to Situation*, p. 174.

reflection upon the nature of collaboration and speculation upon the ownership of the end artwork has been important to the development of how the discourse gathered through my projects is incorporated into the two artworks produced. Within these works I allow the multiple voices and contradiction to remain distinct in order to evidence the discursive process in which the students were involved.

3.4.4 My own approach

In keeping with Simons and Usher's discussion of an ethical approach that is practice specific, the reflection upon projects by Deller, Ondák and Shaw informed the development of my own approach to working with others.

Unlike Ondák who does not credit his contributors, it was important to acknowledge the students involved in my projects, both as a way to thank them for their contribution, but also to make visible the process through which their contribution was gathered. However, Deller's direct crediting of the artists/ fans who contributed to his *The Uses of Literacy* seems unnecessary. Unlike Deller's project, the students involved in my projects were not contributing their own work but were responding to a framework that I established. When the final works were exhibited, although the student's feedback and drawings contained nothing personal or exposing, the decision was taken to thank all the participants for their contribution (in alphabetical order), but not to directly link their contribution with their name. Equally, where contributions from specific students are discussed within the thesis I do not name the specific student, but use a labeling system that upholds their anonymity.

In addition to the consideration of how to credit the participants, in advance of each session, students were briefed about the process to which they were

contributing. At the beginning of each session this information was reiterated and informed consent was sought to make an audio recording.

3.5 Method summary

Although *The Archive of Manufacture* developed out of my own practice, two processes formed important methods to expand its content and decentralise my relationship to it. This included: incorporating examples suggested by others and processes of contextualising pre-existing material in order to more fully understand examples that were incorporated into *The Archive* from my pre-existing collections. As a result, *The Archive* incorporated a much broader range of material and unexpected themes. *The Archive* is not segmented by professional concerns, but is reflective of the more open and holistic influx of information that contributes to an understanding of making process. Also, by including examples that I was not able to access, *The Archive* recognises processes and circumstances that restrict visibility. The initial analysis of *The Archive* as described on page 102, informed the structure of Chapter 2.

The Archive contains a breadth of material including objects, images and film. Steiner's description of close reading as a method of visual analysis that responds to the singularity of the object or image encountered provides a method for responding to this diversity and acknowledges the particular character of individual examples. Steiner's method of close reading as a 'meticulous visual analysis' has been expanded through this research to include material and visual processes from art practice, and the written form of ekphrasis. These methods functioned as a critical form of looking to explore how examples from *The Archive* communicate process and how these examples are understood.

Ekphrasis provided a method of elucidating information from *The Archive* through description. Crucially ekphrasis acknowledges the personal nature of interpretation, combining information that is physically present with speculative or imagined responses. Although in the discussion above, material and visual processes and ekphrasis as a written form are presented in separate sections, they are not so different. Both are processes of identifying and extracting visual information. In fact art making when responding to a 'source', involves a similar process of identification and extraction. This can be seen in Starling's investigation of Frank's fabric through material based methods.

The analysis of the material within *The Archive* has occurred through two distinct periods. These were developed firstly to utilise my own knowledge and relationship with the material, and in Phase 2 to decentralise it. In Phase 1, a dialogue and interchange between different activities (including drawing, making, writing), functioned to drive the research forward, generating new insights, experimentation and new artworks. Within the development of these works source material moved across the investigation – often collaged into a number of different works. Within this process my own understanding of the material was central.

By working with groups of students in Phase 2, I was able to broaden my own understanding of the material in *The Archive* by observing how others interpreted it. A method from art education (the crit), was combined with methods from art practice of provoking and recording the responses of participants. Reflecting Rust's call for art-based researchers to avoid 'unnatural scientific methods', creative methods that were familiar to the students (drawing, tracing, comparison, discussion) were employed in order to capture individual students' understanding of the material they were encountering. The final works aimed to reflect the discursive nature of the sessions by allowing the multiple voices and contradictions of the students' interpretation to remain evident.

In this phase, I informed my own ethical approach to working with the student participants by reviewing a number of contemporary art projects that employ similar methods. This led to the decision to acknowledge the students' contribution by naming them as a group, but not to link their names directly to their contribution.

2.1 Introduction

The Chapter introduces a diverse array of the artworks produced during the research period. These were made in response to the research question – What is understood? Through the production of and reflection upon the artworks, this chapter extends the discussion made at the end of Chapter 2 (page 91) where the limitations of the material within *The Archive* were identified. The artworks aim to introduce specific examples in *The Archive* and explore the contingency of these fragmentary or partial descriptions of process and the speculative and contingent understanding of process that result.

Chapter 4

Four key principles that describe how process is understood

During the research period 31 artworks, 16 videos, 16 performances, 16 exhibitions, 7 exhibitions and 8 papers / presentations (Appendix 3). These were produced through two distinct phases: Phase 1 where my own understanding of process broadened my understanding of material in *The Archive* by observing how student participants interpreted it –

While not every output is discussed in this chapter, it is important to note that it is through the production of the entire body of work that the ideas discussed have been generated. Where artworks are numbered, in order to situate them in sequence in which they were developed and to denote whether they were produced in Phase 1 or Phase 2 of the research. The artworks discussed are presented either on the enclosed DVD, which contains six films, or presented as one of three pullouts contained in this chapter.

This chapter is written as a series of subchapters. The first conducts an in-depth description of the historical production process of a design class. With a focus on the historical production process, the product of the design class is *The Archive* as a historical record of the

4.1 Introduction

This Chapter forefronts a discussion of the artworks produced in the research period. These were made in response to the research question - What is Understood? Through the production of and reflection upon the artworks, this chapter extends the discussion made at the end of Chapter 2 (page 91) where five limitations of the material within *The Archive* were identified. The artworks aim to interrogate specific examples in *The Archive* and explore the contingency of these fragmentary or partial descriptions of process and the speculative and contingent understanding of process that result.

During the research period 31 outputs have been produced, including 16 artworks, 7 exhibitions and 8 papers/ presentations (Appendix 3). These were produced through two distinct phases: Phase 1 where my own interpretation of the material in *The Archive* was central and Phase 2, where I broadened my understanding of material in *The Archive* by observing how student participants interpreted it.

While not every output is discussed in this chapter, it is important to state that it is through the production of the entire body of work, that the ideas discussed have been generated. Where specific outputs are discussed, they are numbered, in order to situate them in sequence in which they were developed and to denote whether they were produced in Phase 1 or Phase 2 of the research. The artworks discussed are presented either on the enclosed DVD, which contains six films, or presented as one of three 'pullouts' contained in this chapter.

This chapter is composed of four subchapters. The first conducts an in-depth description of the making process of Crown Glass, the historical production process of window glass. Within the research *The Crown Glass Object* – the product of this making process, has functioned as a 'founding object',

exemplifying many of the concerns of the research.²⁴⁶ Its analysis has taken place concurrently to the production of the artworks and through this process four key principles have been developed.

Initially introduced through the example of the Crown Glass Object, the four principles are subsequently developed and expanded through the discussion of the artworks. Over the course of the chapter, the four principles are developed from their specific relation to the Crown Glass Object, to general principles. These describe how process becomes visible and how it is understood and can be seen to affect many examples within *The Archive*.²⁴⁷

²⁴⁶ The idea of the founding object comes from museum collections where the initial collection of perhaps an individual, has informed the subsequent collection and philosophy of the museum in which it is housed. For example, in 1884 Lieutenant-General Augustus Henry Lane Fox Pitt Rivers gave his own collection of 20,000 objects to the University of Oxford. Pitt Rivers had organised his collection in 'typological series' and after his gift the University continued to use this form of categorization to organize its expanding collection that now contains a quarter of a million objects. Pitt Rivers Museum – *The founding collection of the Pitt Rivers Museum*, <<http://www.prm.ox.ac.uk/pittriver.html>> [accessed 21 November 2012].

²⁴⁷ It is important to stress that the 4 key principles were developed over the course of the research both through making artworks and reflecting / analysing examples from *The Archive* – including the Crown Glass Object. Equally, the artworks were not made to 'illustrate' the four concepts. Many of the works also are relevant to more than one of the four concepts.

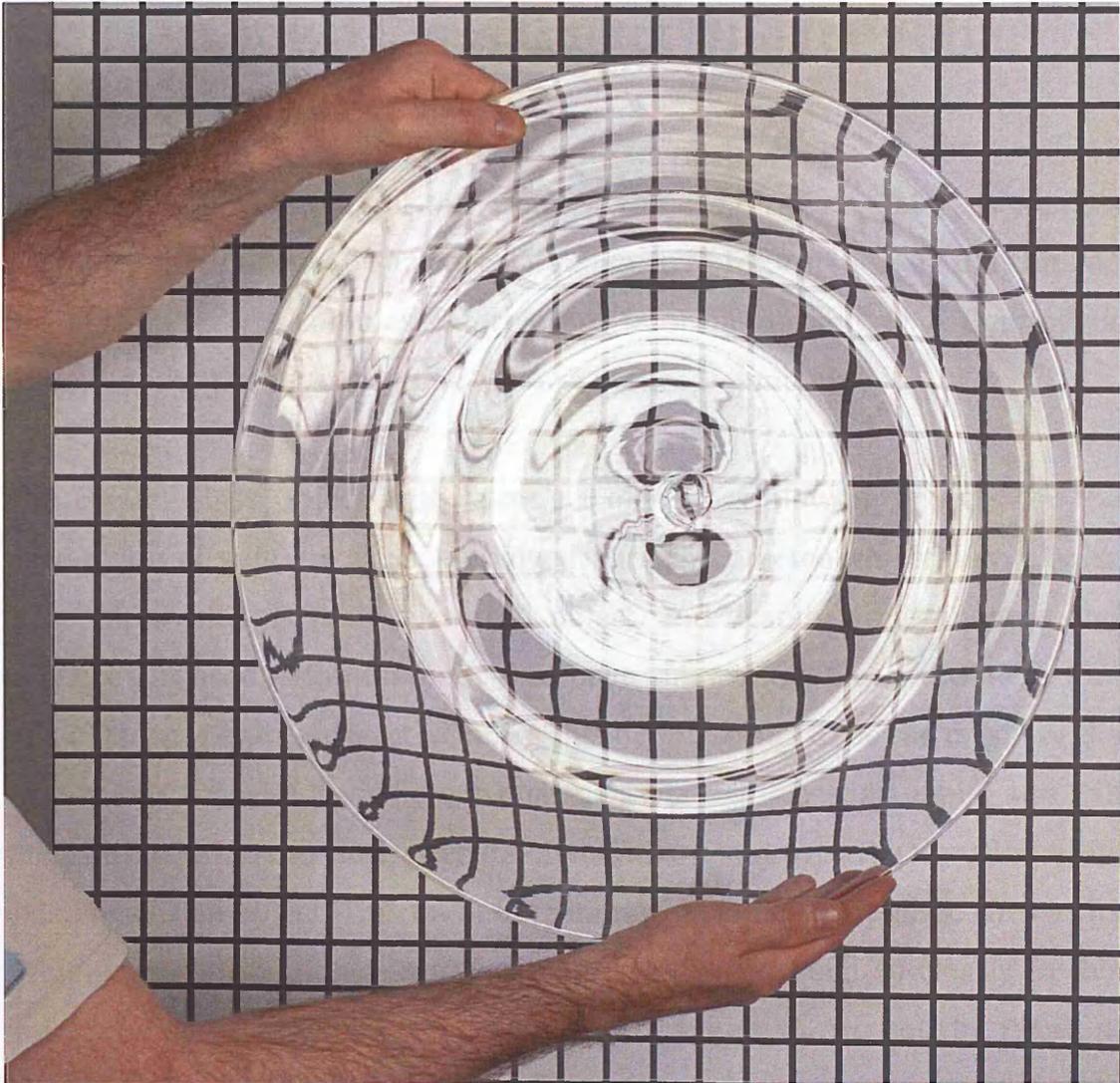


Figure 49: The Crown Glass Object. Photograph: Dave Ball, (2015)

The following text describes the Crown Glass Object's making process as a trajectory of discrete and sequential events, in which several points of juncture separate the finished windowpane from its making process. Over the course of this making process, a number of points of visibility are produced which describe aspects of the object's making process. However, as the text below explores, the incomplete nature of these points plays a large part in the misremembered order of making of the object that results.

4.2 Making as Unmaking

4.2 The Crown Glass Object (the founding object)

Located at the beginning of this chapter, the Crown Glass Object is used to introduce the four key principles: 1) Juncture, 2) Information In and Outside the object, 3) The complex Interplay of information and 4) A Contingent Understanding - and to examine the first of these – juncture.

The Crown Glass Object is the product of a glass blowing process for the production of window glass, employed until the nineteenth century (Figure 49). Although this is an historical object, and despite great changes and advances in production methods that have since taken place, the ideas that this object generates are active now. This object seems to be the origin of the widespread myth of glass flow, which suggests that glass is a liquid and will therefore continue to flow after its manufacture and over the duration of its existence as an object. This myth of metamorphosis, or instability, cites as its evidence the distortion and unevenness that can be seen so clearly in this object. However, the distortions that inspire the myth are not the result of glass flow, but are the visible signs of process that remain discernable in the object.

The following text describes the Crown Glass Object's making process as a trajectory of discreet and sequential events, in which several points of juncture separate the finished windowpane from its making process. Over the course of this making process, a number of points of visibility are produced which describe aspects of the object's making process. However, as the text below explores, the incomplete nature of these plays a large part in the misconstrued understanding of the object that results.

4.2.1 Making as trajectory

The making process of Crown Glass involved the blowing of a sphere (Figure 50, stages 1 + 2), which was transferred from blowing iron to '*puntil*' iron (stage 3), a stage in the process which makes accessible to the glass blower the open end of the sphere. This opening was then heated (stage 4) and the sphere spun, using centrifugal force to 'throw' the glass into a flat disk of up to five feet in diameter (stage 5).

Post glass-blowing process, the final glass disk carries a number of traces of its making process that characterise its appearance (Figure 49). On the disk's surface, a number of concentric ripples are a record of the stages of the process of coaxing the glass from sphere to flat sheet. A mark at the centre of the disk is caused when the puntil iron is detached from the glass, a process which chips and scars its surface.²⁴⁸ Finally, and most importantly for this discussion, when the disk is cut to produce windowpanes, the disks' cross-section is revealed to be uneven. Examining the disk's cross-section there is a discernable change of thickness, the glass being thickest at the disk's centre and becoming thinner towards its edges, as well as a number of ripples across the width of this cross section (Figure 52). This characteristic results from the way in which the sphere is inflated and subsequently unfolded to form a flat sheet (Figure 51).²⁴⁹

When cold, the glass disk moves to a secondary phase of processing, where it is marked and then cut into sections to be used as windowpanes (Figure 53). At this stage, the division of the glass disk into square windowpanes is a process that splits the whole into parts. This is a stage in which the disk disappears and its qualities are abstracted. Unable to extract square sheets from every part of the round disk, waste is produced, sections such as the edges of the disk are removed and disposed of (seen as grey cross hatched areas in Figure 53). As a result, while each square sheet of glass contains

²⁴⁸ A mark commonly referred to as a 'bulls eye'.

²⁴⁹ David Martlew, *History and Development of Glass, in Windows, History, Repair and Conservation*, Michael Tutton and Elizabeth Hirst (eds.), Shaftsbury: Donhead Publishing, 2007, pp. 131-139.

characteristics of the glass blowing process (such as the concentric circular ripples, or the uneven cross-section) these characteristics are separated from their context within the disk; a movement in which they are conceptually relocated and reframed. In this way, the final panes of glass are fragments of a larger landscape of information.

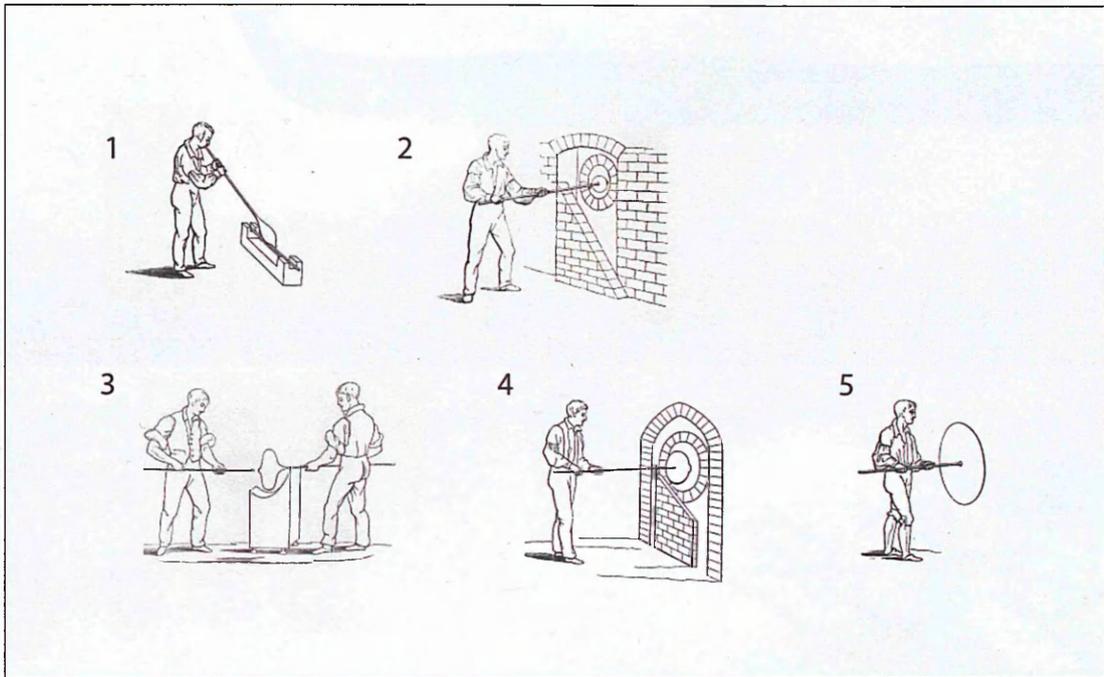


Figure 50: Five stages of blowing Crown Glass, from: *The Crown Glass Cutter and Glazier's Manual*, William Cooper, (1835)

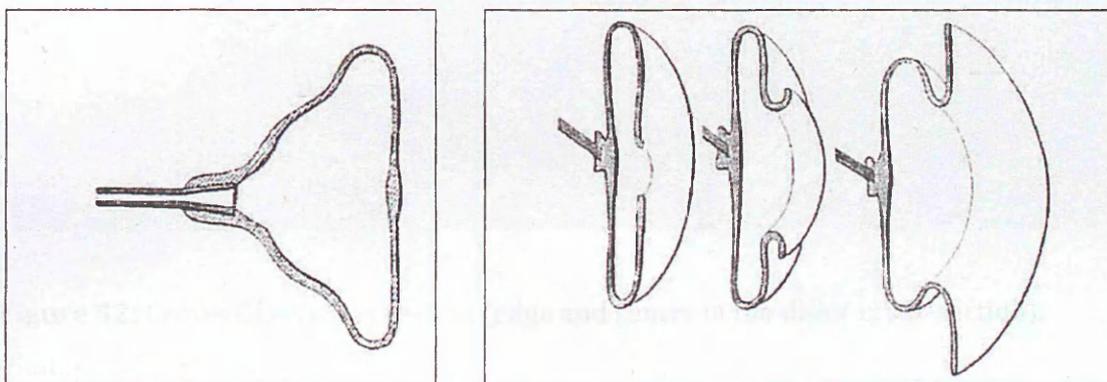


Figure 51: (left) flattening the bottom; (right) Final evolution of the disk, Henry Deacon, (1851)

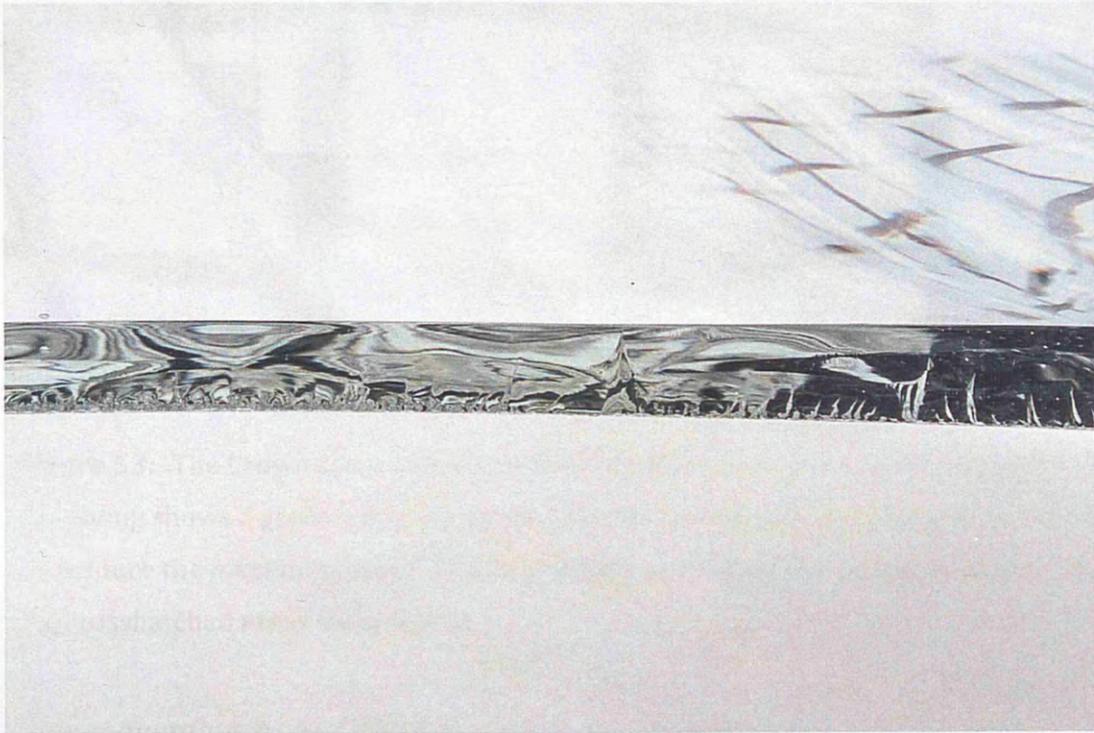


Figure 52: Crown Glass cross section (edge and centre of the disks' cross-section).
Photographs: Marcus Sarko, (2015)

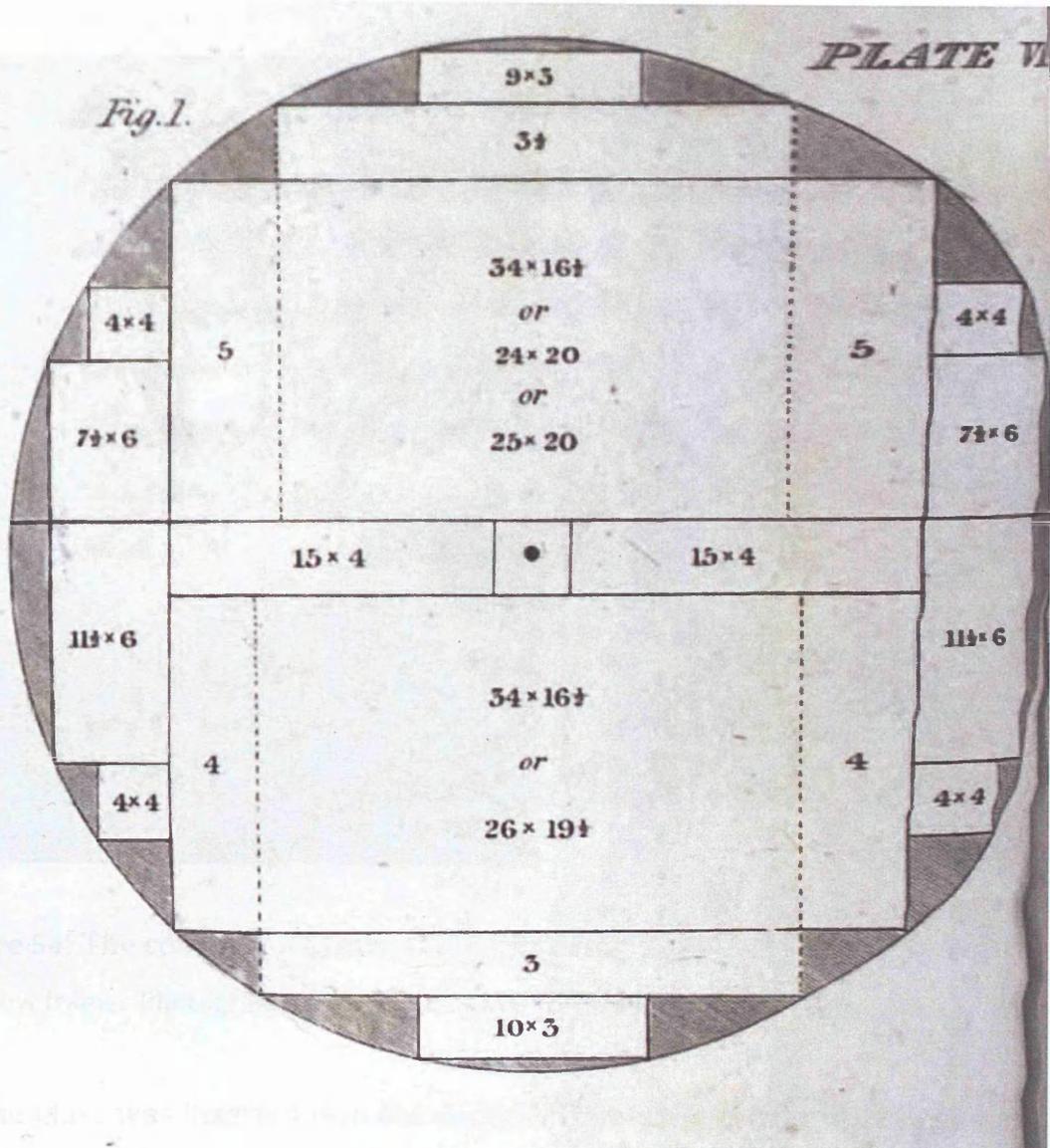


Figure 53: The Crown Glass Cutter and Glazier's Manual, William Cooper, (1835). This engraving shows a glass disk of 50 inches. The measurements show how this can be cut to produce the maximum usage. The largest panes produced are 34 x 16.5 inches and the crosshatched areas show waste.

This movement from disk to square, from whole to part, is followed by a shift in the object's status as it is inserted into the window frame. Once in the window frame, the glass pane can no longer be held and its uneven cross-section becomes hidden. The glass is now looked through, rather than looked at. The only sign of its three dimensional form are the optical effects which magnify and distort views through the glass (Figure 54).

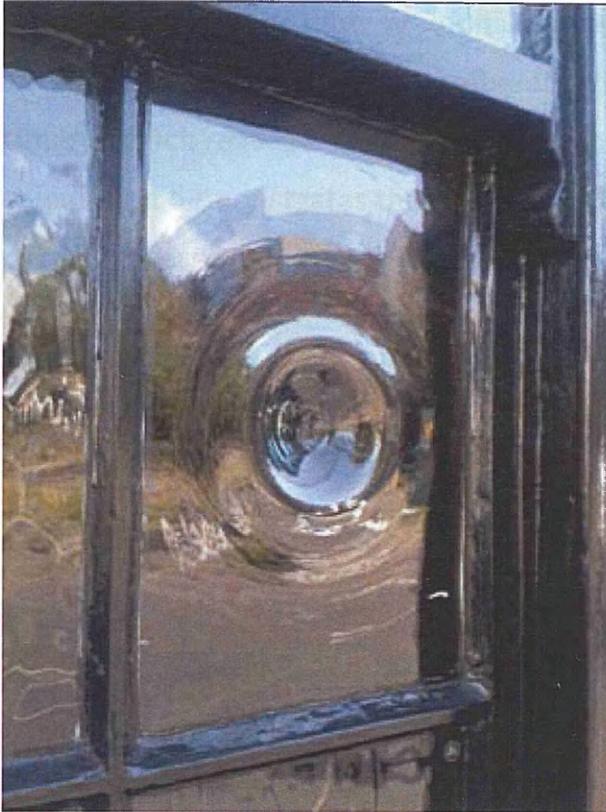


Figure 54: The centre of a Crown Glass Object, or 'bull's eye' inserted into a window frame. Photograph: Jerome Harrington, (2012)

As the glass was inserted into the window frame, the glazier usually makes a practical decision, to place the thicker edge of the uneven cross section at the bottom of the frame and the thinner section towards the top, thereby increasing the stability of the newly inserted windowpane. This decision takes on significance only much later in this object's story, when the glass is removed from the window frame. At this point, the object's true form becomes visible, its uneven cross-section is re-revealed, but now as a new insight. The edge is no longer seen as evidence of the object's making process, but evidence for the myth of glass flow. The myth explains the varying thickness of the windowpane by suggesting that the glass has been affected by gravity, flowing over time and becoming thicker at the bottom than at its top.

The glass scientist Edgar Dutra Zanotto has investigated whether it is possible for glass to flow at room temperature. His research concluded that 'window glasses may flow at ambient temperature only over incredibly long times, which exceed the limits of human history.'²⁵⁰ In fact, Zanotto's calculation demonstrates that significant flow would take well beyond the age of the Universe.



Figure 55: How do they do it? Discovery Channel, (2006)

Despite being categorically disproved, the myth of glass flow continues to prevail and invades a contemporary understanding of glass and its making processes. A recent example that demonstrates the continuing prevalence of

²⁵⁰ Edgar Dutra Zanotto, *Do Cathedral Glasses Flow?*, 1998, pp. 392–395, <<http://www.df.unipi.it/~leporini/DFWebSite/ReviewsTg/CathedralGlasses.pdf>> [accessed 21 June 2010]. The myth of glass flow is categorically disproved by glass materials engineer Edgar Dutra Zanotto, who investigated whether it is possible for glass to flow at room temperature. His research concluded that 'window glasses may flow at ambient temperature only over incredibly long times, which exceed the limits of human history.' In fact Dutra Zanotto's calculation demonstrates that significant flow would take well beyond the age of the Universe. Dr. Robert Brill a research scientist at Corning Museum of Glass also discusses the myth of glass flow. Corning Museum of Glass - *All about Glass*, <<http://www.cmog.org/article/does-glass-flow#.UK1W8mDp7gl>> [accessed 23 November 2012].

the myth is from the popular science program *How Do They Do It?* - a programme which aims to clarify how things are made. The programme aims to explain the production processes of glass, using the Pilkington factory in St. Helens as its case study. In the film, a Pilkington operative stands in front of a Float glass production line, the contemporary production process for making window glass (Figure 55). He states:

Glass is classed as a super-cooled liquid, that in as much as it's never in a completely stable form, if you put it in your windows in twenty years time it will be slightly thicker at the bottom than when it was installed.²⁵¹

In the context of a popular science programme, the myth of glass flow is presented as fact. In this example, there is an interplay between an idea (the myth of glass flow) generated by a historical making processes (Crown Glass) and an industrial produced material Float Glass.²⁵² This interplay, which in this example demonstrates a relationship between historical and contemporary production processes, is further explored in Section 3 of this chapter.

4.2.2 Juncture - The separation of process and product

The making process of the Crown Glass Object as a trajectory of sequential events is visualised in Figure 56A. This diagram describes the object's making process as a series of events that are situated in time, where one follows another. This sequence begins with: (1) the initial glass blowing process, (2) the finished disk, (3) secondary processing where the disk is marked and cut up into square window panes, (4) the installation of a section of the disk as windowpane, (5) its removal from the window frame and the

²⁵¹ How Do They Do It?, Discovery Channel, 25 June 2006.

²⁵² In the example of the Crown Glass Object, both the object itself and its depiction in Diderot are both historical forms, however both are in circulation in the contemporary context and form important points of reference about this object and its making process.

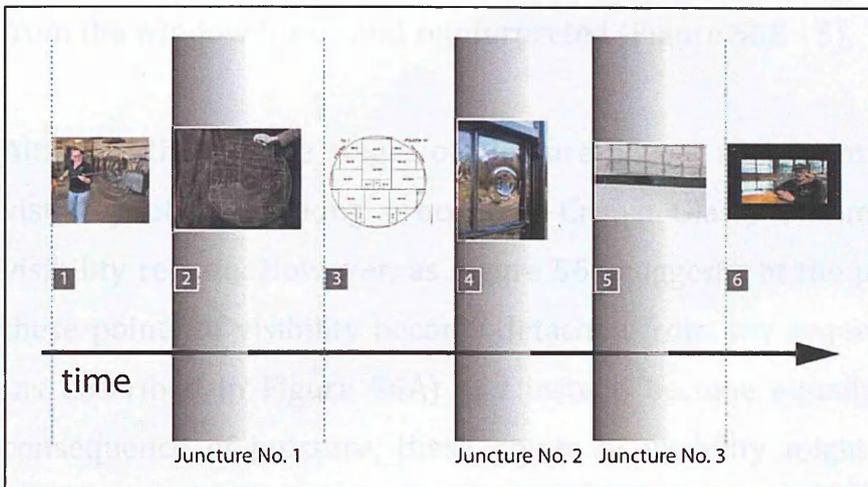
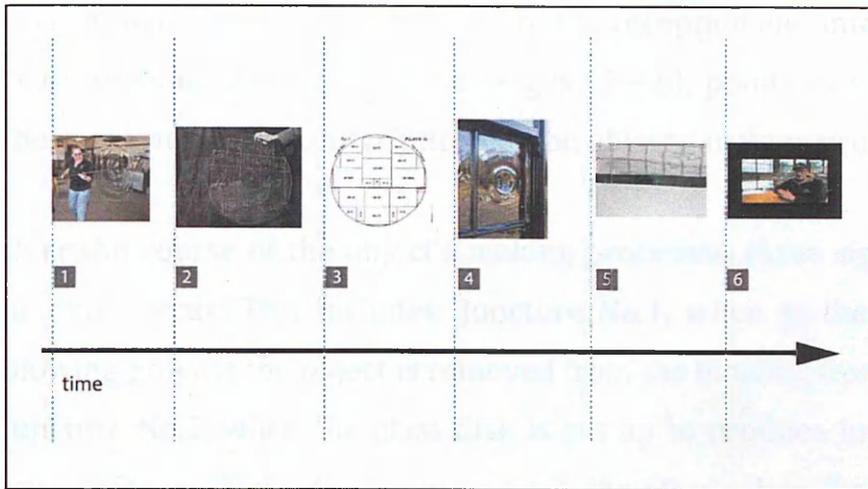


Figure 56: Juncture and understanding: (top) 56A: The object's making process as a trajectory of sequential events. (middle) 56B: three significant stages of juncture (2), (4) and (5). (bottom) 56C: The visibility of the object's making process after juncture (at point of reception). Diagram: Jerome Harrington

revelation of its cross section, and (6) the reception and interpretation of this cross section. At each of these stages (1 - 6), points of visibility form and these provide partial descriptions of the objects' making process.

Over the course of the object's making processes, three significant stages of juncture occur. This includes: Juncture No.1, when at the end of the glass blowing process the object is removed from the blowing iron (Figure 56B - 2). Juncture No.2, when the glass disk is cut up to produce individual window-panes (Figure 56B - 4). Juncture No.3, the stage when the glass is removed from the window frame and reinterpreted (Figure 56B - 5).

Although these three stages of juncture have a significant impact upon the visibility of the making process of Crown Glass, a number of points of visibility remain. However, as Figure 56C suggests, at the point of reception, these points of visibility become detached from any sequential relationship (as described in Figure 56A) and instead become equally available. As a consequence of juncture, these points of visibility might be 'read' in the wrong order, or one might dominate and become the main source of information about this object's making process. These ideas are further explored in Section 3 of this chapter.

Within the points of visibility that remains post-juncture, there are also contradictions in how they describe the making process of the Crown Glass Object. This is clearly seen in the differences between the object itself and engravings that depict its making process from *Diderot and d'Alembert's Encyclopédie*, which despite their historical nature are widely used as part of an explanation of the production of Crown Glass within popular sources (Figure 57). In these engravings the disk is described as having a uniform thickness and perfectly flat surface.²⁵³ In these engravings there is no

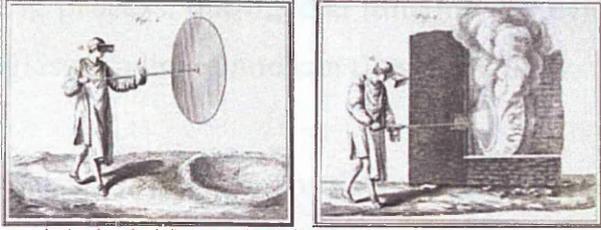
²⁵³ For example, a website discussing the window within Georgian architecture uses two of the eighteen engravings from this sequence to illustrate an explanation of how window glass was produced.

The Bevans Letters – Digital Archive, Georgian glass and its impact on window design,

evidence of the characteristics that result from its making process, which have subsequently inspired the myth of glass flow.

Georgian glass and its impact on window design

Throughout Georgian Britain, the predominant type of glass used to glaze domestic windows was Crown glass. This was manufactured by blowing, from a set-quantity of molten glass, a small globe of material and then spinning this, using a puntil or punty stick, into a large, thin, spherical disk, usually just over five feet in diameter. Two early representations of Crown manufacture are reproduced below.



Once manufactured, the thickness of the disk was greatest at the centre where the puntil stick was attached. The quantity of glass at this point and the imperfection caused as the puntil stick was broken off made the central section unsuitable for general use and it was usually either re-melted or used in low-end applications such as the glazing of stable and works areas. The nick-name bull's eye has come to be associated with this piece of glass and, today, fake bull's eyes are fabricated for use in theme pubs, etc. A photograph taken through a bull's eye pane is reproduced below.

Out of the remaining portion of the Crown sheet the glazier acquired the glass he would place into the main windows of a property. The geometry of the Crown sheet meant that pane size options were restricted. The glazier could cut very long, narrow, panes by selecting the area nearest the centre of the disk (panes of this shape were often required for margin-light work), or a set of more standard rectangular panes, if he did not sacrifice this part of the Crown disk.

As the panes that could be obtained from a Crown disk were far smaller than the average sash used in a window, a number of panes of glass were fitted into each sash, these being 'joined' together with glazing bars. Typically, a window might have 6 panes in the upper sash and 6 in the lower, making a so called '6 over 6'. Today, we call such multi-pane windows Georgian pattern, after the historical period during which they were the predominant type used. A picture showing such windows is reproduced below.



Crown glass has a unique visual quality, derived from its method of production, which makes it relatively easy to identify. The spinning of the glass globe into a disk resulted in a series of concentric rings radiating out across the sheet from around the puntil stick - these rings being a little akin to those formed when a stone is thrown into a pond. Once the Crown sheet has been cut into individual panes the rings appear as radial imperfections, usually one or two per sheet, these distort the image seen through a pane. These distortions are a sure marker of crown fabrication and quite unlike the more regular imperfections seen in other types of hand made glass, where the whole surface of a sheet takes on a dimpled appearance and there's a full pane optical distortion.

Figure 57: Georgian glass and its impact on window design (screen grab)

4.2.4 The founding of four key principles

The Crown Glass Object is placed at the beginning of this chapter to introduce the four key principles of the research. These are outlined below, initially in relation to the Crown Glass Object and secondly as general principles. Over the course of this chapter, these principles are elaborated and extended through the discussion of the artworks produced.

1 Juncture

<<http://bevan.rth.org.uk/explore/georgian-glass-and-its-impact-on-window-design>> [accessed 6 September 2012].

In the case of the Crown Glass Object, the separation of the object from its making process significantly effects how the visible evidence of the object's making process is read or understood. The Crown Glass Object demonstrates how juncture causes a perceptual shift in which the uneven cross-section is no longer understood as evidence of the object's making process, but instead functions as evidence to support the idea that glass is a liquid and can therefore flow.

As the Crown Glass Object demonstrates juncture occurs several times and at different stages during the object's making process (Figure 56B). However, juncture as a stage of disavowal does not equate with total invisibility of process – this research identifies two sites of information that remain after juncture: information in and outside the object.

As a general principle, juncture describes the separation of an object from the complexity of its making process – a point where process is discarded or divorced. It is important to emphasize that juncture effects every example within this research, both the examples in *The Archive* and within the artworks produced. For this reason, rather than having a discrete section on juncture, the discussion of juncture occurs throughout this chapter.

2 Information in and outside the object

The uneven cross section of the Crown Glass Object plays a vital role in the understanding of its making process. However, in addition to this trace of process in the object, a number of other sources, particularly images which depict the object and its making process form important points of information.

The Crown Glass Object demonstrates a situation in which an understanding of the object is constructed through a dialogue of

information, qualities of the object itself (information in the object) and external sources of information where the object is seen or described, for example the Diderot engravings (information outside the object).

Section 4.3 explores these two sites of information through which process is made visible post-juncture. 'Information in the object' refers to the visible or tangible effects of process upon material and 'Information outside the object' refers to images and film that offer glimpses of manufacturing process.

3 The complex interplay of information

The Crown Glass Object demonstrates how post juncture multiple sources of information become available and contribute to an understanding of process (Figure 56C). However, as described above there are significant differences between the evidence of making process in the object itself (the cross -section), and the way in which the glass disk is described by information outside the object - such as the Diderot engravings.

Section 4.4 explores how understanding is formed through the complex interplay of multiple sources of information. It explores how these sources of information (in and outside the object) relate and how their difference resolved at the point of reception.

4 A contingent understanding

The interpretation of the uneven cross-section of the Crown Glass Object is made both through myth (the Pilkington operative in *How Do They Do It?*) and scientific calculation (Zanotto). These divergent

perceptions of the object seem to be dependent upon levels of knowledge (the novice and the expert).²⁵⁴

Section 4.5 examines *Delineating an understanding*, a short animated film generated through a series of workshops with postgraduate fine art students, who were asked to isolate and identify key visual components of photographs from *The Archive*. The student's responses revealed the contingent and fluid process of interpretation that is dependent on personal experience, knowledge, expertise, and encounters with different sorts of information.

²⁵⁴ There are some similarities here with my uncle's perception of the broken wine glass. Although the specifics of my uncles' story are different, his comment closely relates to this idea of glass flow.

4.3 Information in and outside the object

The Archive contains over one hundred still images, including photographs and engravings, fifteen films and animations and two objects. Within *The Archive* the photograph is the main form through which process is made visible. In comparison, objects that have a visible trace of their making process, as in the case of the Crown Glass Object, are rare.²⁵⁵ Despite their infrequency objects have been no less important in informing the nature of this research. In the following two sections, both the image and object are explored as 'sites of knowledge' – sites where evidence of making process remains visible after juncture. 4.3.1 examines information outside the object and 4.3.2 information in the object.

In each section, an artwork is presented which explores either information in, or outside the object. In both instances the discussion of the artwork is paired with a review of key theory regarding the contingency of understanding of images and objects. Although the structure of the thesis suggests a linear relationship between these activities, it is important to stress that these works were made concurrently to the examination of the theoretical discussions and are the result of a generative interchange between these two activities.

4.3.1 Information outside the object

This section explores information outside the object through two sections:

4.3.1.1 presents *Untitled (Diderot)*, an artwork that interrogates the contingency of the image and factors influencing its construction. *Untitled (Diderot)* analyses an engraving from *The Archive* and identifies what is

²⁵⁵ In the majority of cases the visible trace of process is often removed through design and manufacture and therefore they have a limited representation in *The Archive*.

missing from this visual description of process, and the difference between the physical act of making and its representation. 4.3.1.2 discusses theories which forefront the contingency of interpretation and the singular nature of an individual's encounter with a photograph.

Although the photograph is the dominant form within *The Archive*, other types of images (such as engravings) function as important points of visibility. *Untitled (Diderot)* interrogates an engraving made in the 1750's to describe a contemporaneous glass making process and which still contributes to the understanding of this process as a historical document.

4.3.1.1 *Untitled (Diderot)*

Untitled (Diderot) [Artwork No.3] is a short film which examines the depiction of the Crown Glass production in *Diderot and d'Alembert's Encyclopédie* (DVD: Film No.1) It translates one of the engravings into a live tableaux in which the glass disk and the blowing iron have been re-made as a prop, with which an actor interacts as though the maker of the object. Through this live re-making, the original engraving was deconstructed and specific qualities extrapolated and examined. *Untitled (Diderot)*, critiques the way in which process is described by this engraving by examining two aspects: first, the visualisation of the object being produced and second, the depiction of its maker.

The object

The Crown Glass process is depicted in the *Encyclopedia* through a series of eighteen engraved plates. Each plate depicts one stage of the process and through the specific ordering of the engravings the development of this manufacturing process is described (Figure 59). In this sequence the sixteenth plate is significant because it appears to have a dual aim, describing

at once the process and the product (Figure 58 top). The engraving functions to describe a stage in the ongoing process, but the way that the glass disk is rendered, suggests qualities specific to its use beyond the workshop as windowpane. The previous fifteen engravings depict stages in which the glass is shaped and formed. These show nondescript forms, where the glass is being coaxed towards product. In comparison, the sixteenth plate depicts a moment of revelation, where amorphous form is transformed into flat and perfect material. This is the first instance in the sequence of engravings where the output of this process - window glass - becomes visible.

The methods used to render the glass disk seem to reinforce this juncture. The surface of the glass is depicted with a series of straight parallel lines which run from the top to the bottom, implying a uniform thickness and perfectly flat surface, and its edge has been drawn to look sharp and square (Figure 60). These qualities imply that the disk is now a sheet of glass, material ready to be set into a window. In *Untitled (Diderot)*, the glass disk was remade using printed-paper, glued onto a plywood disk. The graphic vertical lines aim to depict the glass disk in a manner similar to the original engraving.

The maker

As discussed on page 74, in *The Craftsman*, Richard Sennett identifies ways in which *Diderot and d'Alembert's* depictions of process are edited and composed. Sennett suggests that the engravings are highly edited to exclude the dirt, physical strain, or heat of making process.²⁵⁶ The resulting depiction communicates the maker in full control of the moment, composed and at ease.

²⁵⁶ Sennett, *The Craftsman*, p. 93.

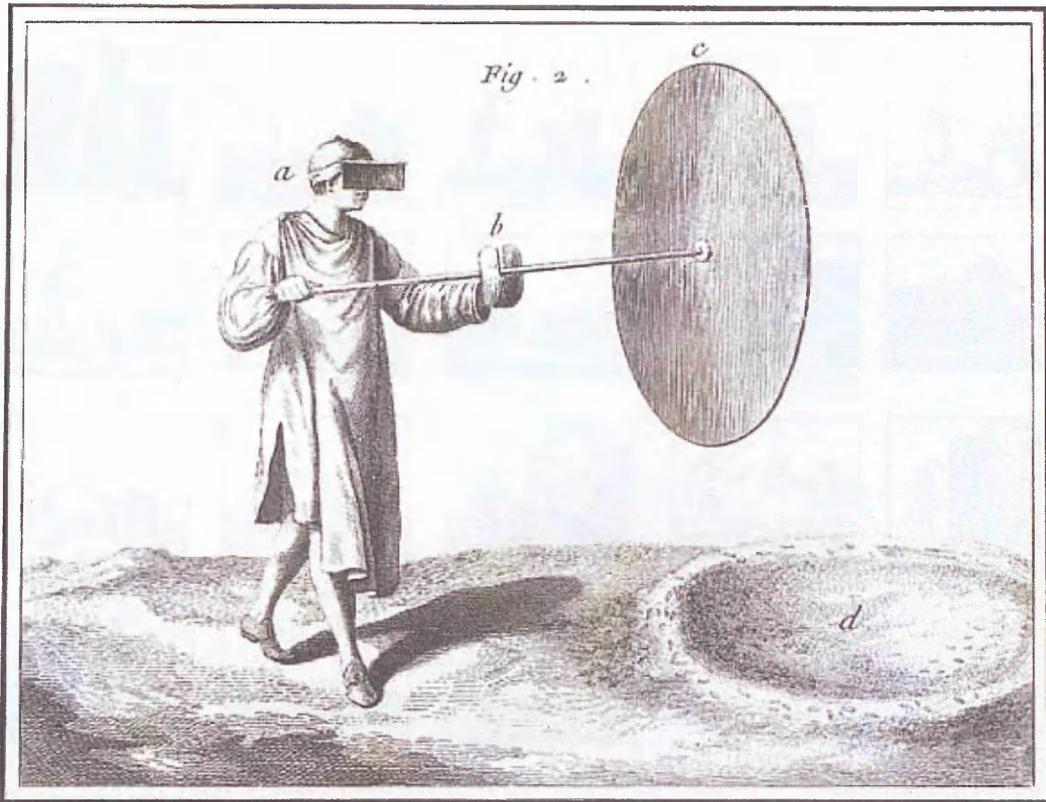


Figure 58: (top) *Diderot and d'Alembert's Encyclopédie*, Crown Glass, Volume X, Plate XV (1751); (bottom) Still from *Untitled (Diderot)* (2011)

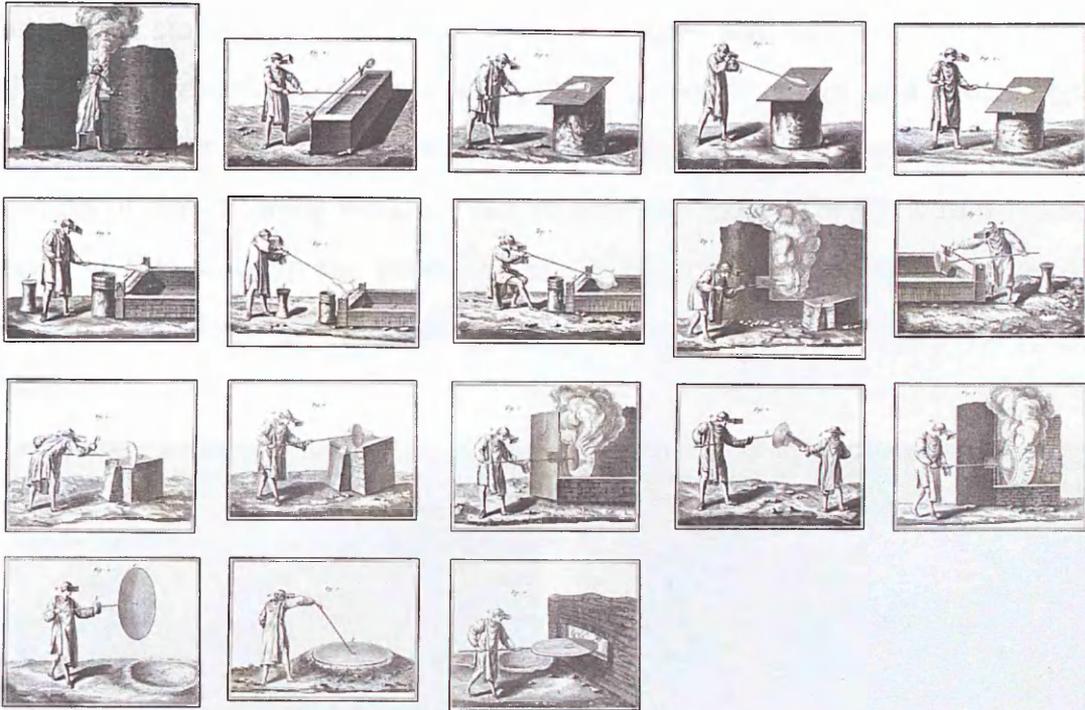


Figure 59: *Diderot and d'Alembert's Encyclopédie, Crown Glass, Volume X, Plate XV, (1751)*

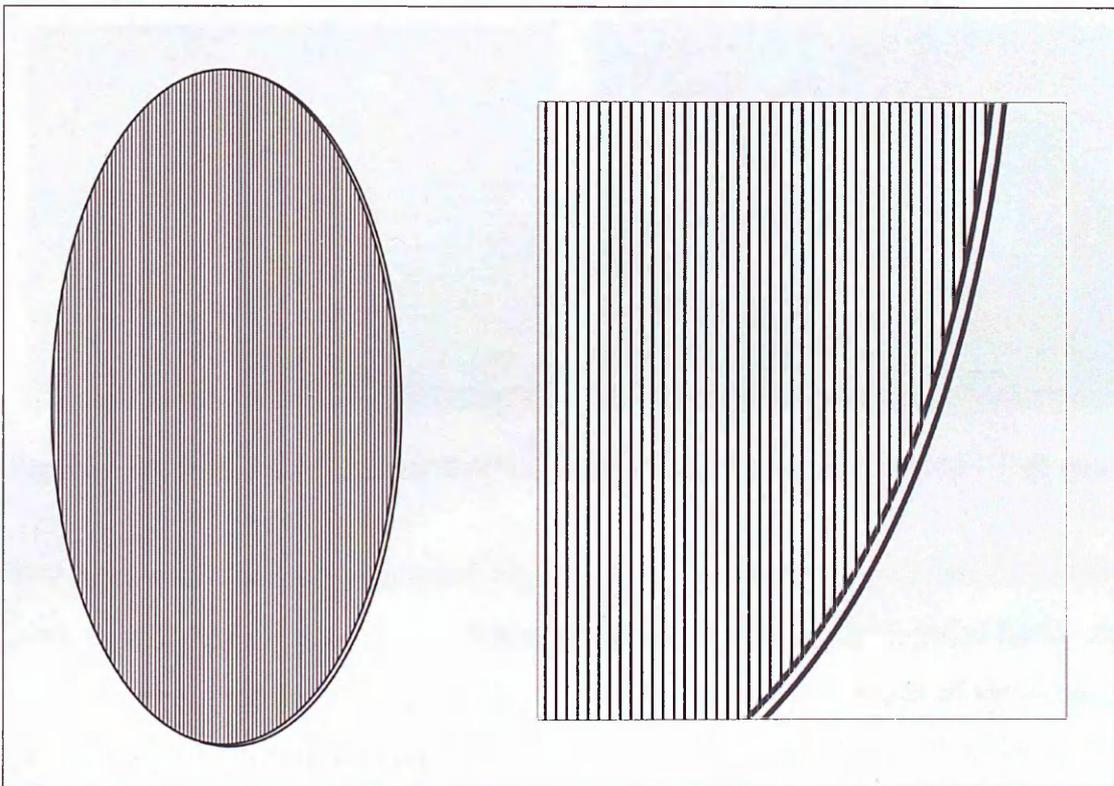


Figure 60: Re-drawing of the glass disk to overemphasise its depiction in the Diderot engraving. Drawing: Jerome Harrington (2011)

Untitled Diderot explores the depiction of the maker through three distinct stages. In stage one the maker holds but does not turn the blowing iron, allowing a graceful and static interaction between maker and prop (Figure 61A). In contrast, in stage two (Figure 61B), the maker rapidly rotates the handle of the blowing iron, an action that the glass blower would need to make at this stage in the process. As a result of the rotating force, the disk begins to wobble and the graphic image created by the vertical lines starts to blur.

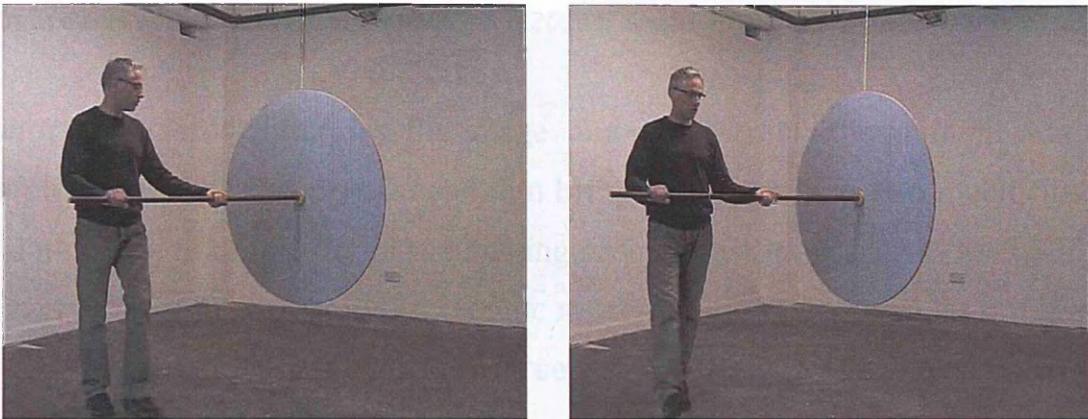


Figure 61A: Stills from *Untitled (Diderot)* (2011): Stage one (between 0:00 – 0:44 min)



Figure 61B: Stills from *Untitled (Diderot)* (2011): Stage two (between 0:44 – 1:40 min)

The plywood disk is suspended from the ceiling so that the maker interacts with it, with the 'serenity' that Sennett describes. However in stage three, the string is removed forcing the maker to carry the entire weight of the disk, as he also tries to rotate it (Figure 61C). For the first time in the film, the maker noticeably struggles, the position of his body changes to cope with reality of the object with which he is interacting.

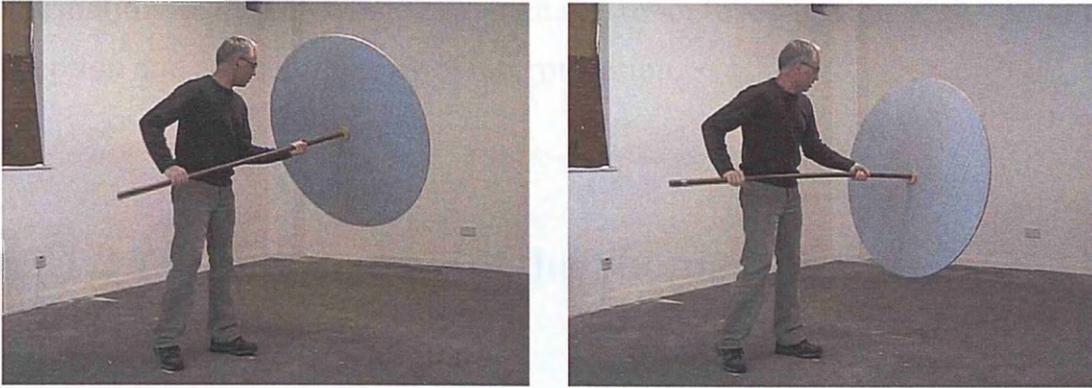


Figure 61C: Stills from *Untitled (Diderot)* (2011): Stage three (between 1:40 – 2:10 min)

Untitled (Diderot) 'occupies' the image and deconstructs the moment that it depicts. Through this process the film brings the engraving into much closer relationship to the reality of the making process that it describes. As the film progresses, it moves from the graphic representation of process as critiqued by Sennett, into stages two and three, where through the introduction of movement and strain upon the actor, the film visualises the physicality of process not reflected in the engravings.

While *Untitled (Diderot)* interrogates the constructed nature of the engraving, it also raises questions that go beyond the debates which link the visual description of process with the ideological agendas in which it was made (Sennett). The work raises a set of questions: Does the engraving intentionally set out to communicate material in this perfect form? Or is it the by-product of creating an understandable graphic representation within the limits of a particular medium? Equally, is the way in which process is visualised the result of the naivety its draftsman? If this were the case, it would suggest that a disconnection to manufacturing process is not just a contemporary phenomenon, and in keeping with Heartfield's discussion that commentators not directly involved in manufacture are the ones generating the social commentary about making (as discussed on page 30), *Diderot and d'Alembert's Encyclopédie* is the product of the stranger.

In the following section, the discussion moves from a consideration of the information inside the frame of the image, to an investigation of the point of reception and the contingency of interpretation.

4.3.1.2 The contingency of the photograph

David E. Nye's *Image Worlds* (also see Chapter 2, page 76) presents an extensive discussion of photographs depicting industrial production and has therefore been an important text in the development of this research. Nye's methodology is grounded in semiotics²⁵⁷, and makes an analysis of the photograph as an ideological construct, offering a political (Marxian) reading of the photograph by defining its relation to power. In his analysis of the photographs in the General Electric archive, Nye employs Roman Jakobson's division of any act of communication into six parts (Figure 62), stating that a communication between the Sender [1] and Receiver [2] requires a reliable contact [3], an understood context [4], a mutually understood code [5] and a message [6].²⁵⁸

²⁵⁷ Nye, *Image Worlds – Corporate Identities at General Electric*, pp. 46 -47. Nye's methodology is three-fold: firstly, he demonstrates a historical understanding of the development of industrial photography and how the changing technological 'ability' of the camera effects the possibilities of representation. Secondly, Nye introduces Roman Gubern's principle of the seven fundamental transformations that take place through the photographic representation. Nye states that 'collectively these seven transformations severely reduce any photograph's ability to act as a pane of glass, or window, on any subject.' The third and most important aspect is his use of Semiotics.

²⁵⁸ Nye, *Image Worlds – Corporate Identities at General Electric*, pp. 47-49. However, Nye reconfigures this model into a form suitable for the consideration of the use of photography within General Electric, where 'the sender is not a single intelligence but a set of bureaucratically ordered people.' Nye redraws Jakobson's model to incorporate the two groups involved in the creation of a photographic communication in this context; the photographer and the manager. This allows Nye to demonstrate that the photographs of General Electric are the result of an interaction between these two groups and formed through their different agendas. For Nye, this results in the photographs having 'a unique form of double coding': a primary code created by the photographer (its technical framing and aesthetic), and a secondary code, created by the

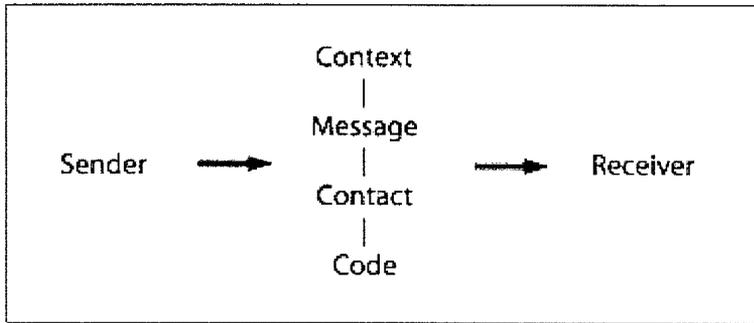


Figure 62: Roman Jakobson's General model of communication. Diagram from David E. Nye's *Image Worlds*

Nye's approach to the photograph is informed by the specific ambition of his research - to analyse the General Electric archive in its totality (a collection of more than one million photographs). The specific status of the archive as an enclosed form and equally its size, allows Nye to conduct what Rose terms 'content analysis'. Through this approach he identifies commonalities across the breadth of the archive, which he describes with the term 'image classes'. By examining the publications aimed at engineers for example, Nye identifies five image classes: 1) products photographed out of context, 2) machines installed in situation, 3) images of machinery which use the worker to provide scale, 4) portraits of individual engineers, and 5) group portraits of engineers.

management, who initially instigate the commissioning of the photograph and who subsequently place the image in its specific place of publication.

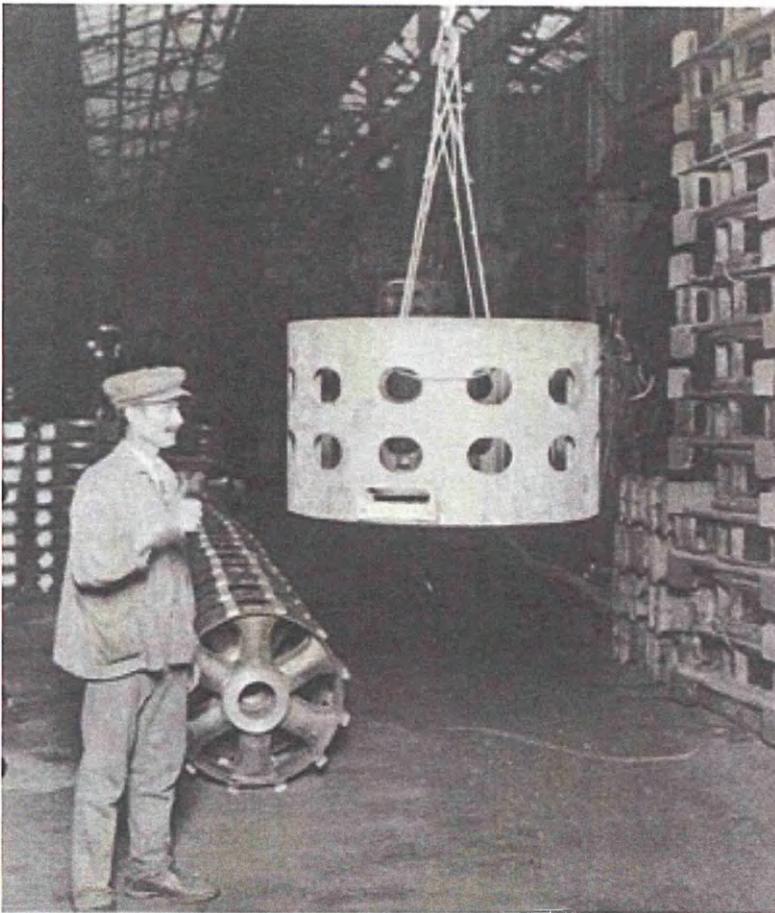


Figure 63: Crane Follower in Motor Department, Directing Load to be raised, (1920).

Photograph: General Electric Archive

It is the identification of these meta-structures that is Nye's primary concern. Only rarely does he make an analysis of what is in the frame of a single photograph.²⁵⁹ In one example he conducts a detailed description of a photograph of a crane operative, (Figure 63), he states:

²⁵⁹ Nye, *Image Worlds – Corporate Identities at General Electric*, pp.52 - 53. Nye sets his reading of the photograph in opposition to Roland Barthes's work, who, in Nye's opinion 'looked carefully only within the frames of single images'. For Nye this approach is only able to consider the 'secondary coding, a gloss on objects represented, not on the means of representation.' Nye suggests such an approach leads to 'an acceptance of the content depicted' and does not consider the photograph as part of a wider system of communication or the groups of people involved in its production. Despite his general disagreement with Barthes's method, he concedes that once such image classes are identified, 'one can supplement the sort of analysis Barthes developed.'

These images of individual workers shot from a distance of perhaps ten feet, showing the entire body of each. The worker usually stands, occupying the central space of the frame. He is not obviously posing but rather is immersed in an interesting, skilled job that is clearly visible and comprehensible. [...] the crane follower confidently stood beside the heavy load he guided through the plant, ensuring it did not impede other work or endanger the lives of other employees.²⁶⁰

Nye's research provides a model to understand the visibility of process within industrial production, and the extent to which these forms of knowledge can be manipulated and constructed. His insistence upon the need to understand the relationship between an image and the context in which it has been produced has informed the approach in Chapter 2, where the social, political and economic context are examined.²⁶¹ However, I do not share Nye's belief in a mutually understood code, and instead align my understanding of the image as a site of knowledge with a number of authors (explored below) who suggest that the photograph is a contingent source of knowledge.

Despite discussing images that were seen by a wide cross-section of viewers, in his belief in a 'mutually understood code',²⁶² Nye does not acknowledge or explore the understanding of the 'receiver' - of how different viewers might interpret or understand the photograph.²⁶³ In her essay *His Master's Eye*, Mieke Bal critiques Jakobson's model employed by Nye and instead offers an understanding of the photograph which is individual and contingent. Bal states that Jakobson's model of communication:

²⁶⁰ Nye, *Image Worlds – Corporate Identities at General Electric*, p. 82.

²⁶¹ Beyond his political reading of the photographs, it is not part of Nye's aim to consider the images for their potential to inform an understanding of making process (the specific focus of this research).

²⁶² Nye, *Image Worlds – Corporate Identities at General Electric*, p. 52. Nye suggests 'that the viewer and photographer share, the secondary code. Both have lived in the world and the names and uses of objects; both the language and so forth.'

²⁶³ Rose, *Visual Methodologies*, p. 106, 'Semiotics [...] remains uninterested in how different viewers interpret images differently.'

can only account for ideal, totally successful communication, wherein the message arrives unharmed at its destination and is decoded according to the intention of the sender. We all know of course, that reality is not so ideal – nor so oedipal – and that messages hardly ever arrive complete or undamaged.²⁶⁴

In *On Photography* Susan Sontag describes the photograph's contingency, stating: 'At one end of the spectrum, photographs are objective data; at the other end, they are items of psychological science fiction.'²⁶⁵ In her analysis Sontag places the interpretation of the photograph by the 'receiver' centre stage, suggesting that:

Any photograph has multiple meanings; indeed, to see something in the form of the photograph is to encounter a potential object of fascination. The ultimate wisdom of the photographic image is to say: "there is the surface. Now think - or rather feel, intuit - what is beyond it, what the reality must be like if it looks this way." Photographs, which cannot themselves explain anything, are inexhaustible invitations to deduction, speculation, and fantasy.²⁶⁶

In a similar way to Sontag's description of a spectrum of possible understandings (objective data / fiction), Roland Barthes in *Camera Lucida* describes the need to write about the photograph through two voices:

the voice of banality (to say what everyone sees and knows) and the voice of singularity (to replenish such banality with all the élan of an emotion which belonged only to myself).²⁶⁷

²⁶⁴ Mieke Bal, *His Master's Eye*, in, *Modernity and the hegemony of vision*, David Michael Levin (ed.), California: University of California Press, 1993, p. 382.

²⁶⁵ Susan Sontag, *On Photography*, London: Penguin Modern Classics, 1977, p. 127.

²⁶⁶ Sontag, *On Photography*, p. 23.

²⁶⁷ Roland Barthes, *Camera Lucida*, trans. Richard Howard, London: Vintage Books, 1993, p. 76.

Barthes' describes the photograph as 'pure contingency'²⁶⁸ and places the affect of the photograph (on him) at the centre of his discussion. He states:

So I resolved to start my enquiry with no more than a few photographs, the ones that I was sure existed for me. [...] In this (after all) conventional debate between science and subjectivity, I had arrived at this curious notion: why mightn't there be, somehow, a new science for each object? A *mathesis singularis* (and no longer *universalis*)?²⁶⁹

Barthes' discussion of a singular, individual learning or understanding, as opposed to a universal understanding (*mathesis singularis* and *universalis*), leads to his identification of the *studium* and *punctum*. Barthes' employs the term *studium* to describe 'the message or semiotic content it discloses.'²⁷⁰ The *studium* describes the cultural, political, historical content of the photograph which has 'a familiarity as a consequence of my knowledge and my culture'.²⁷¹ In contrast, the term *punctum* to describe the disturbance or breakdown of the *studium* and highlights the specific affect of the photograph on him. Barthes describes the *punctum* as a detail, which 'pricks me (but also bruises me, is poignant to me).' Barthes describes the effect of the *punctum* as 'at once brief and active,' this 'detail' overwhelming 'the entirety of my reading; it is an intense mutation of my interest, a fulguration'.²⁷² His use of language in describing the affect of the *punctum* is important, 'fulguration' – a flash like that of lightening; and 'satori' an awakening, describes a dramatic and sudden shift in the viewers' relation to the photograph.²⁷³

²⁶⁸ Barthes, *Camera Lucida*, p. 28.

²⁶⁹ Barthes, *Camera Lucida*, p. 8.

²⁷⁰ W.J.T. Mitchell, *What do pictures want? The lives and loves of images*, Chicago: The University of Chicago Press, 2005, p. 9.

²⁷¹ Barthes, *Camera Lucida*, pp. 25-28. This shared understanding of the content allows him to participate with 'the figures, the faces, the gestures, the settings, the actions.' For Barthes, the *studium* describes photographs that operate through a shared code, he states that the *studium* 'is a contract arrived at between creators and consumers.'

²⁷² Barthes, *Camera Lucida*, p. 26.

²⁷³ Fulgurite is a natural form of glass created by lightening.

Summary

Barthes' description of the *studium* aligns with David Nye's description of a shared code between sender or receiver (photographer and viewer). However, Sontag's description of the speculation and fantasy inherent in the reading of any photograph, Barthes' description of the *punctum*, and Bal's discussion of the 'damage' which can occur to the photograph's message, suggests the contingency of interpretation. Whilst the images in *The Archive* make process visible, I am particularly interested in the 'failure' of these images, and the subjective understandings of process and material that emerge. In section 4.5 – page 225, the contingency of interpretation of a photograph from *The Archive* is demonstrated through an artwork called *Delineating an understanding*).

4.3.2 Information in the object

This section examines information in the object through two sections: the first examines the value and affect that a number of authors have attributed to the trace of making process. The second presents *Plasticine, ekphrasis and imagined making*, an artwork that explored the imagined ideas that might be generated through an encounter with information in the object.

4.3.2.1 Expert knowledge

How the trace of making process left in the object is interpreted and given value differs widely. The two sections below explore two positions - expert and non-expert, to demonstrate how different levels of knowledge effect the individual's ability to interpret information in the object. The first explores how through their specialist knowledge, the expert is able to 'read' information in the object to illuminate the object's making process. The

second examines the imaginative and speculative reading of information in the object made by the non-expert.

In *The Nature and Art of Workmanship* David Pye defines two ways in which something can be made: 'the workmanship of certainty' and 'the workmanship of risk'.²⁷⁴ Pye defines the workmanship of risk as a process of manufacture usually associated with hand making, in which the 'quality of the result is continually at risk during the process of making'.²⁷⁵ In contrast, the workmanship of certainty usually seen within with machine manufacture, describes a manufacturing process where 'the quality of the result is exactly predetermined before a single saleable thing is made', he goes on to state that in the workmanship of certainty 'the result is predetermined and unalterable once production begins.'²⁷⁶



Figure 64: (left) Wooden cabinet (1868); (right) Mass-produced glass jar. Photographs: David Pye, (circa 1968)

²⁷⁴ David Pye, *The Nature and Art of Workmanship*, Cambridge: Cambridge University Press, 1968, pp. 4 – 9.

²⁷⁵ Adamson (ed.), *The Craft Reader*, p. 342.

²⁷⁶ Adamson (ed.), *The Craft Reader*, p. 343.

However, by comparing a wide range of objects, such as an exquisitely inlaid wooden cabinet from 1868, with a mass-produced glass bottle (Figure 64) Pye problematises the definitions of 'hand made' and 'machine made'.²⁷⁷ Through his close reading of these objects, Pye undermines the expectation that the glass bottle, the product of mass production is the most 'highly regulated' of the two objects.²⁷⁸ Instead he points out that the bottle contains less highly regulated forms of workmanship than that of the cabinet.²⁷⁹ He states:

The inner surface of the glass is unregulated and only the outer form of it has been determined by a mould. The wandering inner surface distorts and modifies the reflected lights and imparts diversity.²⁸⁰

Pye introduces the term 'diversity' to describe the affect of qualities left in the object as a result of its making process. For Pye these qualities can enhance design and our environment by producing 'an immensely various range of qualities, without which at its command the art of design becomes arid and impoverished.'²⁸¹

²⁷⁷ Pye avoids a dichotomy between the craft and the industrial object by identifying diversity as a quality across a range of objects, not just present in the craft object.

²⁷⁸ Pye, *The Nature and Art of Workmanship*, p.17. Pye states: 'Let us then say that, where the naked eye can detect no disparity between achievement and idea, the workmanship is 'regulated' or, in cases of extreme precision, 'highly regulated'. Where slight disparities can be detected let us say that it is 'moderately free'. Where there are evident (and usually intentional) disparities, as often seen in woodcarving and calligraphy, where precise repetition is on the whole avoided, let us say the work is 'free'. And where we should ordinarily call the work rough, let us call it rough; remembering always that rough does not necessarily mean bad.'

²⁷⁹ Pye, *The Nature and Art of Workmanship*, p. 83. 'The can is entirely a product of the workmanship of certainty but it is less highly regulated than the cabinet, which is the product of the workmanship of risk. The central rivet of the can, for instance, is unevenly buckled, and there is unevenness in the impression of the lettering. These elements of free workmanship enhance the appearance by contrasting with the completely regulated elements elsewhere.'

²⁸⁰ Pye, *The Nature and Art of Workmanship*, p. 94.

²⁸¹ Pye, *The Nature and Art of Workmanship*, p. 7.

Pye's discussion is primarily an aesthetic one and does not consider how this evidence of making process might give access to how the object was made. The potential of information in the object to articulate making process is demonstrated by brick expert Tony Mugridge in Chapter 2. However, as discussed on page 61 Mugridge's ability to 'access' the object's making process is dependent upon his expert knowledge. For the non-expert, whilst the marks on the surface of the brick would be aesthetically noticeable and align with Pye's description of diversity, it is debatable if this aesthetic information would give access to the object's making process. The following section examines readings of information in the object made by the non-expert that results in speculative or imaginative ideas that are not associated with its making process.

4.3.2.2 Speculation and imagination:

Published in the same year as Pye's book, *The System of Objects* by Jean Baudrillard examines the handmade object in a section entitled 'Marginal Objects', a term employed to describe objects which cannot be categorised by a 'functional calculation', but instead 'answer to other kinds of demands such as, witness, memory, nostalgia or escapism.'²⁸²

In comparison to Pye and Mugridge, Baudrillard's exploration of the affect of the visibility of making process moves the discussion in a different direction, by conducting a psychological rather than aesthetic or pragmatic reading of information in the object. Describing the object as a 'mental precinct',

²⁸² Jean Baudrillard (1968), *The System of Objects*, tr. by James Benedict. London: Verso, 2005, p. 79. Although the main focus of his discussion is the antique object, Baudrillard's definition of the marginal object also includes '[...] craftsmanship, handmade products, native pottery, folklore and so on.'

Baudrillard sets out to examine the subject's experience of the object.²⁸³ He states:

Apart from the uses to which we put them at any particular moment, objects in this sense have another aspect which is intimately bound up with the subject: no longer simply material bodies offering a certain resistance, they become mental precincts over which I hold sway, they become things of which I am the meaning, they become my property and my passion.²⁸⁴

In *The System of Objects*, Baudrillard uses the term 'traces of creation', to describe evidence of the objects' process of making. He suggests this information prompts speculation about the moment of creation:

The fascination with handicraft derives from an object's having passed through the hands of someone the marks of whose labour are still inscribed thereupon: we are fascinated by what has been created, and therefore unique, because the moment of creation cannot be reproduced.²⁸⁵

For Baudrillard, the marginal object has a mythological function, acting as a signifier of time,²⁸⁶ and provides the subject with a sense of origin or descentance (of context). However, Baudrillard's use of the term 'phantasy' to describe this relation indicates that this is not a specific or actual understanding of origin, but an imagined one.²⁸⁷

Although Baudrillard's discussion of the affect of the marginal object includes a discussion of the object's material qualities, Baudrillard's focus upon the

²⁸³ Baudrillard, *The System of Objects*, p. 2. Baudrillard states: 'what mental structures are interwoven with [...] their directly experienced everydayness.'

²⁸⁴ Baudrillard, *The System of Objects*, p. 91.

²⁸⁵ Baudrillard, *The System of Objects*, p. 81.

²⁸⁶ Baudrillard, *The System of Objects*, p. 77.

²⁸⁷ Baudrillard, *The System of Objects*, p. 84.

object as a sign, limits his discussion.²⁸⁸ In *'The Technology of Enchantment and the Enchantment of Technology'*, Alfred Gell discusses the affect of the object in terms of its 'enchantment', a term employed to describe how certain objects cast 'a spell over us so that we see the world in an enchanted form.' Gell links the enchantment of the object to its process of 'coming into being'; the process through which the object is made.²⁸⁹

By foregrounding the object's 'becoming rather than their being',²⁹⁰ Gell sidesteps an aesthetic analysis of the object, and instead considers the making process as the cause of its enchantment. This is clearly seen in his discussion of a matchstick model of Salisbury Cathedral which he saw as an eleven year old child. Gell States:

The building itself made no great impression on me, and I do not remember it at all. What I do remember, though, very vividly, is a display which the cathedral authorities had placed in some dingy side-chapel, which consisted of a remarkable model of Salisbury Cathedral, about two feet high and apparently complete in every detail, made entirely out of matchsticks glued together [...] At one level, I had perfect insight into the technical problems faced by the genius who had made the model, having myself often handled matches and glue, separately and in various combinations, while remaining

²⁸⁸ Tom Fisher and Janet Shipton, *Designing for Re-Use – The Life of Consumer Packaging*, New York: Earthscan, 2010, p. 57. 'Of course we interact with objects and their materials as symbol-reading creatures; but we do this also as embodied beings – we interact in a tactile, emotional, sensual register too as social beings with the ability to use our interaction with objects as part of our self preservation. Materials symbolize – they carry cultural 'baggage' – but they also have physical properties which push back at us.'

²⁸⁹ Alfred Gell, 'The Technology of Enchantment and the Enchantment of Technology,' in, *Anthropology, Art and Aesthetics*. J. Coote and A. Shelton, (eds.), Oxford: Clarendon, 1992, pp. 40–66. The title of Gell's essay describes a relationship between the objects 'enchantment' or effect (Gell defines artworks as 'a component of technology' thus the term 'The enchantment of technology') and their process of 'coming into being' - thus employing the term 'the Enchantment of Technology' to point to the process of coming into being.

²⁹⁰ Gell, *The Technology of Enchantment and the Enchantment of Technology*, p. 46.

utterly at a loss to imagine the degree of manipulative skill and sheer patience needed to complete the final work.²⁹¹

Gell's experience of the model, its enchantment, was caused by what he calls the 'halo effect of technical difficulty',²⁹² the technical skill and investment needed to create the model. However, unlike the understanding of Pye or Mugridge gained through their expert knowledge, Gell suggests that his understanding is an imagined or speculative one:

It achieves its effect via the enchantment cast by technical means, the manner of its coming into being, or, rather, the idea which one forms of its coming into being, since making a matchstick model of Salisbury Cathedral may not be as difficult, or as easy as one imagines.²⁹³

He goes on to suggest the affect of not being able to understand the object's making process:

the difficulty I have in mentally encompassing their coming-into-being as objects in the world accessible to me by technical process which, since it transcends my understanding, I am forced to construe as magical.²⁹⁴

Gell and Baudrillard's emphasis on the subjective relation of the object are particularly relevant here for understanding of information in the object seen in the Crown Glass Object, where the evidence of the object's making process (the uneven cross-section) is explained through myth.

The myth of glass flow can be understood as the perception of the non-expert and can be seen in stark contrast to the interpretation of information in the historical brick by an expert such as Tony Mugridge. However, within the

²⁹¹ Gell, *The Technology of Enchantment and the Enchantment of Technology*, p. 47.

²⁹² Gell, *The Technology of Enchantment and the Enchantment of Technology*, p. 46.

²⁹³ Gell, *The Technology of Enchantment and the Enchantment of Technology*, p. 47.

²⁹⁴ Gell, *The Technology of Enchantment and the Enchantment of Technology*, p. 49.

research, despite the apparent naivety of this interpretation it is no less significant. In *Materiality*, Daniel Miller describes how the anthropologist needs to respect people's 'common sense' or 'colloquial' understanding of objects, which is observed and exposed through ethnography.²⁹⁵ Miller's description of a colloquial or common sense understanding contextualizes my uncle's comment and up holds its importance. In the following artwork it was the view of the non-expert – the imaginative or speculative perception of the object which I aimed to examine.

4.3.2.3 Plasticine, ekphrasis and imagined making

Plasticine, ekphrasis and imagined making [Artwork No.14 and 15, produced in Phase 2] is a second, more substantial work made after *Making with Plasticine while thinking about glass* (DVD: Films No.2 + Appendix 4 + 5).²⁹⁶ The making process of this work was conceived to produce an object in which information in the object was an integral and primary characteristic. The object was produced through a lengthy, complicated making process, in which several stages of juncture separated the final object from its making process. The project aimed to examine the relationship between information in the object and the imagined ideas that this information might generate.

²⁹⁵ Daniel Miller (ed.), *Materiality*, London & Durham: Duke University Press, 2005, pp. 4-14. Miller describes 'Common Sense' as follows: 'We may often find ourselves conducting research among people for whom "common sense" consists of a clear distinction between subjects and objects, defined by their opposition. They may regard any attempt to transcend this distinction as mystificatory and obfuscating. As part of our own engagement we will necessarily attempt empathize with these views. Furthermore, we will strive to include within our analysis the social consequences of conceptualizing the world is divided in this way.'

²⁹⁶ I started to work with Plasticine after sitting in a staff meeting where the son of one of my colleagues was playing with a ball of Plasticine. The ball was made up of a tangle of different colors – absent-mindedly I started to wonder what previous forms / objects / figures this lump of material had been.

Whilst this work built upon earlier experiments which explored information in the object, it extended these by working with groups of students from the Fine Art department of Sheffield Hallam University, who were asked to interpret this information. The students' response was recorded and subsequently used to produce a short ekphrasis text that accompanied the object when exhibited.

The project set out to investigate a number of questions:

- How can information in the object be read or understood?
- What methods can be employed to make a close reading of such information? How can we speculate, extract or re-imagine the making process of an object?
- What is left in the object, what is lost, and what emerges in this potential vacuum?

Making *The Plasticine disk*

The making process involved two distinct stages and at each stage a specific object was produced. *Plasticine Diderot* was the first object (Figure 70) and *Plasticine Disk*, the second (Figure 74). This process is detailed below.

Object 1: Plasticine Diderot

Plasticine Diderot involved the translation of an engraving from *Diderot and d'Alembert's Encyclopedia* into a three dimensional statue made of five different colors of Plasticine (Figure 70).

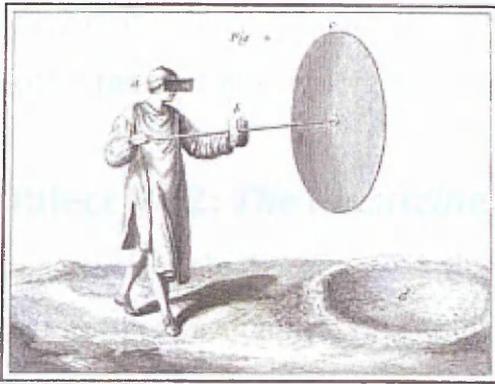


Figure 65: (left) Diderot and d'Alembert's Encyclopédie, Crown Glass, Plate 16 (1751); (right) Plasticine Diderot, (2011)

Unlike earlier works, the statue was not produced by me, but by a model maker.²⁹⁷ Employing someone else to make the object acted as a way of distancing myself from the object's production, so that I would share some of the experience of the students who were seeing it for the first time.

Produced over three days, the statue was made in strictly controlled working conditions, which structured the model maker's working time and the way in which he used the different colors of Plasticine.²⁹⁸ The restrictions imposed meant that the model maker worked with one color of Plasticine at a time for set periods of ten minutes, separated by one minute of rest (Figures 67 - 69). This pattern of ten minutes working time and one minute of rest continued over the duration of the three days. During each of the ten-minute sessions a different color of Plasticine was used, so that the finished object had a grain or patina, a visualisation of the structure of this working time.²⁹⁹ The build up

²⁹⁷ The model maker was Nick Palmer. I employed Nick after agreeing a number of factors in advance: 1) the amount he would be paid; 2) He would be credited when the project is described or images shown; 3) He was given copies of statue's documentation; 4) He was informed from the outset that the statue would be squashed.

²⁹⁸ It was important to get someone else to make the figure as a way of bringing their interpretation of the Diderot engraving and their method of making into the project.

²⁹⁹ Ten minutes of action, one minute of rest: During Walter Benjamin's flee into exile across the French-Spanish border in September 1940, his guide, Fittko noted Benjamin's carefully calculated pace: 'ten minutes of walking, followed by one minute's rest'.

Although it is not the intention to make specific reference to Benjamin within the work,

of colored material and its distribution was structured by this timing method, not by the aesthetic choice of the maker (Figures 66 - 69).

Object No.2: *The Plasticine Disk*

Once the finished statue was documented, it was squashed into a ball and then using a mechanical press squashed into a flat disk (Figures 71 - 75). This stage formed the most pronounced and distinct stage of juncture, a process of change that was both destructive and transformative. At this point, the form of the object changed significantly: from a figurative to an abstract form, and from a vertical three-dimensional form to a horizontal one, with a large two-dimensional surface. Equally, at this stage the skill and care of the statue's making process was seemingly erased - a process which has parallels to Robert Rauschenberg's erasing of a William De Kooning drawing, where juncture is very significant.³⁰⁰

The resulting object *Plasticine Disk* is roughly sixty centimeters in diameter and one centimeter thick. The only discernable evidence of the first object (the statue and the labor of its making) is the distribution of the coloured Plasticine throughout the object in a seemingly random pattern, reminiscent of marble (Figure 74 + 75).

this timing method, of a specific period of action and rest, provides a method of structuring the duration of making.

Walter Benjamin: 1938 – 1940, v4: Selected Writings, Walter Benjamin, Michael William Jennings, Howard Eiland (eds.), trans by Edmund Jephcott and Others, Cambridge: Harvard University Press, 2003, p. 444.

³⁰⁰ Tony Godfrey, *Conceptual Art*, London: Phaidon Press Limited, 1998, p. 63. Godfrey states: 'In the same year [1953] Rauschenberg approached Willem de Kooning, an artist he especially admired and told him that he would like to make an artwork in reverse, that is, by rubbing it out. De Kooning agreed, but gave him a very heavily worked drawing, so that he too would have to labour hard.' Godfrey goes on to say that it took Rauschenberg six weeks to erase the drawing.

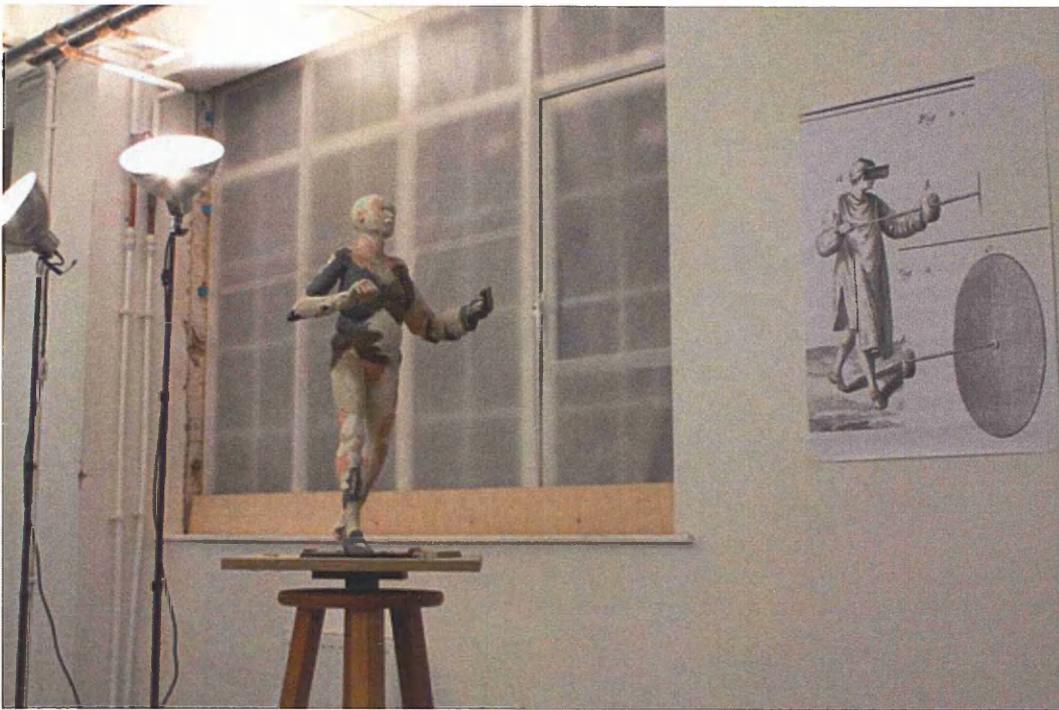


Figure 66: *Plasticine Diderot* at an early stage of its making, with Plate 16 *Diderot and d'Alembert's Encyclopedia* from visible on studio wall. Photograph: Jerome Harrington, (2011)



Figure 67: Model maker Nick Palmer taking one minute of rest. Photograph: Jerome Harrington, (2011)



Figure 78: *Plasticine Diderot* (Diderot's Anatomy) Photograph: Jerome Harrington, (2011)

Figure 68: Nick working on *Plasticine Diderot* at an early stage in its production. Photograph: Jerome Harrington, (2011)



Figure 69: Nick's workbench

Figure 69: Nick's workbench – NB. Two clocks which measured working and rest periods. Photograph: Jerome Harrington, (2011)

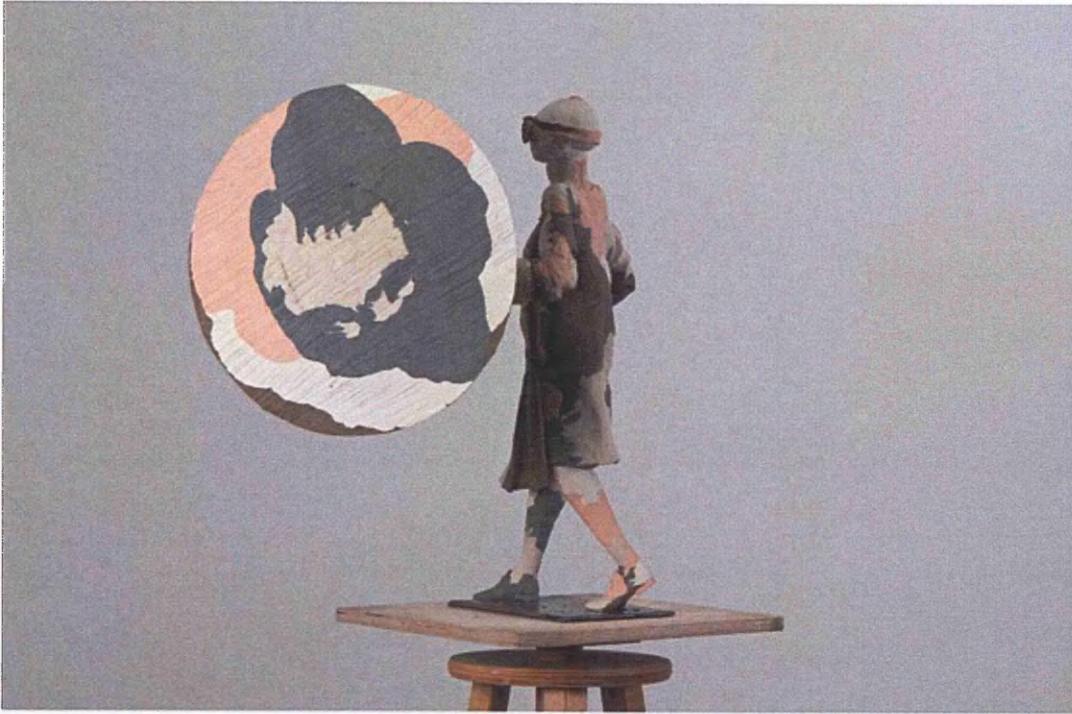


Figure 70: *Plasticine Diderot* (finished model). Photograph: John Hartley, (2011)

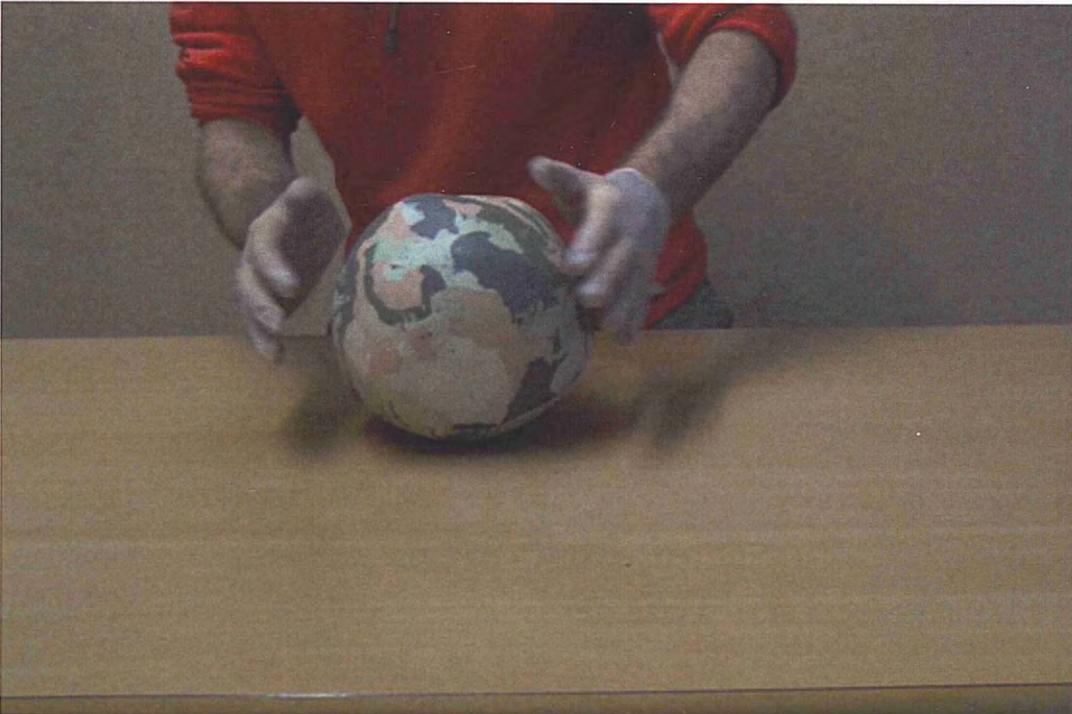


Figure 71: Reconstituting the Plasticine ready for squashing it. Photograph: Jerome Harrington, (2011)



Figure 72: Reconstituting the Plasticine ready for squashing it. Photograph: Jerome Harrington, (2011)



Figure 73: Using a mechanical press to squash the disk. Photograph: Jerome Harrington, (2011)



Figure 74: *The Plasticine Disk*. Photograph: Jerome Harrington, (2011)



Figure 75: *The Plasticine Disk* (detail). Photograph: Jerome Harrington, (2011)

A close reading of *The Plasticine Disk*

At this point, *The Plasticine Disk* was shown to groups of students from the Fine Art department of Sheffield Hallam University, in sessions that aimed to make a close reading of the object (Figure 76). This was the first of two works produced in Phase 2 of the research, where the question 'What is understood' was used to broaden my own understanding of the material in *The Archive* by observing how others interpreted it.



Figure 76: The close reading of *The Plasticine Disk* with the student group. Photograph: Jerome Harrington, (2011)

Within these sessions I invited the students to react to *The Plasticine Disk* and feedback without any knowledge of the wider aims of the research project, or its complex making process. This decision was taken in order to reflect the partial and incomplete nature of information about an object's making process observed within *The Archive*, placing the students in the position of stranger narrator to which Armstrong refers.

As discussed in Method (page 138) these projects took place within one and a half hour teaching sessions, and in order to facilitate the student's close reading within this duration, they were provided with five prompts. The prompts were references that I had come across during the course of the research. They were selected for their relevance to aid the interpretation of particular aspects of the disk, but crucially were selected to help identify the speculation and imaginative response which Gell and Baudrillard discuss.

The student group was split into small groups and each worked with only one prompt. They were asked to use this to speculate about, extract or re-imagine the making process of the object, and to describe its visual and material characteristics.³⁰¹ The five prompts are summarised in the table below:

Prompt	Brief outline
Prompt No.1	Prompt no.1 consisted of two texts. The first, Charles Baudelaire's <i>A philosophy of Toys</i> (1853), describes the child's desire to take their toys apart, in a search for the toy's soul. Baudelaire suggests that the soul of the toy is an imagined thing, a speculative and subjective notion of interior. ³⁰² The second, Walter Benjamin <i>Russian Toys</i> (1927), speculates on the child's

³⁰¹ I worked with two different student groups – Mart and BA students, each within a one and a half hour teaching session. With the Mart students (the first group that worked with) the whole group worked with all five of the methods. However, working with the second group gave me the opportunity to evaluate and adjust this process. With the second group, I divided the student group into pairs or groups of three and each group worked with only one method. This second method worked much better as the students took much more ownership of their method and were able to spend more time engaged with it. As a result the final text was based upon the session with the BA students and it is this session that has been transcribed (see Appendix No.5).

³⁰² Charles Baudelaire (1853), 'A Philosophy of Toys', in *The Painter of Modern Life and other essays*, Jonathan Mayne (ed.), London: Phaidon, 1964, pp. Page 202 – 203. Baudelaire states: 'the overriding desire of most children is to get at and see the soul of their toys [...] The child, like the people of Tuileries, makes a supreme effort; at last he opens it up, he is stronger. But where is the soul? This is the beginning of melancholy and gloom.'

	ability to sense in the hand-made toy a connection to the maker and its making process. ³⁰³
Prompt No.2	The palimpsest, a velum document in which it is possible with the aid of modern technologies to see different ancient texts which were written in different time periods over the top of one another. The palimpsest was presented as an example of an object where different layers or incarnations could be seen or read.
Prompt No.3	A series of twelve images from <i>The Archive</i> were provided which depicted the production of circular objects. The students were asked: Could these images of making procedures be used to think about the making process of the disk?
Prompt No.4	In <i>Painting as an Art</i> , Richard Wollheim describes 'seeing-in' as one of our three fundamental perceptual capacities. ³⁰⁴ Wollheim states that 'seeing-in' is triggered off by ' <i>a differentiated surface</i> ' which causes a perception of ' <i>twofoldness</i> '. Wollheim states: ' <i>[...] when seeing-in occurs two things happen: I am visually aware of the surface I look at, and I discern something standing out in front of, or (in certain cases) receding behind, something else.</i> ' ³⁰⁵ In addition to Wollheim's text, the students were given a copy of an engraving from 1628 (Figure 77) depicting the cross-section of an apple tree that was reputed to contain images of Catholic priests. ³⁰⁶

³⁰³ Walter Benjamin (1927), 'Russian Toys', in Walter Benjamin: Moscow Diary, Gary Smith (ed.), trans. by Richard Sieburth, Cambridge: Harvard University Press, 1986. p. 123. He states: 'The spirit from which these products emanate – the entire process of their production and not merely its results – is alive for the child in the toy, and he naturally understands a primitively produced object much better than one deriving from a complicated industrial process.'

³⁰⁴ Richard Wollheim, *Painting as an Art*, 1987, Thames and Hudson: London, p. 45.

³⁰⁵ Wollheim, *Painting as an Art*, p. 4.

³⁰⁶ The image in cross section of the tree is referred to by Christopher Janaway who states: 'In the year 1628, in a village just outside the city of Harlem, an old apple tree was cut down. Inside its bark there was said by the pious to be miraculous images of Catholic priests. A devout print was soon published to celebrate this discovery. Then, within the year in order to rebut these superstitious beliefs, to 'believe rumors'. And to furnish the materials for a naturalistic explanation of how these beliefs arose, Pieter Saenredam executed a drawing, after which another print was made, exhibiting the tree in cross section. To make his point, Saenredam was committed to showing that the bark was so formed that the priests could be seen in it. But, though they could be seen in it, they could not be seen in it with such force, or such clarity, as to make us conclude that this is what some divine artificer expected us to see: unless, the print hints, we were superstitiously motivated to think so.'

	This prompt was introduced as a method to explore the shapes or patterns that might be described by the distribution of the different colours visible on the surface of <i>The Plasticine Disk</i> .
Prompt No.5	In an exhibition called <i>With Hidden Noise</i> , ventriloquism was used as a metaphor to describe how the viewer participates with the art object, acknowledging that they are complicit in the act of allowing the object to speak. ³⁰⁷ Ventriloquism was presented to the student group as a method of speaking on behalf of the object about the information it might contain. ³⁰⁸

The presentation of *The Plasticine Disk* at exhibition:

The feedback generated was recorded and a transcript produced (Appendix 5). This was subsequently used as the basis for a short ekphrasis text which accompanied *The Plasticine Disk* in exhibition (Figure 79). Narrated by a female voice and broadcast on wireless headphones, the text is reminiscent of a museum audio guide – which authoritatively tells you what you are looking at. However, unlike the authoritative voice of the institution, the text is contradictory in nature reflecting the different interpretations of the object that emerged through the workshops. Within the exhibition the text is

Christopher Janaway, Richard Wollheim, *Painting as an Art* (extract), in *Reading aesthetics and philosophy of art*, Christopher Janaway, Oxford: Blackwell Publishing, 2006, pp. 245-266.

³⁰⁷ Stephen Feeke and Jon Wood, *With Hidden Noise, Sculpture, Video and Ventriloquism*, Leeds: Henry Moore Institute, 2004, p. 30. 'This active involvement of the viewer is important to the overall conceit of ventriloquism, since it is only through our imagination and our willingness to participate in the ruse that makes ventriloquism effective.'

³⁰⁸ Feeke and Wood, *With Hidden Noise, Sculpture, Video and Ventriloquism*, p.19. In the catalogue essay, John Wood describes a particular type of ventriloquism called distant ventriloquism which '[...] does not entail the use of a ventriloquist dummy or figurative prop, but enclosed spaces such as crates, trunks, chests, cupboards and rooms that are, or are presented as being far away from the ventriloquist.'

intended to prompt the viewer to consider different interpretations of the object, suggesting different positions that they might occupy.

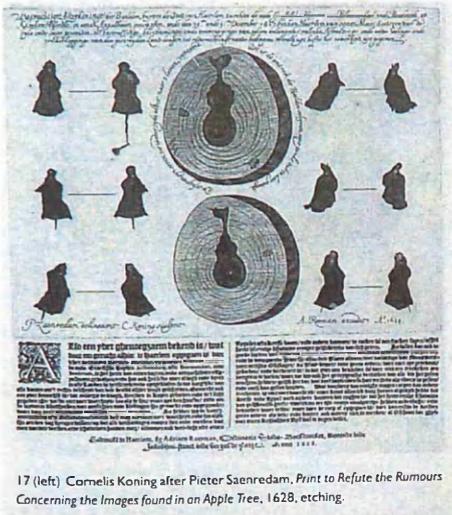


Figure 77: (left) Cornelis Koning, *Print to Refute the Rumours Concerning the Images found in an Apple Tree*, 1628, etching; (right) Furniture-maker slices open tree to find 'Jesus' in the rings, Mail Online, (2011) ³⁰⁹

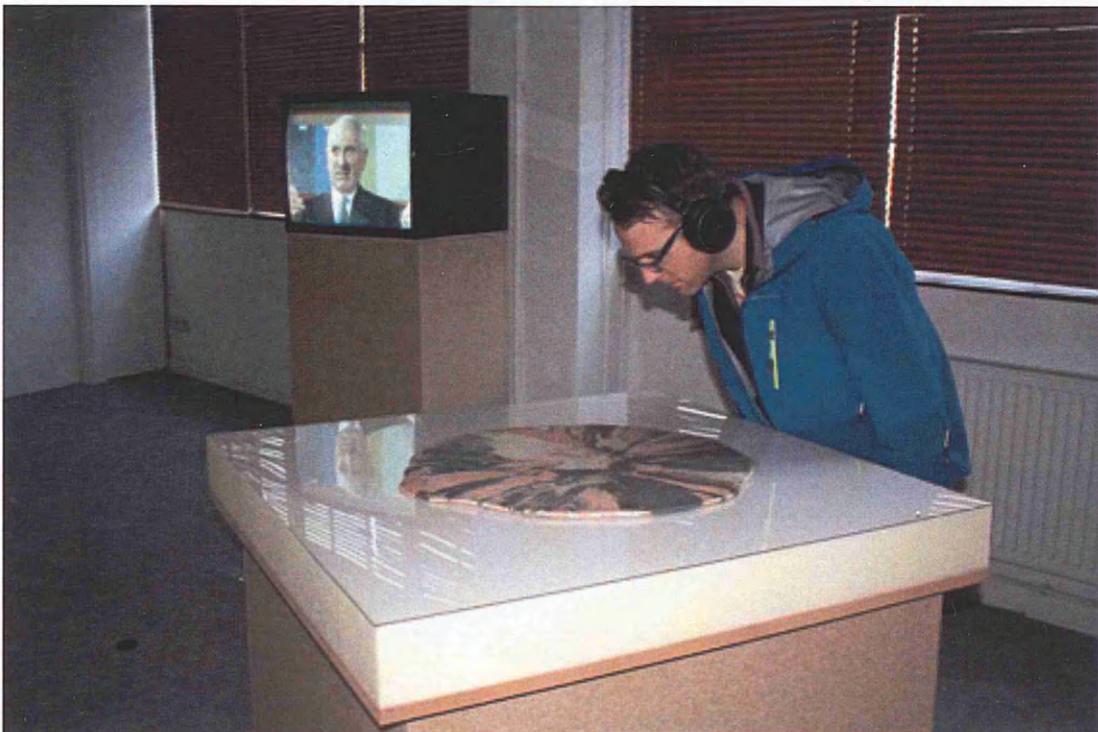


Figure 78: The presentation of *The Plasticine Disk* at exhibition. Photograph: Jerome Harrington

³⁰⁹ Daily Mail Online, Furniture Maker slices open tree to find 'Jesus' in the rings, <<http://www.dailymail.co.uk/news/article-519097/Furniture-maker-slices-open-tree-Jesus-rings.html>> [accessed 21 July 2011].

Plasticine Diderot

At the center of the disk, there is a stillness. The material, still soft is moving outwards, slowly drying or crystalising, and subsequently cracking as it reaches the edges. The stillness suggests an action which has passed. Like the surface of a pond the instant after a stone has pierced the water, the ripples are moving outwards – a record of a unique event that has taken place, but the cause - the piercing of the water is no longer audible, no longer visible; only the disturbance that it has caused remains.

Here, frozen and laid out, this object reads both as form and as an image. Any looking shifts between a consideration of the disks formal aspects (its shape - surface – edge) and as an abstract image, formed by the distribution of coloured material.

There is an oscillation between information that is present (knowable by an analytic looking, based upon evidence: cracked edge, undulations of the surface) – and the object as image (formed by an imaginary looking - outlines – clouds - blurs). This contradiction between form and image continues – each shifting in relation to the other, asserting a temporary prominence over the other, and at these points of prominence suggesting particular information:

As form, surface and edge dictate: cracks (pastry making),

indentations (landscape), holes and pits in the surface (excavations or collapses of the interior) and although flat, the small inconsistencies of thickness (geology - the tectonic plate – the mountain).

As image: its colour (natural like rock or marble) but the colours distribution both random and contrived. A blur suggests speed, spinning or dropping. Its opacity creates distinct outlines and boundaries; sharp edges. But also in places like a veil, its transparency revealing overlaid information.

The images on the surface seem to go deeper, the layers folding under one another – which leads to the speculation of an imagined core. There is the possibility of sinking into the object, the abstract image prompting connections - ideas and tangents forming. But the object's surface, and the reality that marks it, brings you back to the object, a stark reminder of your fantasy.

The disk provides no orientation, its circular edge refusing any fixed point with which to frame an image, images continually shift. As image, the disk refuses to acknowledge a scale, moving between macro and micro. Read as a whole - the nebula, the cosmos, or as detail, a cross section of organic object – tree – rock, but also figures – an anthropomorphic presence. But any image 'like this or like that', is not, only settling and fixed by you; only you can tell me what you are seeing.

The smooth, glassy surface of the disk makes palpable the pressure which created this object and suggests a process of fossilization – the transfer of three-dimensional form into two-dimensional image.

The volume of the three-dimensional form requires a circumnavigation to understand, a movement of head and body to see front and back. But now we have an overview, an ability to see the surface all at once.

In the process of compression a confusion occurs, a three-dimensional structure is laid down without consideration – top becomes middle, left becomes top, and right... elsewhere; information is distributed and overlaid, disordered, causing a loss of legibility.

If this is a fossil, then only a fraction of the original remains preserved, but separated from its original context or environment. The fossil could be described as the objects shadow, a hard outline or silhouette - but if this is the shadow, then what did the object look like and how can we see it? Is it the image that has already formed in your head?

The flow of material from the center to the edge suggests that time is recorded in the disk. Its center is the past, its edge forming now as we look – the disks history spread between these two points. But is this reading of this surface too simple? Maybe the disks history is folded in on itself and as turbulent as the pattern on its surface might suggest?

When separated from touch, there is a frustration and limitation to seeing which is unable to answer such questions. Here a knowing can only come through touch: the need to prod, to scrape, to excavate; an archeology where seeing and touch occur at the same moment.

This is about the layers beneath – a depth of information – only knowable through cross section - a taking apart - an extraction - an autopsy; the need to lay out and to catalogue.

But there is a danger to this taking apart, of finding a repeat of the information which is already seen on the surface spread layer upon layer throughout the object. A refusal of the object to acknowledge – parts which don't speak – or an inability to reassemble...

4.3.3 Discussion No.1

1) Untitled (Diderot)

Untitled (Diderot) interrogates how an engraving from Diderot's Encyclopédie depicts the making process of the Crown Glass Object. By occupying the engraving through re-making it as a live tableaux, the work deconstructs the moment it describes. By bringing the engraving into a closer relationship with the reality of the making process that it visualises, the work builds upon the written analysis of the engravings by others - particularly Sennett. Through its three stages, the work reveals the physicality and movement that is missing from the image.

By re-making the engraving, the work interrogates this depiction of juncture – revealing how within this visualisation of process, the recognisable end product is also present. The work raises questions about the contingency of the image: the impact of the engraving's own process of making upon its capacity to visualise process, or the possible understanding of the draftsman as a stranger to the process that they were depicting, perhaps projecting their own understanding of the finished product into the engraving?

2) Plasticine, ekphrasis and imagined making

The Plasticine Disk was conceived as an object that would both 'record' and make visible its own making process – the build up of different colours of Plasticine providing a visible trace of the stages of this duration. By working with groups of students I could observe their process of interpretation and subsequently incorporate their response into the ekphrasis text. When presented in the exhibition, the text gave the viewer the opportunity to access this process of interpretation.

Expanding the theory of juncture

Through the production of *Plasticine, ekphrasis and imagined making* it is clear that juncture isn't just one point, but occurs at many stages through-out a making process. Whilst the most pronounced stage of juncture is the squashing of the statue to form the disk, other more subtle stages of juncture occur throughout this making process. This can clearly be seen in the build up of the different colours of Plasticine every ten minutes, each new layer covering previous layers.

These points of juncture form significant stages of change that are only partially visible in the finished object, in the form of the distribution of coloured material. Not surprisingly, none of the students mentioned the original nature of the Plasticine form – the figurative Diderot statue and the skill and care of its making. This stage of the object's making process was simply not accessible to them through the evidence left visible in the object. In this way the sessions with the students revealed that important stages of process disappear and are irretrievable.

Interpretation of information in the object

In responding to *The Plasticine Disk*, some of the students displayed a surprising ability to read the information visible in the object and use this to speculate upon its making process. They made links between the distribution of colours across the disk's surface and used this information to speculate on how the Plasticine moved as the shape of the object changed. They also discussed the pressure that created the disk, and the cracks at the edges were familiar to them from processes they already knew (such as pastry making).

However, the students also misread information visible in the object and suggested that a spinning process produced the disk.³¹⁰ They also linked visual information on the surface with other manipulative processes – such as geological formation of mountains, or the distribution of material caused by the big bang. In these speculations, vast changes of scale were made – the disk prompting associations with much larger processes of making. These comments reveal how suggestive and generative these traces of process are, acting as prompts for Baudrillard’s description of the object as a mental precinct. It is important to stress that this information was only visible because the object’s making process was conceived to make it visible. In this way the work can only offer a metaphor of production, not a general description of how visibility is effected by juncture.

The impact of the prompts

The five prompts were given to the students for two reasons: first, in order to speed up the process so that it could take place within a one and a half hour teaching session and second, to explore imaginative responses to the object. However, as no contradictory or oppositional prompts were used, it is difficult to discern whether the interpretations that emerged were a ‘natural’ response to the encounter with the object, or because of the prompts employed.³¹¹

3) The relationship between objects and images

Despite setting out to collect both information in and outside the object, photographs are the dominant form within *The Archive*. This reflects debates

³¹⁰ This response was prompted by the blurs where two different colours of Plasticine met and overlapped one another.

³¹¹ Within the session, the emphasis on reading information on the disks surface was partly due to one of the prompts - Wollheim’s discussion of ‘seeing in’ which describes a method of reading the surface of a painting – a surface not dissimilar to that of *The Plasticine Disk*.

over how contemporary culture is experiencing a 'relentless march of pictures,'³¹² and would suggest that *The Archive* is a microcosm of the culture in which it was made. The dominance of photography also reflects the speed and ease at which this form of visibility circulates, and is able to make visible distant and inaccessible processes.

One of the effects of this 'march of pictures' is how objects are experienced, which increasingly is through virtual forms. John Plunkett describes 'a world where researchers and students encounter it [matter] predominantly as a virtual, digital presence'. Plunkett suggests that this can result in 'a loss of materiality.'³¹³ This can be seen in a number of examples in *The Archive* where objects are presented through photography and film.³¹⁴

The image plays a central role in constructing our understanding of the world, where it has come to function as a form of knowing. This centrality is described by Rose as 'Ocularcentrism'.³¹⁵ Rose states: 'It is suggested that modern forms of understanding the world depend on a scopic regime that equates seeing with knowledge'.³¹⁶ However, as discussed in 4.3.1.2 Sontag's description of the speculation and fantasy inherent in the reading

³¹² Sherman Sam, *Richard Tuttle*, Art Review, October 2014, p.105.

³¹³ Digitization and materiality forum - From optical to digital (and back again) *Interdisciplinary Studies in the Long Nineteenth Century*, 6 (2008), <http://www.19.bbk.ac.uk> [accessed March 2014].

³¹⁴ Such as BQ plant pot – Grand Design's tiles – Ceramics a fragile history

³¹⁵ Rose, *Visual Methodologies*, p. 2. Ocularcentrism is a term used by Martin Jay.

³¹⁶ On p .3. Rose quotes from Gordon Fyfe and John Law's *Picturing Power*, to describe the role of the image in the construction and understanding of the world: 'Depiction, picturing and seeing are ubiquitous features of the process by which most human beings come to know the world as it really is for them.' Susan Sontag also discusses the relationship between the image and knowledge, pointing to the irreconcilable gap between the photograph as a source of information and real experience or knowledge. She suggests that through the photograph we: 'acquire something as information (rather than experience). Indeed, the importance of photographic images as the medium through which more and more events enter our experience is finally, only a byproduct of their effectiveness in furnishing knowledge disassociated from and independent of experience.' Sontag, *On Photography*, p. 121.

of any photograph, Barthes description of the *punctum*, and Bal's discussion of the 'damage' that can occur to the photographs message, suggests that this dominant form of information is liable to contingent processes of understanding.

Although 4.3.1 and 4.3.2 examine information in and outside the object separately from one another, through making these artworks – a more complex and integrated relationship between objects and images has been observed.

This was clearly revealed by the student's response to *The Plasticine Disk*, which fluctuated between reading it as an object and as an image. As object they focused upon indentations, cracks and the edges of the disk – and as image on the distribution of the colours and the potential delineation of these. Equally some students were frustrated by not being able to touch the object and this led them to talk about wanting to cut up the object, in order to break the image on its surface and understand its interior.³¹⁷

Equally there are similarities in the theory that describes the interpretation of these types of information. For example, Sontag's description of the fantasy inherent in the interpretation of the photograph, has many parallels with Gell's description of how – when confronted by a object's making process that is beyond his technical understanding, he perceives the object as 'magical'.

Finally, in both objects and images juncture causes significant gaps – missing information which prompt speculation. This can be seen in *Untitled (Diderot)* where the physical is translated into an image with the resulting loss of information. Or in *The Plasticine Disk* where although a trace of making process is visible, significant stages disappear and are irretrievable.

³¹⁷ I asked the students not to touch the disk as the Plasticine surface was quite soft and would easily mark.

The two artworks described above were developed at an early stage in the research and aimed to interrogate these sites of information as separate or discrete locations of information. However, in the following section two artworks produced at a later stage are presented, these consider how a more complex interplay of information contributes to an understanding of process.

4.4 The Complex interplay of information

In the previous section, information in and outside the object were discussed separately from one another. However, it is important to stress that this does not suggest that these types of information are mutually exclusive, or have no relationship. Whilst at times they are experienced independently, it is more likely that knowledge of process is constructed through their complex interplay - as originally observed in the Founding object (page 151).

This subchapter explores the complex interplay of information through two sections. The first, *Fantasies of Making* (Paper No. 1), makes a detailed case study of Float glass to demonstrate that it is through the complex interplay of information that a relationship to and understanding of this material is established. The second, *Glass eliminates all confusion*, examines how this interplay of information has been explored through art practice (particularly installation) by setting up environments in which the viewer is surrounded by a complex dialogue of elements - through which they can construct meaning.

4.4.1 Fantasies of making

On 20th January 1959 Pilkington Glass announced a new and revolutionary process for the production of flat glass, known as the Float process. Float glass, is created by pouring molten glass onto the surface of molten tin, on which the glass floats and forms. The surface of the glass in contact with the mirror-like surface of the tin becomes correspondingly flat, while the topside of the glass sheet becomes perfectly smooth in the heated atmosphere of the furnace. When the ribbon of glass emerges from the furnace the most pronounced stage of juncture occurs. As the glass moves along the production line, a computer detects any flaws and the corresponding section

is removed.³¹⁸ This ubiquitous material that is produced at the rate of fifteen meters of glass per minute, bears no visible sign of its making process.³¹⁹

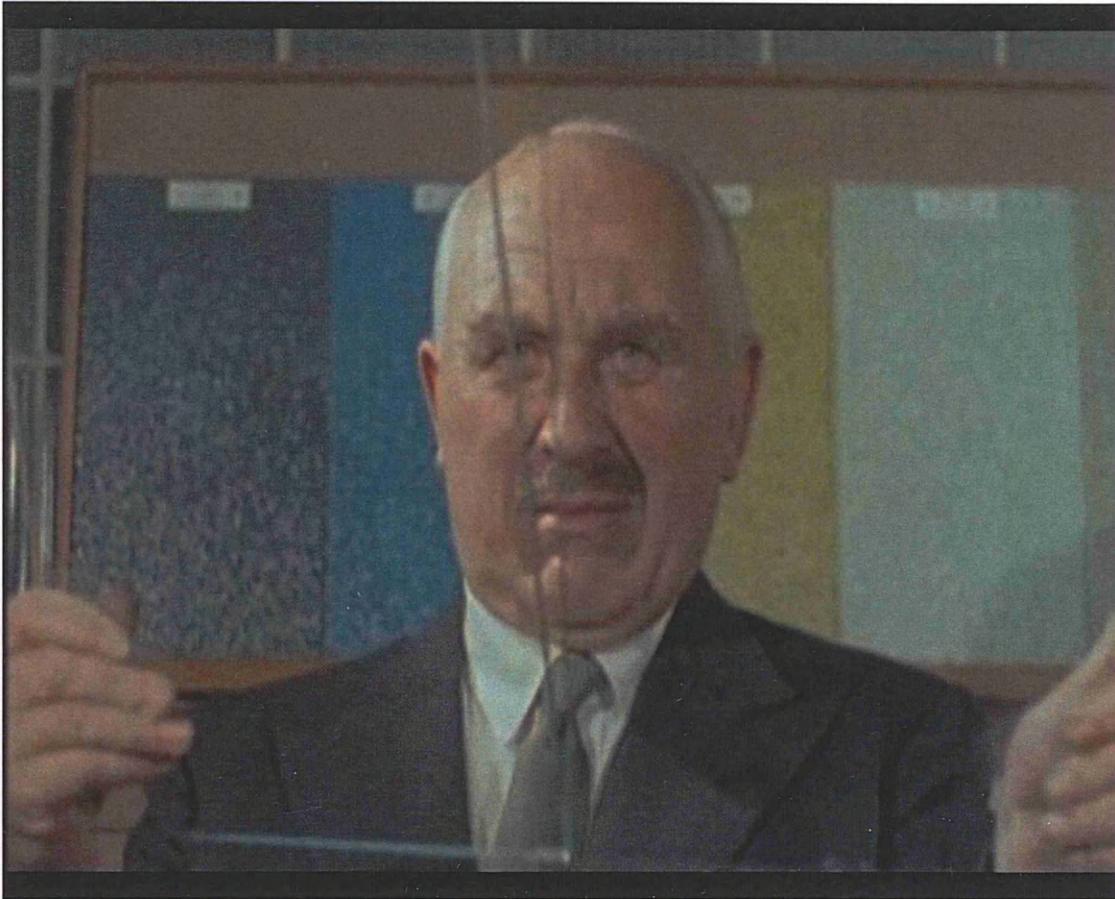


Figure 80: Still from *Glass Research*, *British Pathe*, (1959)

In a 1959 promotional film produced by *British Pathe*, we see a man examining two sheets of glass held directly in front of him, while a voiceover extolls the virtues of Float Glass (Figure 80). Looking at this material that has no visible sign of its making process – what does he (or we) see? ³²⁰

³¹⁸ At this stages the edges of the ribbon are also removed.

³¹⁹ Michael Wigginton, *Glass in Architecture*, London: Phaidon Press, 1996, p. 65.

³²⁰ In his 1931 essay *Unpacking my Library*, Walter Benjamin describes a collector looking at a historical object. Benjamin suggests that the collector 'seems to be seeing through them [the object] into their distant past as though inspired.' Walter Benjamin, *Unpacking my library* (1931), in *Illuminations*, Walter Benjamin, Hannah Arendt, London: Pimlico, 1999, pp. 61-70.

The three sections below explore how it is the lack of a visible trace of the manufacturing process that makes Float a canvas for projected ideas; a perception of the material that is constructed through the complex interplay of information. These three sections introduce components that are significant in contributing to an understanding of Float.

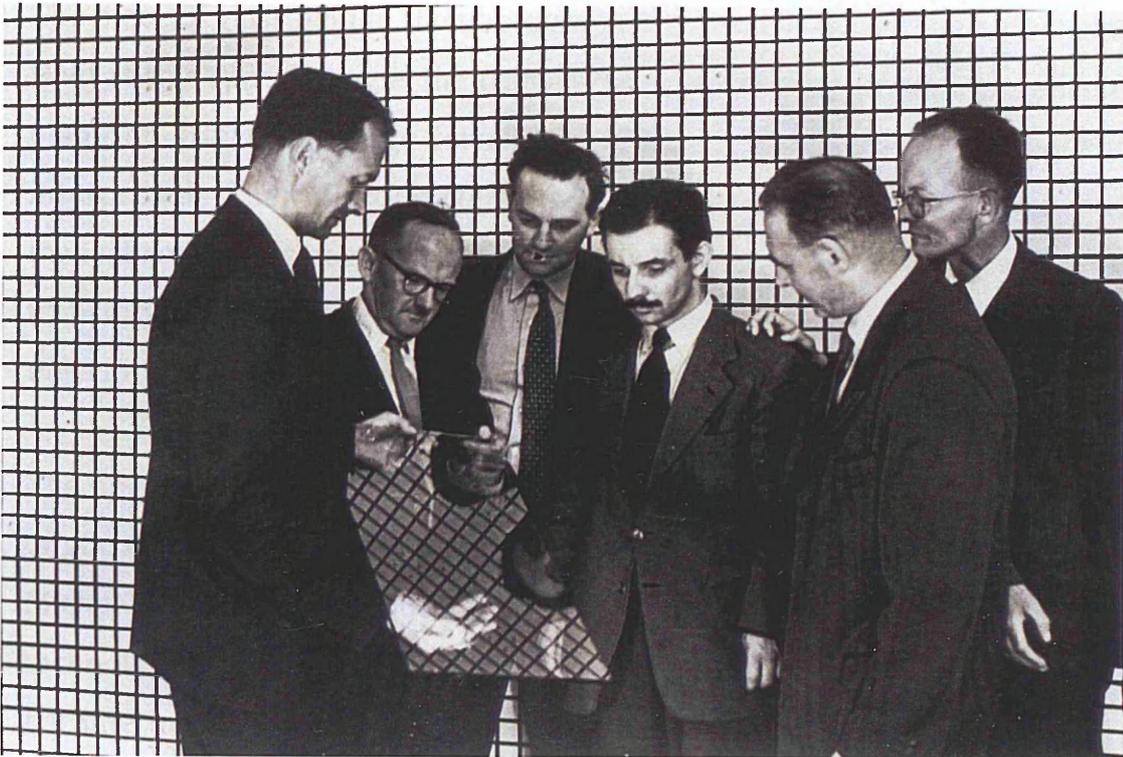


Figure 81: The Float development team, (1959), Alastair Pilkington (far left) (on his left) E.Litherland, production manager, Cowley Hill, George Dickinson, development manager, J.E.C Thomas, tanks manager, Jack Topping, special examiner and Richard Barradell-Smith (ex-Rolls Royce), leader of the float development team. Photograph: Pilkington Glass

Component 1: images of Float glass production

To aid the introduction and public explanation of this new process, Pilkington Glass released printed material, a film and a number of photographs.

Significantly, one of the key images used as a representation of this new making process does not depict the process of production but the six men from the Float development team (Figure 81). On the left Alistair Pilkington, a mechanical scientist credited with the invention of Float, presents a piece of Float glass to the rest of the team, who are gathered around it, looking at its surface.

The piece of glass held in the photograph is a sheet of transparent Float glass. Held at this specific angle, the transparency of the glass becomes a reflective plane on which an image forms and it is this image that is subsequently interpreted. The reflection consists of two elements: the tops of two of the men's heads and a section of the background grid. The reflection of the grid transforms what would be a rather banal looking, completely transparent object into an image of calculation and perfection.³²¹

The development of Float glass is part of a significant change in the methods of glass production that started at the end of the nineteenth century, which Michael Wigginton describes as a change from 'an empirical set of crafts, to technologies informed by science as the processes and the chemistries became understood.'³²² Float's successful development and the subsequent exacting control of the process, relied on a total understanding of the chemical and physical properties of this new process and it is the team which exerted this control which is depicted in Figure 81.

³²¹ In her discussion of the grid as a modernist motif, Rosalind Krauss describes the effect of the grid, suggesting that the object had '[...] landed in the present, and everything else was declared to be the past.' Krauss suggests the grid announces its 'hostility to literature, to narrative, to discourse.' Although Krauss's text refers to the grid in modernist painting – it could be seen as a motif which occurs elsewhere outside of art, particularly architecture and town planning and here could be discussed in relation to industrial production and technology. Rosalind Krauss, 'Grids', in *The Originality of the Avant-Garde and Other Modernist Myths*, Cambridge, MA: The MIT Press, 1985, pp. 9-22.

³²² Wigginton, *Glass in Architecture*, p. 63.

A comparison of this image with earlier depictions of manufacture, such as Diderot and d'Alembert's depiction of glass production in the eighteenth century (see page 166, 167), demonstrates this fundamental shift in production. This is a different set of people involved in this material's manufacture. These are not the craftsmen who have physically engaged with material and process, but technologists and scientists who have calculated the manufacture of this material. The reflection of the men's heads on the glass's surface, their craniums, would suggest that this is a material made by thinking; the meeting of mental calculation and material.

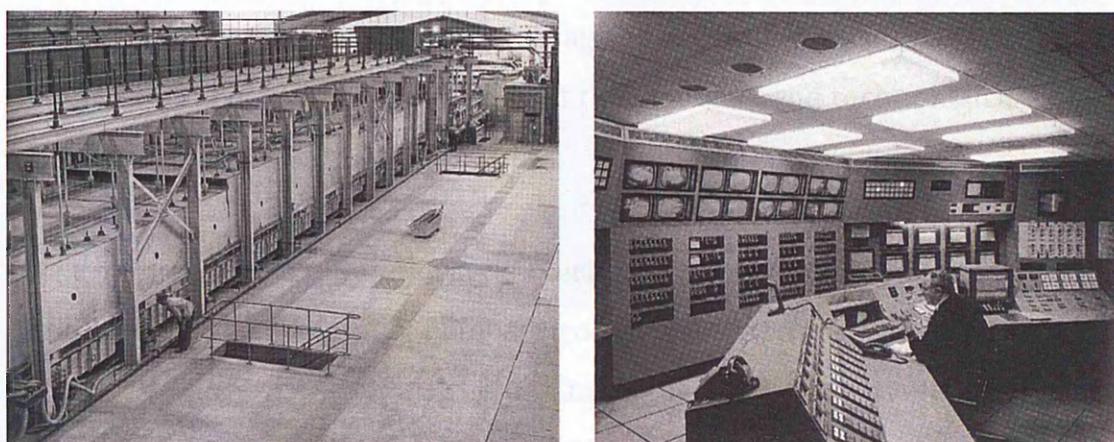


Figure 82: (left) CH3, (1962); (right) Bath control room, UK5, St Helens (1986).

Photograph: Pilkington Glass

Following the public announcement in 1959 the development of Float continued throughout the 1960s, the process only becoming a fully operational and economically viable proposition in the late 1960s.³²³ In this same decade, Jean Baudrillard, in *The System of Objects*, discusses glass's 'purity, reliability and objectivity', writing that 'glass eliminates all confusion'.³²⁴ Although Baudrillard's text does not refer to Float specifically, his terms 'purity, reliability and objectivity' seem to describe Float precisely:

³²³ David Bricknell, *FLOAT: Pilkington's Glass Revolution*, Lancaster: Carnegie Publishing, 2009, p.96. Bricknell states: 'And it was only in 1971 that the board was confident enough to plan to substitute all flat glasses, both sheet and plate with float'.

³²⁴ Baudrillard, *The System of Objects*, p. 41.

'purity' describing its unblemished surface and clarity; 'reliability', the exacting control and consistency of product; 'objectivity', its method of production, which takes place in a sealed chamber and is mediated through a computer terminal set in a distant control room (Figure 82). This is a manufacturing process of disconnectedness, of 'distributed knowledge' as discussed in Chapter 2.

Component 2: The use of glass in magic tricks

Moving from the production of Float glass to an example of its use, this section examines the use of glass in magic and conjuring tricks, to explore an understanding of glass that contradicts the objective and technological nature of Float as described by Baudrillard.

In an online video, contemporary American magician Criss Angel performs a trick in which he seemingly climbs through a glass window in front of a live audience (Figure 83, top). At the beginning of the illusion, while tapping his hand against the glass, Angel says: 'Now a lot of people would say glass is a solid, some would say it is a liquid [...] and a solid cannot pass through a solid. Unless it was really a liquid?'³²⁵

Earlier precedents of magic tricks in which sheet glass is penetrated are relatively common, although they usually take place on a smaller scale. A few examples from the 1950s include: 'Bending Glass', described by its marketing literature as 'a practical demonstration of the impossible', 'Dove Through Glass,' and 'Warlocks Amazing Frame', in which, with the application of a

Angel's reference to the classification of glass (liquid or solid) made at the beginning of his trick connects float glass (the material he is seemingly passing through) with the myth of glass flow.

³²⁵ Criss Angel, Criss Angel Walks Through Glass,  photograph and the illustration used to <http://www.metacafe.com/watch/37292/criss_angel_walks_through_glass/> [accessed 21 June 2010].

magic word, a series of objects including a metal rod, a ribbon, and a magic wand pass through a sheet of glass (Figure 83, bottom).³²⁶

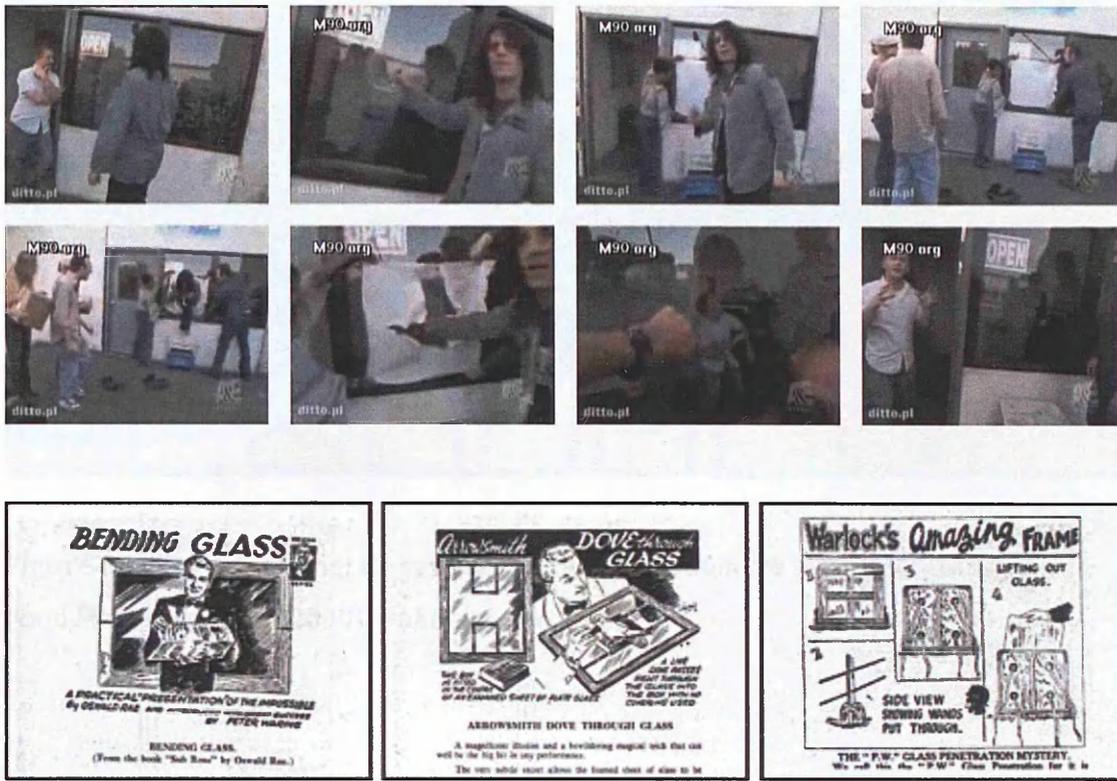


Figure 83: (top) Stills from Criss Angel, *Walks Through Glass*, (circa 2007); (bottom, left) *Bending Glass*, (bottom, centre) *Dove Through Glass*, (bottom, right) *Warlock's Amazing Frame*. Images courtesy of The Magic Circle, London

The use of sheet glass in these historical examples and in Angel's contemporary trick, functions to counter the suspicion of the audience. Employed as a transparent barrier, the glass' transparency provides the audience with visual access, and suggests a climate of openness between magician and audience, as any interference from the magician would be seen. Angel's reference to the classification of glass (liquid or solid?) made at the beginning of his trick, connects Float glass (the material he is seemingly passing through), with the myth of glass flow.

³²⁶ The similarity of the gesture in the Pilkington photograph and the illustration used to depict Oswald Rae's Bending Glass trick is striking. In both cases we see the presentation of an artefact (a glass sheet in both cases) to an audience.

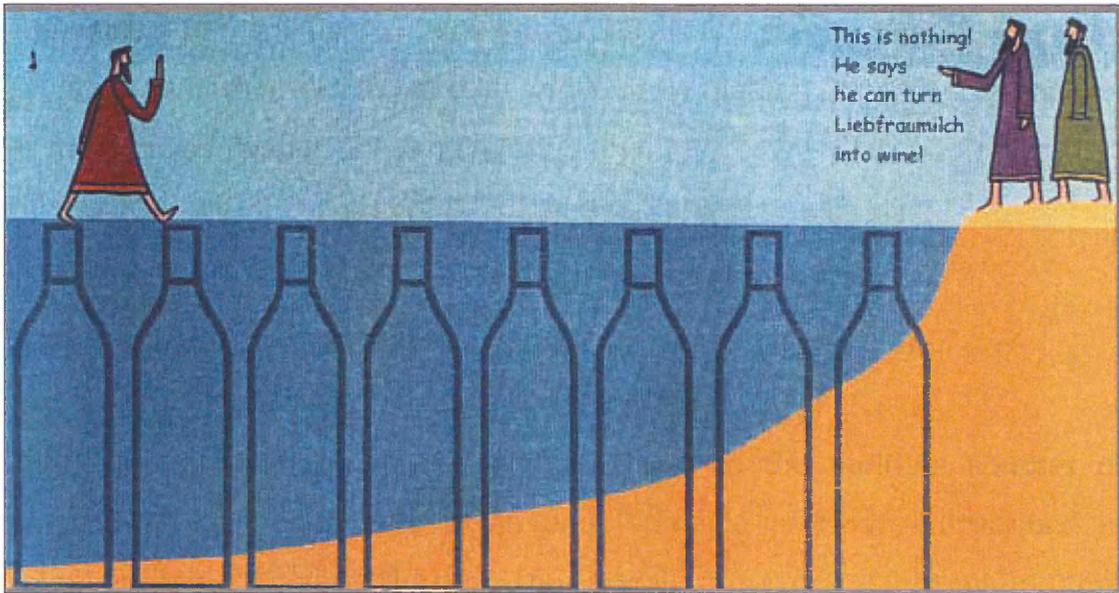


Figure 84: 'This is nothing! He says he can turn *Liebfraumilch* into wine!' Guardian Food Magazine, (circa 2000). Unknown cartoonist

Component 3: The myth of glass flow

Angel's statement implies that instead of the glass sheet breaking or its solidity forming an impenetrable barrier as we would expect, the glass gives way, either bending or flowing, allowing him to pass through.

In making this statement, Angel makes reference to widespread confusion regarding the nature of glass – a confusion which revolves around questions of its classification as a solid or liquid. This perception of glass relates back to the Crown Glass Object, and its uneven cross-section as a prompt for the myth of glass flow (page 156). While originating from the Crown Glass Object this idea can be observed more widely, such as this cartoon from the *Guardian Newspaper*, where glass is both like water and solid enough to walk on (Figure 84).

Angel's use of the myth of glass flow attempts to mystify or confuse the audience and establish circumstances in which magic can be the only explanation of the events that they witness. By making this link (consciously or not) Angel brings ideas generated by the Crown Glass Object into a relationship with Float glass.

Float glass - the complex interplay of information

The complex interplay of information refers to the multiple sources of information that contribute to an understanding of Float – described in components 1 – 3 above. The term (the complex interplay of information) has parallels with Irit Rogoff's description of 'intertextuality'. Rogoff suggests that understanding is constructed through multiple sources that are 'read onto and through one another, leading to ever-accruing layers of meaning and of subject responses'³²⁷ She states:

In the arena of visual culture the scrap of an image connects with a sequence of film and with the corner of a billboard or the window display of a shop we have just passed by, to produce a new narrative formed out of both our experienced journey and our unconscious. Images do not stay within discrete disciplinary fields [...], since neither the eye nor the psyche operates along or recognizes such divisions.³²⁸

Rogoff's description of how meaning is constructed through an encounter with multiple sources is a particularly apt way of describing the interplay of information that constructs an understanding of Float glass. Figure 85 visualises the man seen in the 1960's Pilkington film, looking at the sheet of Float glass. The diagram suggests that due to lack of a visible making process,

³²⁷ Irit Rogoff, *Studying Visual Culture*, in, *The Visual Culture Reader*, Nicholas Mirzoeff (ed.), London and New York: Routledge, 1998, pp. 24 – 27.

³²⁸ Rogoff, *Studying Visual Culture*, p. 26.

he (and we) see through Float and other forms of information (components 1 - 2 - 3) contribute to an understanding.³²⁹

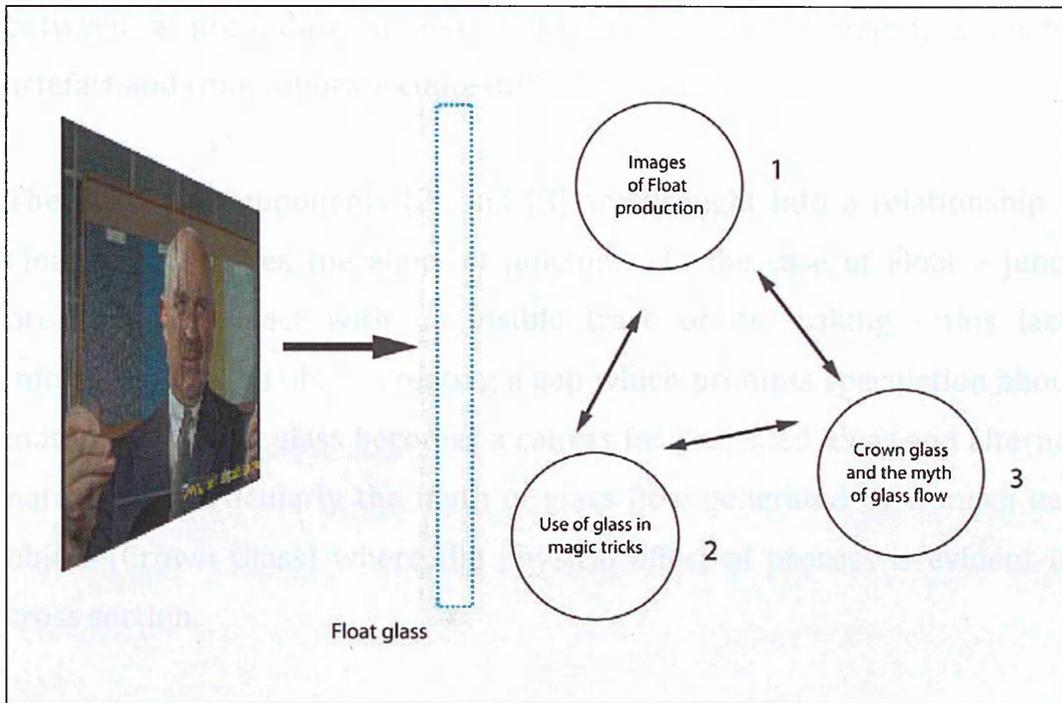


Figure 85: Float glass - the complex interplay of information. Diagram: Jerome Harrington

As Rogoff suggests, the construction of understanding that takes place through intertextuality does not respect 'discrete disciplinary fields', but is more open and inclusive. In forming an understanding of Float, sources of information that visualise its making process [1], but also information that do not, such as the use of glass in magic tricks [2], become part of this interplay.

As a result, dependent upon what sources of information are encountered or available, contradictory understandings of Float will result. The photographs of Float's manufacture [1] will reinforce its technological manufacturing process. However, in contrast, components [2 & 3] suggest ideas that

³²⁹ This account of components that contribute to an understanding of Float glass cannot account for all information that contributes to understanding, but details significant sources of information which I have observed.

contradict Float's physical reality and the objective nature of its making process. These components bring ideas generated through the Crown Glass Object into a relationship with Float. In this relationship there is an interplay between a pre-industrial and industrially produced object, a historical artefact and contemporary context.³³⁰

The fact that components [2] and [3] are brought into a relationship with Float demonstrates the effect of juncture. In the case of Float – juncture produces an object with no visible trace of its making - this lack of information in the object creating a gap which prompts speculation about its materiality. Float glass becomes a canvas for projected ideas and alternative narratives, particularly the myth of glass flow generated by a much earlier object (Crown Glass) where the physical effect of process is evident in its cross section.

There is also the possibility that people are susceptible to these alternative narratives of Float glass's materiality, accepting or wanting to believe them. For example, while writing this text I spoke with a number of people, giving a quick outline of the nature of its content. When I told them that the idea of glass flow is a myth, there was a palpable sense of disappointment. This susceptibility (in part due to a lack of knowledge) was also evident in my uncle's transitory belief that glass can be cut under water and in magic tricks, which create the circumstances for believing in glass's mysterious possibilities. Just as Angels' illusion only works if the audience accepts the description of material he presents, alternative narratives or 'fantasies of making' become part of people's subjective relationships to the ubiquitous products of mass production.

³³⁰ In the example of the Crown Glass Object, both the object itself and its depiction in Diderot are both historical forms, but both are in circulation in the contemporary context.

The following artwork aims to reproduce circumstances originally described in *Fantasies of Making*, as well as reflecting upon Rogoff's description of intertextuality. The artwork uses installation to present competing and contradictory bodies of information exist and from which meaning is constructed.

4.4.2 Glass eliminates all confusion

Glass eliminates all confusion [Exhibition No.7], is an installation that incorporates five artworks: three films and two sound elements (DVD: Film No. 3 + 4 + 5).³³¹ Within this installation the five artworks function as components from which meaning is constructed by the viewer through their interpretation of and the piecing together of these separate artworks.³³²

The description of this work is made through two discreet sections: the first Figure 86 describes each of the five artworks as individual components. In the form of a 'pullout', Figure 86 aims to reflect the spatial arrangement between the artworks in the exhibition and disrupt a linear reading of them. Subsequently, in the text immediately below, the interplay between the five artworks is explored.

The interplay of components

³³¹ The works title refers to Jean Baudrillard description of glass in *The System of Objects*. Exploring the connotations of glass, Baudrillard describes glass as a 'material of the future' which 'eliminates all confusion'. Baudrillard, *The System of Objects*, p. 41. However, as demonstrated in the section *Fantasies of Making* above, Float glass continues to be effected by the myth of glass flow and its relationship with would suggest otherwise; the Crown Glass Object continues to haunt this 'material of the future.'

³³² Although one artwork is described here, this method (installation of components) was developed through several exhibitions: Arundel Gate Studio exhibition (2014), An object described by fragments, Sheffield Institute of the Arts Gallery (2012), Three Act Structure, S1 Artspace (2014), Testing Space, S1 Artspace, Sheffield (2011), S1 Members Show, S1 Artspace, Sheffield [Plasticine, ekphrasis and imagined making] (2011).

Within the installation, the two sound elements (components 2 + 4) are broadcast through directional speakers to create 'corridors' of sound through which a viewer can move in and out of (shown as grey areas on Figure 87).³³³ By using directional speakers, the audio content is no longer fixed to its original film, but become independent elements that can overlay the three films.³³⁴ By moving through the space the viewer brings the two audio components into new relationships with the other film elements - there by forming new meanings.

Figure's 87 visualises the viewer in relation to one of the films - *Untitled (edge)* - the film of the uneven cross-section of the Crown Glass Object. In both positions A and B, the viewer can watch *Untitled (edge)*, but in each position they will hear a different sound track - neither of which confirms what is presented in *Untitled (edge)*.

In position B, the viewer will hear the audio of Criss Angel's magic trick. Angel's monologue tells you what glass is and how it behaves as a material. His statement is assertive, but also manipulative - and obviously staged. In position A, the sound of flowing water seemingly illustrates Angel's statement about glass as a liquid - paired with this sound, the cut edge of the glass does look like flowing water. However, as the pan shot reaches the centre of the disk, the sound shifts from the natural sound of flowing water, to a more abstract, threatening and supernatural sound. This shift overturns the assertion made by Angel - and through the combination of this new sound

³³³ Bruce Nauman Turbine Hall work Raw Materials (2004) used directional speakers in the same way. Bruce Nauman, Raw Materials, <<http://www.tate.org.uk/whats-on/tate-modern/exhibition/unilever-series-bruce-nauman-raw-materials/unilever-series-bruce-0>> [accessed 2 September 2014].

³³⁴ I first used this approach in an exhibition called Making fact, Making fiction (2005) - where I used wireless headphones so that the viewer could move around the exhibition space whilst listening to an audio narrative.

and the image of the glasses edge - the glass become something unknown - uncertain.

In addition to the way in which individual artworks are affected by the combination different sound elements, the way in which the five artworks are distributed within the space means that the viewer is unable to see everything at once. By looking in one direction for longer than another, or listening more carefully to the audio content than they are observing the visual aspects, they will miss information. As a result the viewer gains only fragmentary insights (reflecting the glimpses of process within *The Archive*), the viewer fuses information together, creating their own understanding of what is being presented and the connections between the five artworks. In this way, the installation aims not to prioritise one understanding over another, but offer rich founding space for divergent understandings to be constructed through the interplay of the five components.

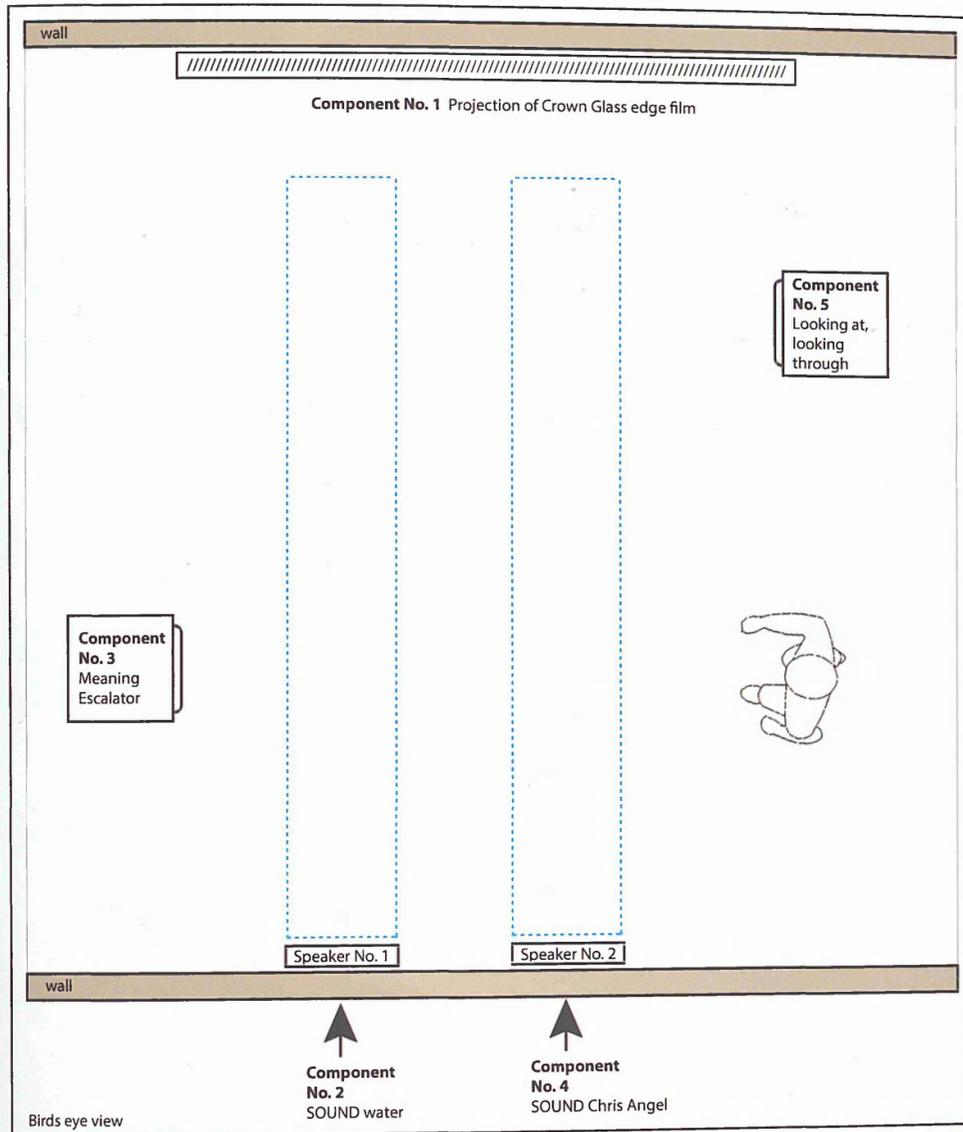


Figure 86

Glass eliminates all confusion

The diagram above illustrates the five components situated within the exhibition space. *Untitled (edge)* (component 1) is shown as a large projection, *Meaning Escalator* (3) and *Looking at, looking through* (5), are situated on the left and right of the projection, and are broadcast on two monitors – sited opposite one another. The two sound elements (components 2 + 4) are broadcast through directional speakers (shown as grey areas).



Component No.1: *Untitled (edge)*

Component No.1: *Untitled (edge)*

Untitled (edge) is a film which examines the uneven cross-section of the Crown Glass disk (DVD Film No. 3). The film was produced using a dolly to incrementally move a camera along the edge of the cross-section. The dolly allowed the camera to be panned along the edge at fractions of a millimeter and at each point a still photograph was taken. The final film is made from six hundred and eighty-nine still images which have been processed to produce a stop frame animation.

The pan along the uneven cross-section is structured by four phases (marked A, B, C, D on timing diagram above right). At each phase, the pan of the camera is slowed. As the film moves from left to right towards the center of the disk, the speed at which the camera moves is seemingly affected by the changing thickness of

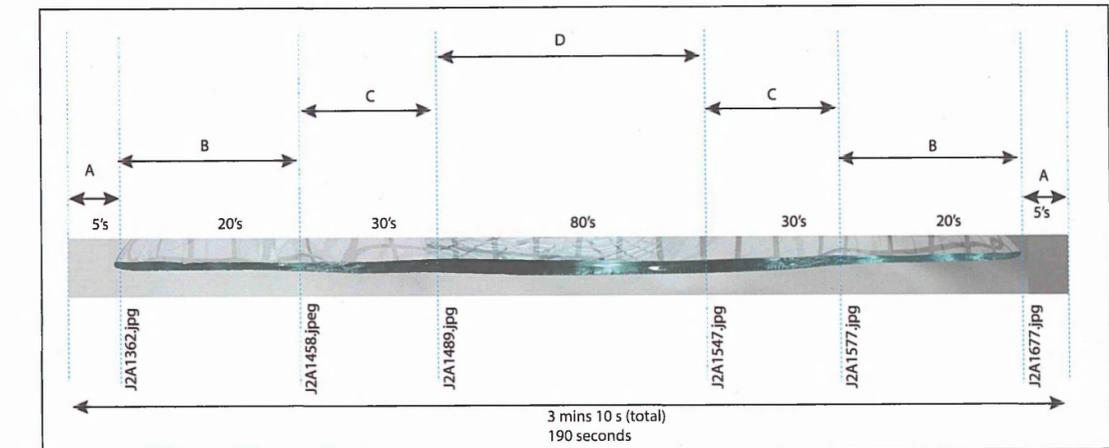
the cross-section of the glass; the thicker the cross section the slower the movement of the camera.

The changing speed of the pan shot is conceived to suggest that the centrifugal force which is a central part of the object's making process, appears to affect its documentation; suggesting an interplay between object and camera. As the film moves towards the center of the disk where the glass is thickest, the movement is the slowest, the camera moves as though moving through a space which is congealing. It is as if, in the center of this object, the contradictory explanations of this uneven cross-section (myth / Zanotto) reside in the thickness of the glass, slowing down and confusing our thinking.

As the film moves from the outer edge of the object towards its center, the cross-section becomes increasingly abstract. As it moves through points A and B the curved outer edge of the object which serves as a point of reference, describing the confines of the object, edge, and top surface – moves out of view.

Through the combination of the slowing of the pan shot and the closeness of the object to the camera causes a confusion of scale is caused – the object seeming much longer than it actually is. In this mid-section, the viewer has more to

time to dwell upon the object. Here, there is a visual confusion between surface and reflection, edge and interior, transparency of the glass object and the surrounding space.



Untitled (edge) timing diagram

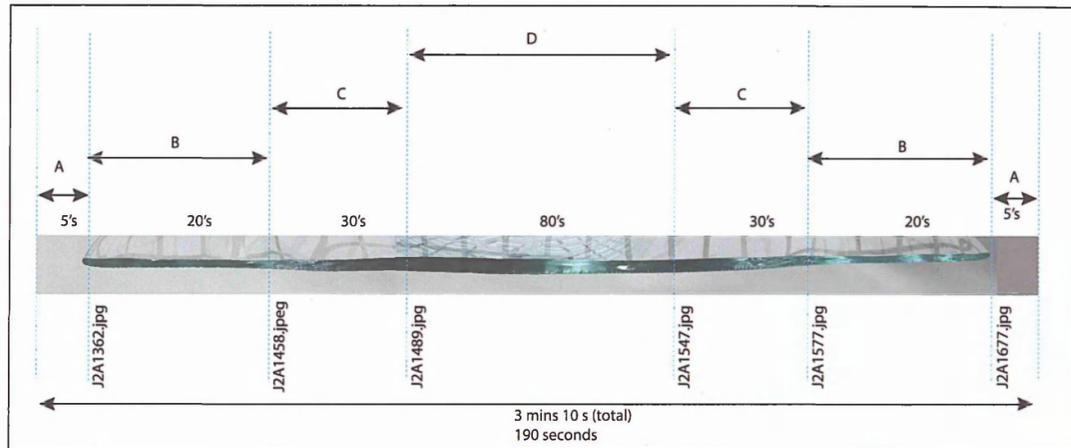
Component No.2: *Untitled (edge)*

The soundtrack accompanying *Untitled (edge)* has a corresponding structure to the film – passing through four phases (see timing diagram above). It is constructed from three separate sounds. As the film moves from left to right, the sound of flowing water becomes audible. Beginning as a gentle trickle, the sound of the water becomes increasingly fast flowing and noisy. The sound makes reference to Angel's statement about the nature of glass being a liquid and flowing like water. As the film moves towards the center of the object (D on diagram above), the sound of flowing water morphs into the sound of static and a pulsating noise.

As the film moves from the outer edge of the object towards its center, the cross-section becomes increasingly abstract. As it moves through points A and B the curved outer edge of the object which serves as a point of reference, describing the confines of the object, edge, and top surface – moves out of view.

time to dwell upon the object. Here, there is a visual confusion between surface and reflection, edge and interior, transparency of the glass object and the surrounding space.

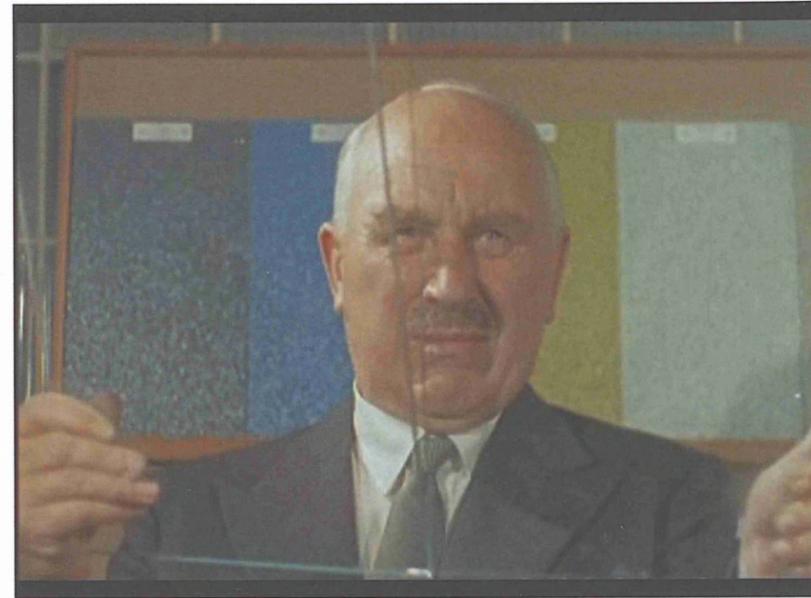
Through the combination of the slowing of the pan shot and the closeness of the object to the camera causes a confusion of scale is caused – the object seeming much longer than it actually is. In this mid-section, the viewer has more to



Untitled (edge) timing diagram

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Component No. 5: *Looking at, looking through*

Component No.5: *Looking at, looking through*

Looking at, looking through is a video made from a short section of archive footage from a film called *Glass Research (1959)*. The film was edited to form a short loop that shows a man inspecting a sheet of glass for flaws. As a loop, the film shows the man caught in a continuous process of looking (DVD Film No. 5).

The film echoes the process of looking which the viewer of the exhibition is engaged in. Unable to discern exactly what the man is looking at, the film emphasises the problem of looking at this transparent material – Is the man looking at material and understanding it, or looking through it and seeing everything but the material?

Component No.s 3 & 4: *Meaning Escalator*



Component No. 3: *Meaning Escalator* – a sample of still images used

Meaning Escalator (DVD Film No. 4) is a short film which uses the unedited audio track from a YouTube video of American illusionist Chris Angel, performing a trick in which he seemingly climbs through a plate glass window in front of a live audience.

In *Meaning Escalator*, Angel's trick is no longer visible but instead replaced with a series of found still images to form a narrative sequence. The images used to 're-illustrate' his trick, range from an engraving from C.1690, to a detail of a front cover of an Agatha Christie novel from 1959. All the images refer in some way to glass, illustrated, photographed, or referenced through text. The images are used to both illustrate the sound component of Angel's trick and contradict it. The image sequence forms a collage of competing and contradictory ideas of what glass is.

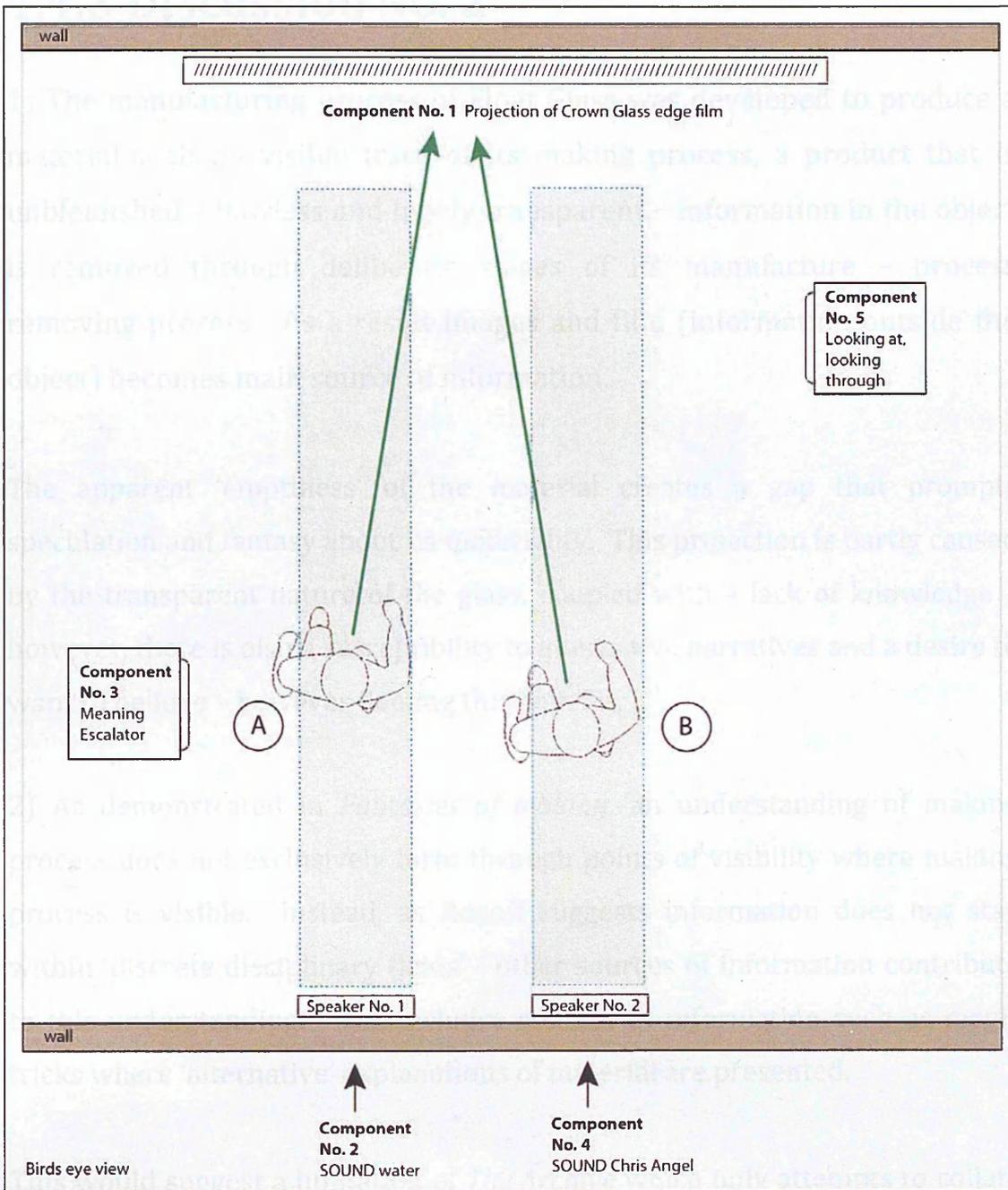


Figure 87: Glass eliminates all confusion – points A and B. Diagram: Jerome Harrington

4.4.3 Discussion No. 2

1) The manufacturing process of Float Glass was developed to produce a material with no visible trace of its making process, a product that is unblemished – flawless and highly transparent. Information in the object is removed through deliberate stages of its manufacture – process removing process. As a result images and film (information outside the object) becomes main source of information.

The apparent ‘emptiness’ of the material creates a gap that prompts speculation and fantasy about its materiality. This projection is partly caused by the transparent nature of the glass, coupled with a lack of knowledge – however, there is also a susceptibility to alternative narratives and a desire to want to believe – however fleeting this belief is.

2) As demonstrated in *Fantasies of making*, an understanding of making process does not exclusively form through points of visibility where making process is visible. Instead, as Rogoff suggests information does not stay within ‘discrete disciplinary fields’ - other sources of information contribute to this understanding. This includes sources of information such as magic tricks where ‘alternative’ explanations of material are presented.

This would suggest a limitation of *The Archive* which only attempts to collate points of visibility which describe making, not the broader bodies of information which are involved in this knowledge construction. *Fantasies of Making* is an exception where I have sought to explore the impact of the wider body of information. However, it is important to stress that in this example I have examined key components that I have observed affecting a perception of Float – rather than attempt to make a complete inventory of the elements are brought into interplay.

3) The complex interplay also suggests that an understanding of process is constructed not from singular points of visibility (as discussed in 4.3.1 and 4.3.2 above) but through multiple sources.

In this interplay a broad range of different types of information are brought into a relationship. This includes contradictory bodies of information such as explanations of making processes both by experts and novices. Different types of information, such as: In and Outside the object; historical and contemporary sources; digital and physical descriptions. As well as bringing together points of visibility created by contradictory 'drivers' such as celebration and concern.

4) *Glass eliminates all confusion* has been used to explore the complex interplay of information and brings together bodies of information where process is made visible, but also broader bodies of information – such as those incorporated into *Meaning Escalator*. As a live experience the viewer's interpretation and piecing together of the separate components allows them to experience the complex interplay of information and the way in which this affects understanding.

5) *Glass eliminates all confusion* and the supporting works that have investigated the complex interplay of information has formed a significant shift in methods of making work within my practice - from producer of objects to producer of experiences. The work also brings together a broad range of methods and sources, from the reflection upon theory (Rogoff), ideas developed through papers (*Fantasies of Making*) and brings together of five previously separate artworks.

4.5 A contingent understanding

This section examines one artwork - *Delineating an understanding* [Artwork No.16, produced in Phase 2] (DVD: Film No.6) as a way to explore the contingent and fluid process of interpretation of photographs from *The Archive*.

4.5.1 Delineating an Understanding

Delineating an Understanding is a short animated film that uses material generated through two workshops conducted with students working on the *Drawing from the archive* module at Sheffield Hallam University.³³⁵

In the workshop students were presented with a series of photographs from *The Archive* and were asked to trace particular aspects of the photograph in response to a series of five questions. The tracings produced by the students subsequently became the starting point for a discussion that explored the differences of how the photograph was seen or understood within the group. This information, both the tracings and a transcript of the resulting conversation was used as the basis for the film. The visual aspect of the film is constructed from forty-five of the tracings and the transcript was used as the basis for a written text which overlays and structures the development of the film.

The method of the workshop

The workshop involved nine students including MArt, MA and PhD students and took place in one of the university's teaching rooms. The students sat

³³⁵ Module delivered by Penny McCarthy. Two workshops: 1st and 8th March 2011.

around a large table gathered around me in a semi-circle and facing one another.

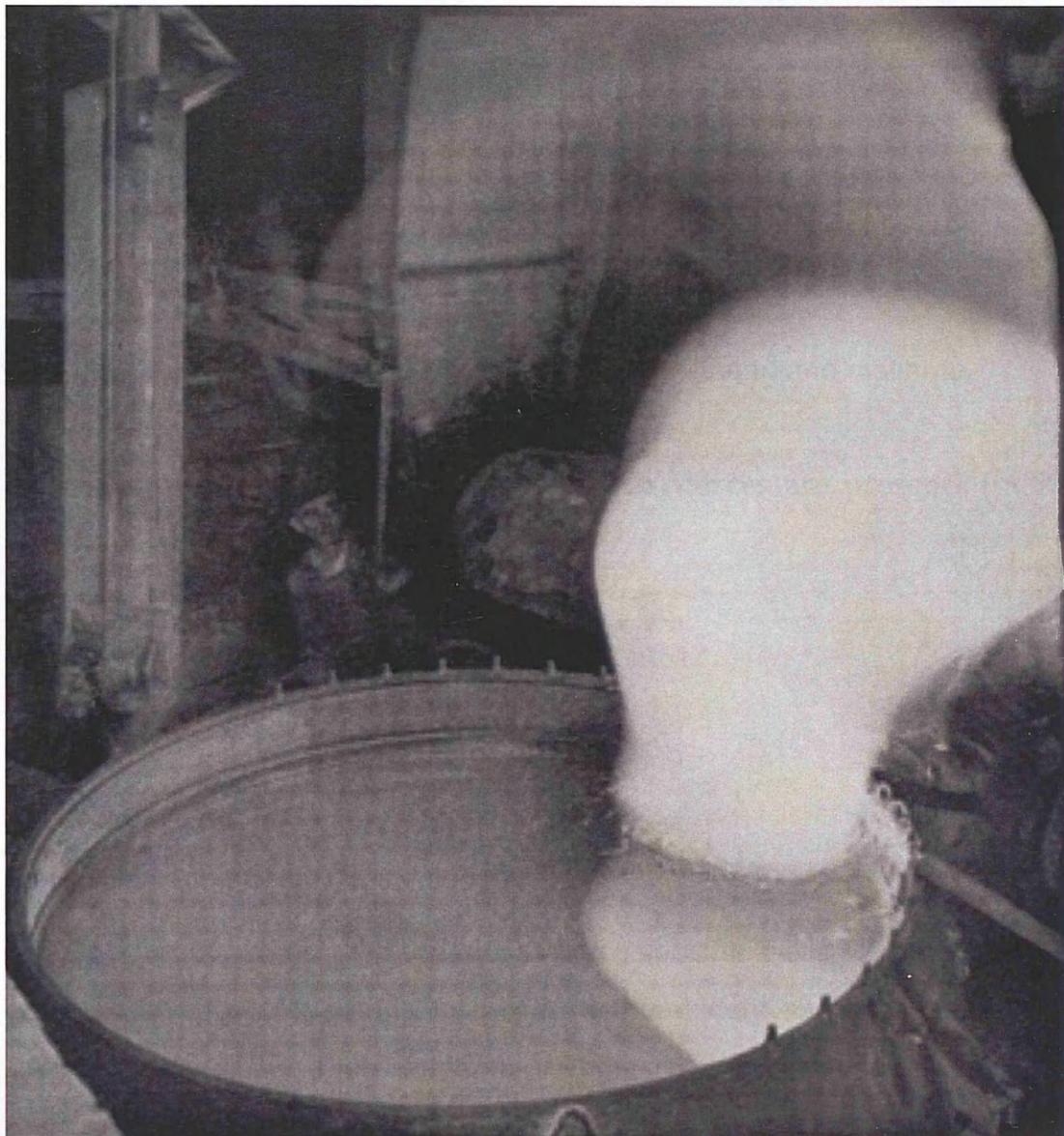


Figure 88. 'The second pot of molten 'metal' being poured into the mould, for the manufacture of a 78 in. disc', (1959). Photograph: Pilkington Glass

Each student was given a copy of the same photograph and five sheets of tracing paper. They were asked to overlay one sheet of tracing paper onto the photograph (Figure 88 - 89) and trace particular aspects in response to

five questions.³³⁶ The students were given four minutes to make each tracing and for each question a new sheet of tracing paper was used. The five questions were:

- 1 What is the most important aspect of the image – what was the first thing that you noticed?
- 2 Trace the object being produced.
- 3 Draw / trace the relationship between eye, hand and machine.
- 4 Trace the position of the body. What forces are present? (pulling, pushing, lifting, dragging etc.)
- 5 What is the next stage, what happens next?

The act of delineating

The process of asking the students to trace specific areas of the photograph was conceived as a method that would make evident and 'record' how each individual read the photograph in response to the questions. The act of delineating specific areas of the photograph prompted the students to make a decision and demarcate edges around areas that they decided to be important (Figure 89). Undertaken individually and prior to any discussion, the tracing of each student recorded what they had understood in advance of hearing the interpretation of others in the group. In this way, the process of making the tracings functioned to record their response made in the moment of their encounter, but the tracings also functioned as a form of commitment. In the following discussion the student needed to 'admit' to and explain the

³³⁶ The questions helped participants to dwell on the photograph, but also allow for comparison to be made between how different participants responded differently.

interpretation, the permanence of the tracing forming a position that couldn't be moved and therefore couldn't be swayed by the response of other more dominant personalities within the group (Figure 90).

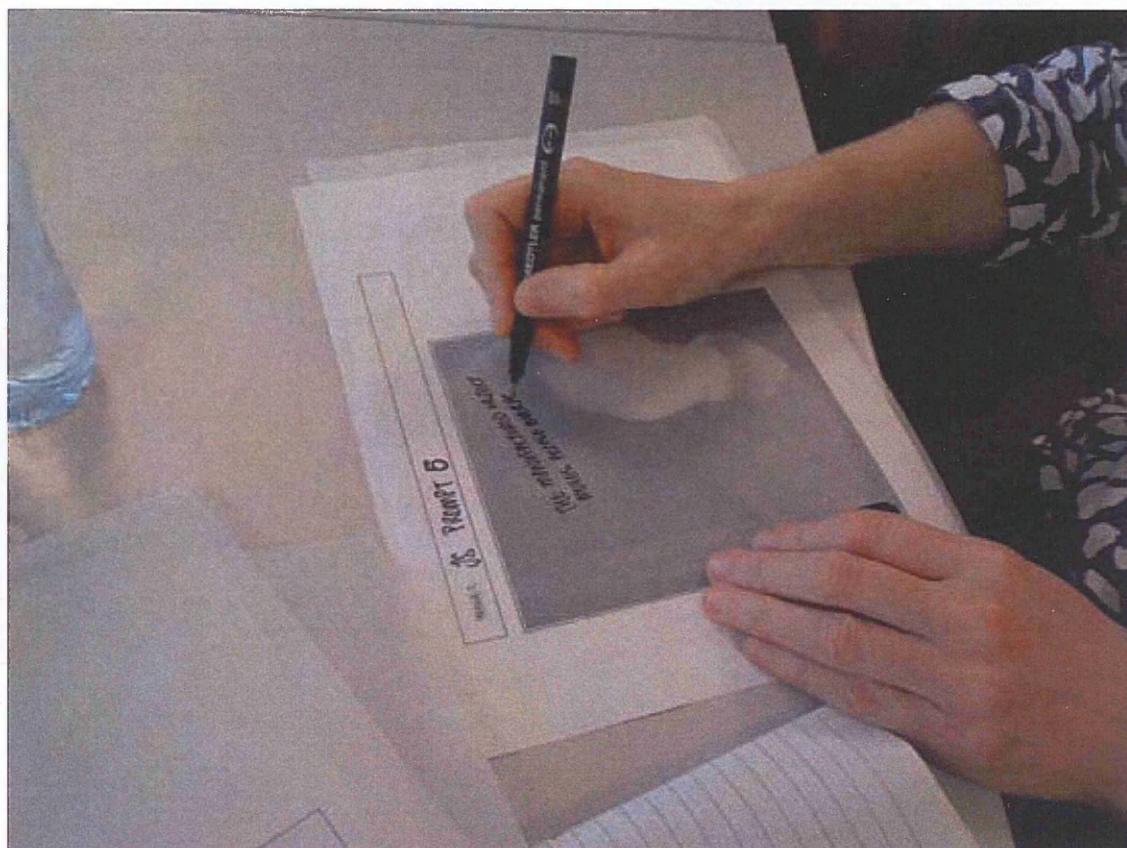


Figure 89: A student making a tracing from a photograph. Photograph: Jerome Harrington, (2012)

Once the five questions had been asked, each student showed their tracing to the group and a discussion followed. Moving around the semi-circle, each student held their tracing in front of them so that the rest of the group could see it and provided a summary of how they had responded to the particular question and what they had subsequently traced.

It was during this process that similarities and differences became evident and generated comparison and discussion of the image within the group.

This process built upon the tradition of crit where information is shared through group discussion – as described in Method (page 137). Within this

process I acted as chair, making sure everyone had time to explain their response, asking further questions if a particular student's response wasn't clear, but also linking similarities and differences within the group.

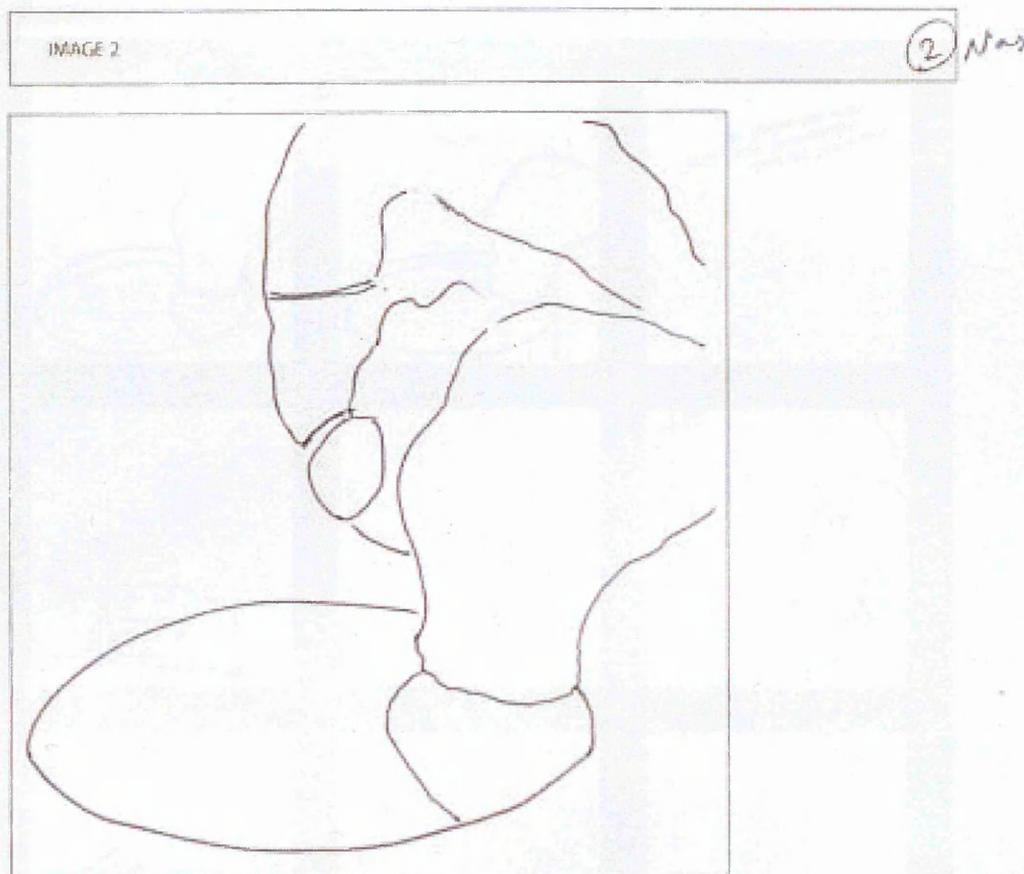


Figure 90 – Student No. 7 – drawing made in response to Question No. 2: ‘Trace the object being produced.’

Post-workshop: the film and ekphrasis text

The workshop produced two immediate outputs; a collection of forty-five tracings (Appendix 6) and an audio recording of the discussion that took place, which subsequently was transcribed (Appendix 7). The tracings were scanned to produce digital files and the transcript was used to generate an ekphrasis text that both directly quoted from the transcript, but also

elaborates upon the student's responses.³³⁷ The text is composed of six chapters (Figure 92) that focus on specific aspects of the group discussion and these structure the visual development of the film.

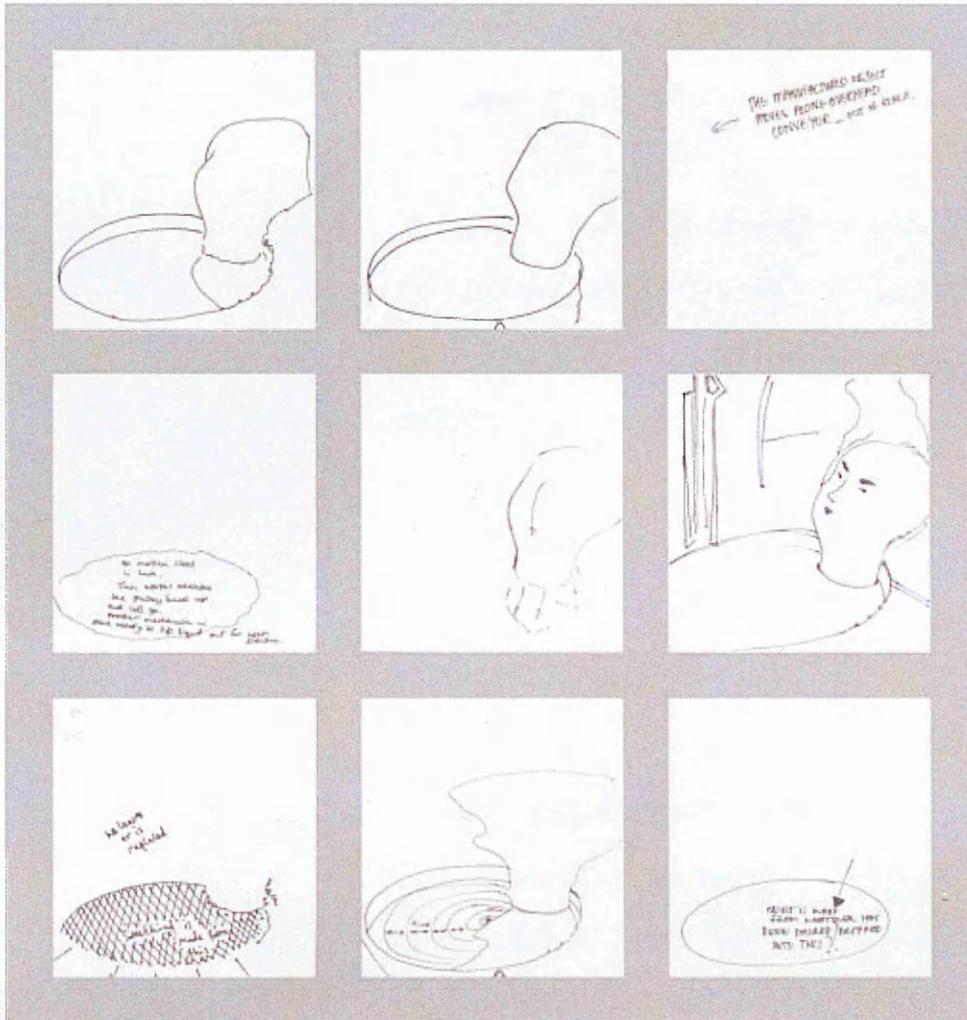


Figure 91: All nine drawings produced in response to Prompt No.5: What is the next stage, what happens next?

Reflecting Rust's call for artists not to adopt 'un-natural scientific methods' of analysis (Method page 133), the process of making the film was the form of analysis of both the tracings and the transcript. In constructing the film,

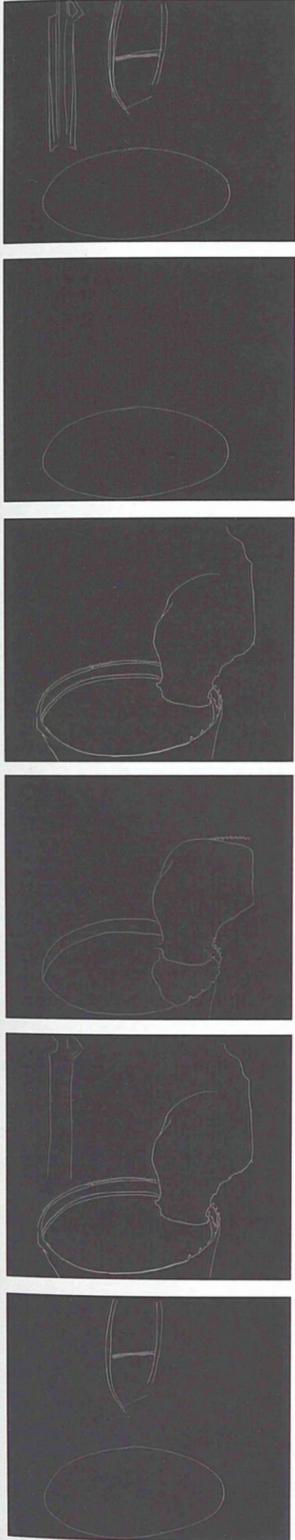
³³⁷ Examples of direct quotes from the transcript include: 'I have changed my mind' (Student No.7), 'I have just sort of made it up'. (Student No.4), 'The thing that has been cast can be taken out - the disk' (Student No.9).

contradictions and similarities of interpretation were identified, key ideas and divergent ideas drawn out.

Figure 92

Delineating an understanding

1 The presence of light



An intense white glow lights this interior. The light and the material from which it emanates share the same viscosity, not a bright flash, but a light that slowly moves, creeping and changing as the material moves and flows. The light spreads across the space, falling onto the horizontal and vertical metallic surfaces, temporarily lighting and revealing. Tops and sides adjacent to the light source are highlighted, appearing sharp and angular against greys, browns, or blacks. Behind the many obstacles and out of the light's direct path, the darkness remains unchanged, un-definable areas which recede, providing no information.

The light produces a fleeting glimpse – the first awareness of where I am. I see a large circular form – the surface of which reflects the light – but there is a confusion of scale, which dictates how I think about this form - tank or vat, bucket or drum. On my right a column or maybe part of a machine.

In this short moment of seeing, so many thoughts occur. There is a slow realisation – a piecing together - where intuition is as important as evidence – the highlighted details tell me as much as the areas where I can see nothing, black unknown shapes which I overlay and fill with information.

It is only as the material cools and the light begins to fade, that as the space moves back towards darkness, I get a sense of what I

have seen – and now in the darkness once again I can begin to dismiss all the other thoughts that I had.

2 What is the shape?

I cannot help but stare at the white intensity of this glow, which burns its image onto my eyes. The intense whiteness is empty, only its glowing shifting edges can be discerned against the blackness in which it appears. The intensity of its glow makes it difficult to see or understand, it is as much a gap or an emptiness as it is a presence in this space.

There is a contradiction to what I see, I cannot understand its form. I see a viscous material (steel or glass), slowly pouring downwards filling the vat, or steam or vapor rising upwards, evaporating, drifting and disappearing. It is possible to see the liquid slowly evaporating as different densities of vapor fill the space – liquid here, turning into gas.

3 Going into the tank – its depth

From this position, I am only able to see a section of the tank – perhaps only the top of it, its full height dropping beneath the structure on which I stand.

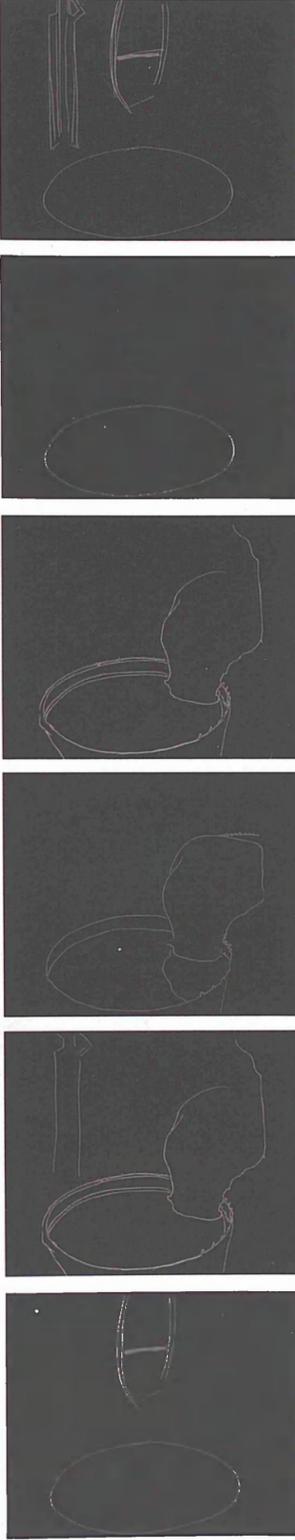
The surface of the water acts as a reflective plane, the effect of the intense light so close to it, but this opacity masks the depth of the tank.

Although I did not see it go into the tank, I saw the moment shortly after - ripples on the surface as it disappears beneath the surface

of the water. There is a moment of impact – a noise – a splash – the disturbance of the surface – there's a bubbling quality where the heat meets the water.

There is the overhead pulley that has swung across the space and then dunked it into the tank in order to cool it – 'hot metal or something that has been cast' – and the plume of smoke the result of the meeting of the hot metal and the water in the tank. I think I that I can still see its glowing form under the surface.

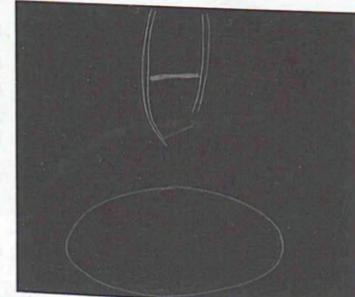
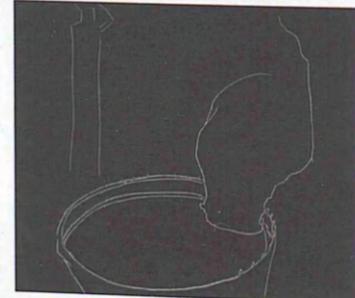
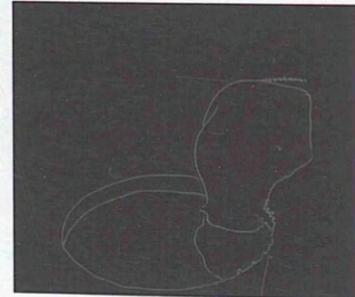
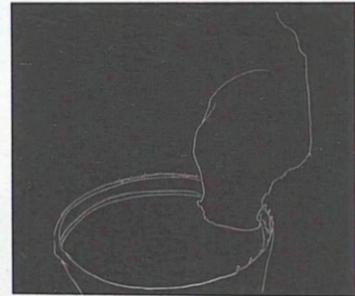
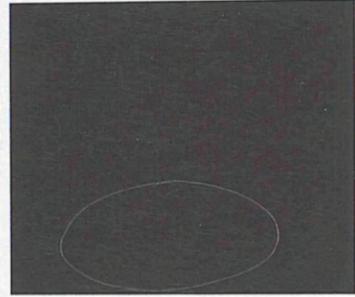
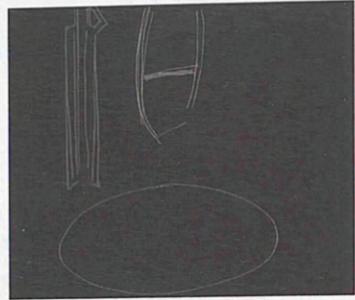
4 The man



I have a sudden awareness that in the midst of this darkness a figure is present, and I am shocked at his presence. I see his cap, his suit, sandy brown in colour and his white shirt. But it is the whites of his eyes, an intensity of looking which I cannot forget.

I have a sudden fear of where I am – the man's presence has changed spectacle into something else – there is the first awareness that the light is accompanied by an intense heat. I suddenly fear for his safety – so close to the molten material, its intense heat falling from above his body. Upon recognising his presence the scale of where I am begins to make sense, the man so small in this space.

At first, startled by the intensity of the glow in the darkness – I misunderstood what was happening before me and where I was. I saw the fear on the man's face, the way in which he was cowering and moving away - like he had seen a ghost. It was only an instant, but there it was, the ghost's face staring at the man, his



eyes full of fear. But now that my eyes have adjusted, I realize that that I was mistaken, my mind projecting onto the intense whiteness of glowing material - but the fear remains – it is in the man's eyes and the way in which he is trying to get away.

Only the upper half of the man is visible, most of his body still in hidden in darkness. I can't understand how his body is positioned – he looks awkward – uncomfortable not unlike a puppet, pulled by conflicting forces in several different directions at once.

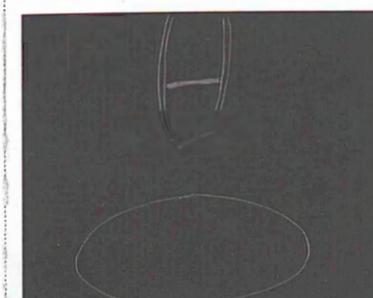
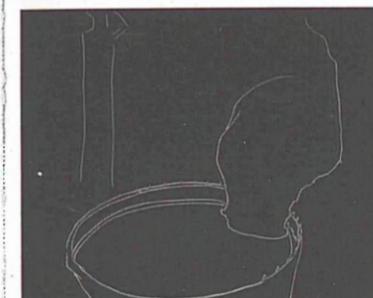
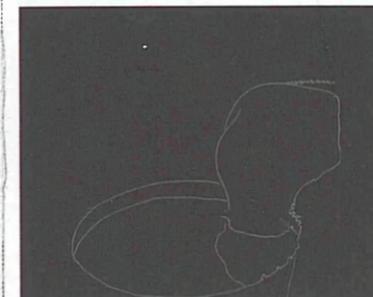
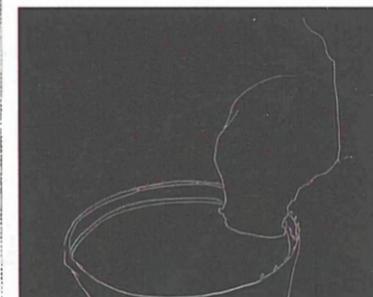
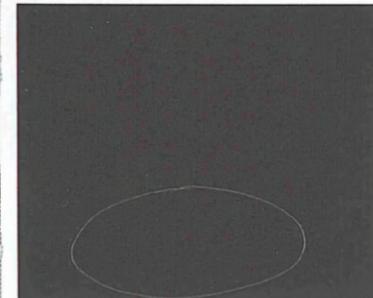
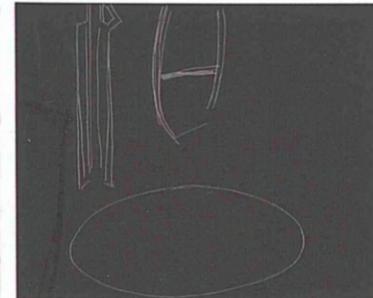
'He is pulling with his arm and bending slightly forwards – but twisting to watch as this thing tips out - his shoulders are really forward and twisting – he's having to move to keep watch'. He is 'Holding something for support – a bit out of kilter'.

One of the man's arms is visible in the light – it is held up grasping for a lever – pushing or pulling I cannot tell.

Although I cannot see it (it is only the position of his body which suggests it) his other arm is engaged in operating a control panel which is hidden, partially by the vat and partly because this area remains obscured by the lack of light.

5 More understanding

Now that I have seen the man and have an understanding of the scale of the events that I am witnessing I look again at the circular tank. Perhaps fifteen feet in diameter, it is made in two half's. The section closest to me, a perfect and solid curve, but the other half looks temporary, held in place by a number of stakes running around the outside of the curve, holding it in place. There are also



props holding the curve in position, to counter the weight of the material – as its mass moves outwards, pressing heavily against these surfaces.

There is a mechanism which holds these two half's together and I immediately think of a cake tin, the metal clasp which when unclipped to release its contents.

There is a moment of impact – a noise - the intensity of heated material meeting cold water – a bubbling. Falling onto the cold perfect surface the molten material spreads taking an impression surface – a perfect copy.

'The thing that has been cast can be taken out – the disk'

6 Memory Bank

Now once again in the darkness I begin to think of other images that I have seen - of factories – of men working – and I wonder to what extent this memory begins to inform what I am seeing now? I realize that in the areas where I could see nothing, the black unknown shapes, I overlaid these with information - 'I have just sort of made it up'.

The circular vat makes me think of other images – I begin to consider other circular objects and in these thoughts the scale shifts once again. And as material moves from viscous whiteness, through crystallization and solidifying processes, I realise that 'I have changed my mind'.

4.5.2 Discussion No.3

Over the course of the workshop, striking differences emerged in how the students read and understood the photograph. Reflecting the contingency and fantasy described by Sontag, Barthes or Bal (as discussed on page 175), the work revealed processes of interpretation that were not singular or summative, but plural and shifting.

In comparison to the method used within *Plasticine, ekphrasis and imagined making* (which was produced earlier in Phase 2), the use of the five questions and the method of tracing, clarified the parameters within which the students could respond. This made the comparison between their responses easier to identify.

There were several aspects of the photograph that were contested. This included the interpretation of movement within the image that the majority of the group interpreted as a downward flow of a viscous material (Figure 93 left), whilst others saw the evaporation of a liquid (Figure 93 right).

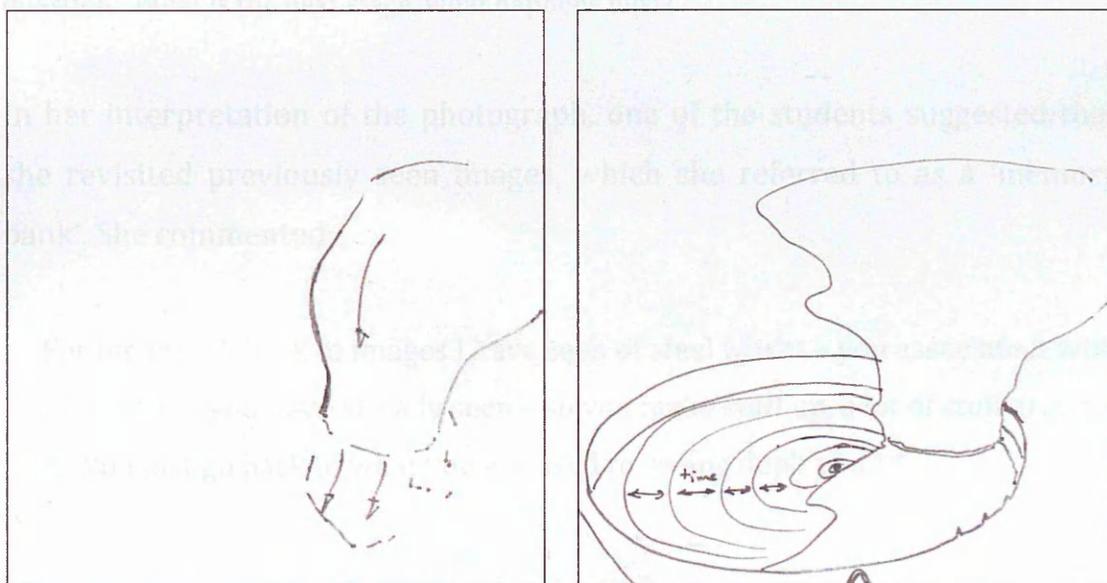


Figure 93: (Left) Student No.5, (Right) Student No. 8

The function of the circular 'tank' which occupies the majority of the foreground also caused confusion and prompted disagreement within the group, who were unable to discern its depth, what it contained or its function. Equally, whilst the glowing material was interpreted both as steel and glass (Figure 94 left), one student did not see this form as a material, but as a ghost (Figure 94 right).³³⁸

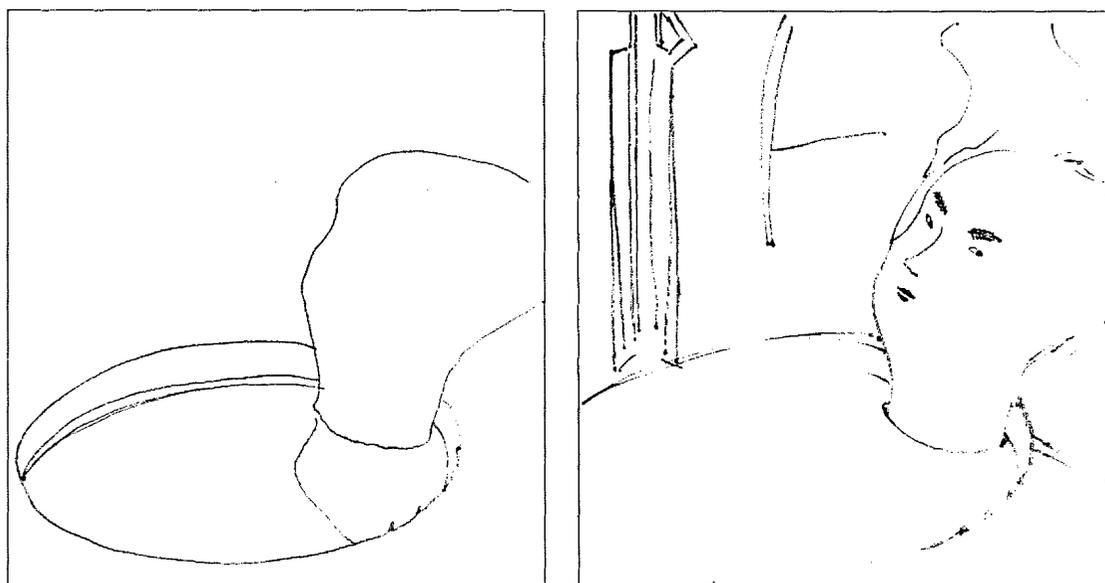


Figure 94: (left) Student No.8; (right) Student No.6. Drawings made in response to the question: 'What is the next stage, what happens next?'

In her interpretation of the photograph, one of the students suggested that she revisited previously seen images, which she referred to as a 'memory bank'. She commented:

For me I think back to images I have seen of steel works – you associate it with images that you have already seen – so you make stuff up, a lot of stuff around it. You just go back to what you are used to seeing don't you.³³⁹

³³⁸ Student No.6 said: 'Actually when I first saw this picture I thought it was a boy looking at a ghost coming from this bucket'.

³³⁹ Student No.4.

Her comment demonstrates the impossibility of isolating a single element - as the workshop was attempting. Instead her understanding was formed through the complex interplay of information - information from other sources (her 'memory bank') was brought into fill gaps in her comprehension of the photograph she was confronted by. Her comment highlights how photographs from different contexts (making processes, era's, industries) are brought into a relationship with one another.

Over the duration of the workshop, the observations of individual students prompted new comments and observations from other members of the group. This process built a momentum through which the group 'delved' into the photograph. Through the accumulation of observations from multiple contributors, the workshop achieved a depth of analysis. However, interpretation is usually an individual experience, rather than a communal one, and is likely to occur through a 'first seeing' (Wall) or 'fulguration' (Barthes) rather than a sustained close analysis of the image. Describing the processes of interpretation, Mieke Bal states: 'Perception, in fact, depends on so many factors that it is pointless to strive for objectivity'.³⁴⁰ To reflect this, the final film does not build to a summative conclusion, or homogenise the student's responses, but aims to acknowledge the breadth of interpretations and the shifting ideas that emerged in the workshop. In both its visual and textual form, the film aims to reflect the processes of interpretation that occurred - its shifting, flickering nature suggestive of the process of drawing

³⁴⁰ Summarising Mieke Bal's text *Looking In: The art of Viewing* (2001), Rebecca Fortnum states: Bal 'Advocates an experiential account of the work, one that does not attempt a finite summation, but rather seeks to describe a performative encounter between the work and its audience, contingent on context. She describes it thus, 'perception, however, is a psychosomatic process, strongly dependent, for example, on the perception of the perceiving body in relation to the perceived object... The degree of familiarity with what one sees also influences one's perception... Perception, in fact, depends on so many factors that it is pointless to strive for objectivity.'
Visual Intelligences: What is Visual Intelligence and how do artists use it?
<<http://www.visualintelligences.com/visual-intelligence-how-artists-use-it.html>>
[accessed 15 January 2013].

sense out of the photograph, speculating and dismissing ideas, only to reveal new ones.

It is important to state that three separate workshops were run, each examining a different photograph from *The Archive* (Figure 95). However, the final film is based on only one of the sessions.³⁴¹ The photograph used in this session (Figure 88) created the most divergent responses. It seems significant that this historical, black and white photograph was much less graphic than the other two images used. Within this photograph, certain areas essentially contained no information (where the image is fully black or fully white) and these prompted uncertainty and speculation. This would suggest that different photographs from *The Archive* are more liable to produce speculation than others



Figure 95: The three photographs used in the workshops: (left) 'The second pot of molten 'metal' being poured into the mould, for the manufacture of a 78 in. disc', (1959). Photograph: Pilkington Glass. (middle) 'This panorama shows the inside of Goddard's High Bay Clean Room', NASA, (circa 2000). (right) Quality inspection room, SCHOTT Glass, (circa 2000). Photograph: SCHOTT AG.

Delineating an understanding demonstrates the contingency that can result in the interpretation of a single component, in this case a glimpse of process in the form of a single photograph. However as demonstrated in the previous section, an understanding of process is likely to be constructed through the

³⁴¹ I particularly focused on the response from this workshop because it aligned with early works such as *Fantasies of Making*.

complex interplay of information. Within this interplay of information – the contingency exposed by *Delineating an understanding* affects multiple rather than singular components.

The duality of the artwork

Within the research process, *Delineating an understanding* has functioned as a method of interrogation – the process of making the work has helped me to identify information which is significant in the understanding of the photograph. However, the final artwork has a second function.³⁴² When exhibited, *Delineating an understanding* offers a live experience, placing the viewer in a situation where they encounter two of the key principles: First, the complex interplay of information is experienced through the combination of the audio narrative and the visual information, which the viewer has to piece together. Second, the viewer witnesses the contingent and fluid process of interpretation of the photograph by the students. Over the duration of the film, the speculations of the students (both visually and through the audio text), suggest lines of enquiry that the viewer might follow – encouraging them to make their own interpretation.

³⁴² This duality is true of other works, such as *Glass eliminates all confusion*, however other works have functioned only within the research process to generate my own insight in to material within *The Archive* – such as *Making with Plasticine while thinking about glass* (Appendix 4).

5.1 Summary

This research responds to the well-documented sense of disconnection to and invisibility of making process. At the outset, in order to understand how something is made, secondary sources with the potential to contribute to an understanding of process were collated in *The Archive of Manufacture*. Through the research these 'points of visibility' have been explored through three questions: why and how is process made visible, and what is understood?

Chapter 2 – The visibility of process

Chapter 2 makes an analysis of the material within *The Archive* through a broad range of strategies to explore how and why process is made visible. The Chapter identifies five types of limitations that effect how process is made visible:

1 Drivers

Many of the examples in *The Archive* were not primarily produced to clarify making process. Instead, the visibility of process in these examples is the result of other motivating factors, or 'drivers'. In addition 'points of visibility' are often the result of multiple drivers – which have competing or contradictory aims.

2 Context and form

These drivers have a significant influence on how process is articulated. For example, in its concern for the loss of a two hundred year old glass making tradition, *Glass Works'* reference to Diderot ignores the situated-ness of the factory's closure in the context of the 1970's.

3 Fragments, gaps and glimpses

Still images make up the vast majority of *The Archive's* content, however this form of visibility often only provides partial or fragmentary insights. Equally, these glimpses of process often appear without contextual information, or are published outside of their original intended context, or printed for their intrigue, or composition. Although sequences (both photographic, film and live demonstrations) are able to describe a more complete narrative, gaps between images or stages result in significant missing information.

4 Objects and images

Although images are the dominant form within *The Archive*, both the image and object function as sources of information about making process. In Chapter 2, Mugridge's reading of the historical brick demonstrates the potential of information in the object to illuminate its own making process. However, this form of information is rare and Mugridge's expertise is not a universal one.

5 Levels of knowledge

Chapter 2 identifies how different levels of knowledge effect both the production of points of visibility, but also their understanding. Descriptions of process are made both by the expert (Mugridge, Zanotto, or Pye) and the non-expert (the teenagers in *Blood, Sweat and Luxuries*). Finally, Wood questions the ability of the non-expert to understand expert knowledge, suggesting different levels of comprehension and access.

The identification of these limitations leads to the conclusion that despite being surrounded by a cacophony of images, discussions, films about making and the made - this material is a conflicted form of information, as likely to be misunderstood as it is able to provide objective information about how things are made. The question - what is understood? - was introduced to investigate

the potential failure of this information and what understanding of process might emerge.

Method

In order to examine examples in *The Archive*, artistic methods of visual, material and cognitive interpretation were fore-fronted.

The research establishes a method that expands Steiner's definition of close reading as a 'meticulous visual analysis' to include material and visual processes from art practice, and the written form of ekphrasis. These methods functioned as critical forms of looking to explore how examples from *The Archive* communicate process and how these examples are understood. In addition ekphrasis provided a method of elucidating information through description. Crucially ekphrasis acknowledges the personal nature of interpretation, combining information that is physically present with speculative or imagined responses.

Two distinct phases of research were used in the analysis – Phase 1 utilised my own knowledge and relationship with the material, and in Phase 2 decentralised it. In Phase 1, a dialogue and interchange between different activities (including drawing, making, writing), functioned to drive the research forward, generating new insights, experimentation and new artworks. Within the development of these works source material moved across the investigation – often collaged into a number of different works. Within this process my own understanding of the material was central.

By working with groups of students in Phase 2, I was able to broaden my own understanding of the material in *The Archive* by observing how others interpreted it. The final artworks produced through these sessions reflected the discursive nature of the sessions by allowing the multiple voices and contradictions of the students' interpretation to remain evident.

Chapter 4 - Four key principles that describe how process is understood

Through the production of and reflection upon the body of artworks, Chapter 4 introduces and details four key principles which describe how process becomes visible and how it is subsequently understood. The artworks explore the contingency of interpretation and the imagined or speculative understanding of process which results. Initially identified in relation to the Crown Glass Object, the four principles were expanded through the production of the artworks.

Information in and outside the object + juncture

The first two of the key principles (Juncture and Information in and outside the object) have a close interrelation. Juncture describes a key moment when process is discarded and the product becomes permanently distinct from the complexity of its manufacturing process. However, the research does not suggest that juncture results in total invisibility, but identifies two sites of information where process remains visible: information in and outside the object.

Untitled (Diderot) investigates information outside the object – an engraving from *Diderot and d'Alembert's Encyclopédie*. The work brings the engraving into a closer relationship with the reality of the making process that it visualises and builds upon the written analysis of the engravings by others – particularly Sennett. Through its three stages, the work reveals the physicality and movement that is missing from the engraving.

By re-making the engraving, the work interrogates this depiction of juncture, revealing how the recognisable end product is also present. The work raises questions about the contingency of the image: the impact of the engraving's own process of making upon its capacity to visualise process, and the possibility of the draftsman being a stranger to the process that they were depicting. If this is the case, it suggests that a disconnection to manufacturing process is not just a contemporary phenomenon, and in keeping with Heartfield's argument that commentators not directly involved in manufacture are the ones generating the social commentary about making.

Plasticine, ekphrasis and imagined making investigates the effect of juncture upon information in the object. In this making process several points of juncture were conceived to separate the final object from its making process and investigate how the Plasticine might 'record' stages of making as a visible trace. Whilst the most pronounced stage of juncture is the squashing of the statue to form the disk, other more subtle stages of juncture occur throughout this making process. These points of juncture form significant stages of change that are only partially visible in the finished object. The sessions with the students revealed that important stages of process disappear and are irretrievable.

However, some of the students displayed a surprising ability to read the information visible in the disk and use this to speculate upon its making process. But, they also misread information visible in the object, bringing into their interpretation knowledge and experiences not directly connected to the disk.

The Complex interplay of information

The third key principle proposes that understanding is formed through the interplay of multiple sources of information.

Fantasies of making demonstrates how understanding of process is constructed not from singular points of visibility, but through multiple sources. This can include: information in and outside the object; historical and contemporary sources; digital and physical descriptions; as well as bringing together points of visibility created by contradictory 'drivers' such as celebration and concern. Reflecting Rogoff's description of intertextuality, in addition to points of visibility where making process is visible, other sources of information not connected to making process contribute to understanding. This can be seen in *Fantasies of Making* where there is a relationship between a pre-industrial (The Crown Glass Object), an industrially produced object (Float Glass) and 'alternative' explanations of material from sources such as magic tricks. This dialogue between different types of contradictory information can influence an understanding which is inconclusive and perpetuates myths and misunderstanding.

The analysis of Float Glass in *Fantasies of Making* demonstrates the dramatic effect of juncture. Float's making process is conceived to remove information in the object through deliberate stages of its manufacture – process removing process. The apparent 'emptiness' of the material creates a gap that prompts speculation and fantasy about its materiality. This projection is partly caused by the transparent nature of the glass, coupled with a lack of knowledge – however, there is also a susceptibility to alternative narratives and a desire to want to believe – however fleeting this belief is.

Glass eliminates all confusion - as a live experience the viewer's interpretation and piecing together of the separate components allows them to experience the complex interplay of information and the way in which this affects understanding.

The work is reflective of the same contingent processes that were originally observed in *Fantasies of Making* – the layout of the five components and the interplay of the two sounds works create circumstances in which the viewer encounters fragmentary information which they interpret through their own previous experience and knowledge.

A contingent understanding

The fourth key principle identifies the impact of the contingency of interpretation upon the understanding of examples from *The Archive*. *Delineating an understanding*, produced in Phase 2, was developed to record the response of students to a series of photographs from *The Archive* and through the process of group discussion reveal similarities and divergences in the ways in which they interpreted the image.

The process revealed several aspects of the photograph that were contested. One student commented that she accessed a 'memory bank' of other images she had previously seen in order to fill gaps in her comprehension. Her comment demonstrated how information from other sources (different contexts, making processes, eras, industries) are brought into a relationship with one another through a complex interplay.

It is important to state that three separate workshops were run, the historical, black and white photograph created the most divergent responses. Within this photograph, certain areas essentially contained no information (where the image is fully black or fully white) and these prompted uncertainty and speculation. This would suggest that different photographs from *The Archive* are more liable to produce speculation than others.

5.2 Contributions to knowledge

The study makes contributions to three areas: 1) to contemporary theoretical understandings of process, 2) to methods of art practice as research, and 3) pedagogical methods for group work.

1) The contemporary understanding of process

A) This research contributes to discussions concerning our relationship with making and the made, expanding theories of a distanced relationship to process as developed by critics such as Marx, de Botton, Heartfield or Crawford by demonstrating the misunderstanding, myth and fantasy which results.

B) The study generates two sets of categories for the analysis of the relationship between process and product: First, the identification and description of types of visibility and their limitations (drivers, fragments – glimpses – gaps). Second, four key principles that describe how process becomes visible and how it is subsequently understood (juncture - in and outside - complex interplay - contingent understanding).

C) The artworks articulate the processes of interpretation through which understanding forms. The artworks *Delineating an Understanding* and *Glass eliminates all confusion* – function as experiences, allowing the viewer to access and experience the contingency of interpretation and how meaning can be constructed through the complex interplay of information.

2) Methods of art practice as research

A) Through its use of practical art research methods including: critical material and making processes, re-making, experiments with video and sound, installation and participatory processes, the research explores the visible signs of process. By using process to explore process, the research offers methods of interrogating artefacts that move beyond expected forms of textual analysis.

B) The study uses processes of description and the juxtaposition of visual and textual description as a key tool of investigation. It expands definitions of close reading to incorporate critical material and making based processes, combined with the use of ekphrasis as a written form.

C) By detailing and reflecting upon the ways in which art practice has been used, the research contributes an articulation of art making process which describes the interchange between different types of activity (including drawing, making, writing); recognises trajectories which are not concluded and remain unresolved; and shares the processes through which understanding is gathered and congealed. The description of the generative interchange between types of methods and activities (as discussed on page 111) suggests a more complex and 'messy' reality in comparison to the processual clarity of Gray and Malins model.

D) Within the research process, many of the artworks have a dual function. Within my research process they have functioned as a methods of interrogation – helping me to identify information which is significant in the examples from *The Archive*. Some of the artwork (such as *Glass eliminates all confusion*) has a second function offering a live experience to the viewer.

When exhibited, the artworks allows others to experience the research in a way that the thesis text cannot. However, whilst the final film is divergent in nature, the writing within the thesis presents a convergent narrative of the work. This raises questions about the role of the thesis in practice-based research and the difference between the artwork that prompts new ideas - and the thesis text that strives to be summative. Additionally, despite the importance of the viewer's first hand experience of the artwork, within the thesis, the context in which the work was shown (the use of an installation of multiple components), cannot be reproduced – DVD film is divorced from this spatial relationship.

3) Pedagogical methods for group work

A) By combining discursive methods from art education (the crit) with methods from art practice – the projects made within Phase 2 achieved three things: 1) conducted an analysis of specific examples from *The Archive*, 2) delivered an engaging teaching session, 3) and produced material which was incorporated into artworks.

B) The processes used to produce *Delineating an understanding* extend definitions of close reading through group work. The observations of individual students prompted new comments and observations from other members of the group. This process built a momentum through which the group ‘delved’ into the photograph. The final work reflects the accumulation of observations from multiple contributors, by allowing the multiple voices and contradictions to remain evident.

C) Although the founding object forms a significant example of an object within *The Archive*, demonstrating the impact of information in the object, I would like to deliberately address the limited presence of objects by finding and adding more examples.

5.3 Further work

1) The Archive of manufacture

The Archive of Manufacture has formed a significant resource within this research and has the potential to become an important source of information for other researchers. However, there are a number of limitations that I would address before considering making it a publicly accessible resource:

A) Although the process of collating *The Archive* employed methods to both expand its content and decentralise my relationship to it, in many ways *The Archive* remains my collection. In order to expand the resource further I would like to investigate ways to 'democratise' it, by setting up a blog or other online site to enable others to directly add their own suggestions.

B) Closing *The Archive* (as discussed on page 102) functioned as a crucial step in making an analysis of the material it contained. However, this process equally had an impact upon what was included and what might not be – as after this date new examples were not added. In many ways this highlights the problems of not working within a pre-existing archive – instead the processes of gathering the material and making an analysis of it, have had to be made within the same period of time. An online resource could adequately address this, allowing *The Archive* to be a 'live' form that grows as material is added.

C) Although the founding object forms a significant example of an object within *The Archive*, demonstrating the impact of information in the object – I would like to deliberately address the limited presence of objects by finding and adding more examples.

D) *Fantasies of Making* identifies how bodies of information not related to making process (such as the use of glass in magic tricks) contribute to

understanding. This challenges the ability of *The Archive* to collate these broader sources of information. This raises the question: should *The Archive* continue to collate information where process is made visible, or respond to this expanded conception of a broader range of information that contributes to understanding?

2) Generative interchange

The generative interchange between types of methods and activities (as discussed on pages 112) has driven the research forward and shaped its unique character, where a broad range of references are brought together through a form of collage. However, this method where practice truly leads the research process – equally causes problems: the developing work takes huge leaps – which you don't always immediately recognise or reflect upon – disparate methods and points of reference are brought together, which methodologically or theoretically jar. For example, in chapter 4 - an artwork exploring an engraving from 1750's sits in close proximity to photography theory.

The non-linear nature of the process employed in my research and the use of diagrams to visualise this (Figure 42), complicates models such as that produced by Gray and Malins.³⁴³ Further work could contribute a more detailed description of the messy reality of this process and reflect upon both problems of the leaps made, but also beneficial aspects of collaging information from a broad range of sources in this way.

3) Pedagogical aspects of method (Phase 2)

A) I have undertaken this research through the post of Teaching Researcher - a post that has afforded the close relationship between teaching and research – which can be seen in projects conducted in Phase 2. These projects have

³⁴³ However, this more messy reality has more in common with Reilly's description of artists' process as a search and her observation that in the search reveals 'more or other than was searched for'.

simultaneously generated original research material for my PhD, whilst engaging the students in an active learning process – where they can see their contribution taken seriously and impacting upon the outcome.

B) Within the same period of time I have sought ways to develop these methods outside of the specific scope of this research. This has led to a series of other outputs: *Constellation* – a project where the third year students of Creative Art practice BA (Hons) produce a map which locates their practices in relation to one another, and *Glass in the expanded Field* which mapped one hundred contemporary glass based artworks with students at the Gerrit Rietveld Academie in Amsterdam. In the immediate future I will undertake a Higher Education Academy Fellowship in order to reflect upon and share these teaching methods.

C) The two workshops conducted in Phase 2 used different strategies to illicit a response from the students. In the close reading of *The Plasticine Disk* the prompts had an impact upon the type of response. Future work would need to incorporate contradictory or oppositional prompts in order to test if the interpretations that emerged were a ‘natural’ response to the encounter with the object, or because of the prompts employed. Equally the impact of conducting these sessions within a one and hour teaching session would need to be addressed. In comparison, in the workshop in which *Delineating an understanding* was developed, the use of the five questions and the method of tracing, clarified the parameters within which the students could respond. Equally, this made the comparison between their responses easier to identify.

4) Artwork as experience

Both *Glass eliminates all confusion* – *Delineating an understanding* mark a significant shift in methods of making work within my practice - from producer of objects to producer of experiences.

However, a work such as *Plasticine ekphrasis and imagined making* can only be seen as a metaphor of production – the terraces of process visible in the *Plasticine* are reflective of some of the issues I observed, but not equivalent. In this work there is a gap ‘real’ production processes and studio based production processes. This is reflective of the difficulty of ‘getting at’ ‘real’ production – in part because of juncture, but it is also reflective of the inaccessibility of process as described by commentators such as Heartfield. The problem of how to make artworks as experiences which closes this gap – bringing art making into a closer connection with ‘real’ making processes will provide the next challenge.

Appendix

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Appendix No.1

Key Words to prompt reflection

1A	Intimacy	1B	Mediated form
2A	Agency		
3A	Personal knowhow Actor	3B	Distributed knowledge (Dormer) Receiver
4A	Craft	4B	Industrial production
5A	Possibility of 1 st hand encounter	5B	Invisibly (is this process visible in everyday experience?)
5C	Accessible	5D	Inaccessible (even if I wanted to see it would I be able to access it? (Inaccessibility through distance / privacy / health and safety)
Spatial			
6A	Local (one person - one site)	6B	Global (distributed knowledge - spaces and people spread across)

Position of documenter / commentator

7A	Naive	7B	Informed
7C	Stranger		

7D	The witness		
8A	Celebration	8B	Concern (Anxiety / paranoia)
8C	Moral	8D	Ethical / environmental
8E	The idea of 're-connecting'		

Appearance of the object			
9A	Appearance of the object	9B	Finished object
		9C	Object as commodity
		9D	Object as fragment
		9E	Gaps

Time			
10A	Live	10B	Not live
10C	'Decisive moment' (Henri Cartier Bresson) [Sennett p95]	10D	Constructed
		10E	Posed
11A	Narrative	11B	Abstraction
12A	Still image	12B	Moving image
12C	Partial / fragmentary / glimpses	12D	Sequence

12E	Contextualised (essay / captions / commentary)	12F	Non-contextualised
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Object			
13A	Regularity (Pye)	13B	Diversity

Figure			
14A	Figure	14B	No figure
14C	Portrait (Penny's feedback)	14D	Anonymous (e.g. faces covered)
		14E	Just hands
15A	What is the focus?	15B	Process
	People (portrait)		
15C	Social documentation / relevance of work / working conditions	15D	Escapism / nostalgia

Date / period			
16A	Enlightenment	16B	Date
17A	Diderot as precedent		

Appendix No.2

Fantasies of making

Introduction

This paper uses ideas of the host, transmission, and the stranger to explore our relation to industrially produced objects and to the making process that creates these objects. These terms will be used to explore the potential of both the object and the images of its manufacture to host ideas, examining the transmission of these ideas to the stranger, who is removed and at a distance from the production process of the products of industrial manufacture. Here the encounter is no longer firsthand, but mediated by film or photograph.

Points of visibility

In order to further define the context, the paper uses a definition from Peter Dormer who draws the distinction between craft and non-craft production with the terms ‘personal know how’ to describe craft process and ‘distributed knowledge’ to describe the systems of industrial production.¹ ‘Distributed knowledge’ is a term which suggests an impersonal relation, marked by distance and disconnectedness: the position of the stranger. In this context our access to and understanding of production is usually gained through points of visibility, photographs, or films which are often presented in publicity and marketing material or in popular science, and which offer glimpses of complicated, high technology manufacturing processes. These images provide important insights with the potential to contribute to our understanding of and relationship to things. However, the ways in which making is made visible are rarely neutral or purely objective; the articulation of making is constructed, staged and released for specific agendas, which effects transmission.

Focus of enquiry: flat glass production

To explore this relation between host, transmission, and stranger, I will examine two production processes of flat glass: the float glass process invented in 1959 and its

historical precedent, the Crown Glass process, employed until the nineteenth century. The paper uses as its evidence information both in the object, referring to the physical effect of process upon material, and information outside the object, including images of industrial manufacture (both historical and contemporary), a film of a magic trick from *YouTube* and a short clip of a popular science television show.

The stranger's understanding

The paper demonstrates the stranger's understanding by examining a number of misunderstandings of glass and its manufacturing processes. It proposes that despite our encounters with the depiction of manufacturing process we remain the stranger. However, the paper concludes that we might want to remain so; a situation in which fantasies of making blossom; fantasies which allow us to form subjective and personal relations to the objects and processes of mass production.

Float glass – an objective material?

On 20 January 1959 Pilkington Glass announced a new and revolutionary process for the production of flat glass, known as the float process. The product of this process, float glass, is created by pouring molten glass onto the surface of molten tin, on which the glass floats and forms. The surface of the glass which forms against the mirror-like surface of the tin becomes correspondingly flat, while the topside of the glass sheet becomes perfectly smooth in the heated atmosphere of the furnace. As the ribbon of glass moves along the production line any flaws in the material are detected by a computer and the corresponding section removed. The result is a material with perfect surfaces and a consistency of finish, produced at the rate of fifteen metres of glass per minute.²

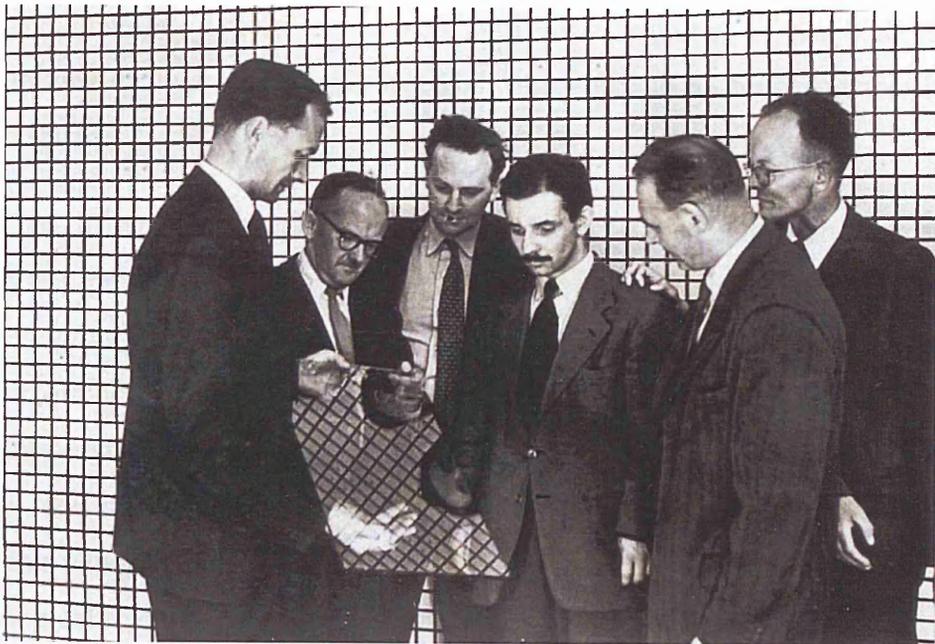


Fig. 1. The float development team (1959): Alastair Pilkington (far left); on his left E.Litherland, production manager, Cowley Hill; George Dickinson, development manager; J.E.C Thomas, tanks manager; Jack Topping, special examiner; Richard Barradell-Smith (ex-Rolls Royce), leader of the float development team. Image courtesy of Pilkington Group Ltd.

To aid the introduction and public explanation of this new process, Pilkington Glass released printed material, a film and numerous images. Released in 1959 this image shows six men from the float development team. On the left Alistair Pilkington, a mechanical scientist credited with the invention of float, presents a piece of float glass to the rest of the team, who are gathered around it, looking at its surface (Fig. 1).

The piece of glass held in the image is transparent and, if held at another angle, would be seen through and would be barely visible. Held at this specific angle, however, the transparent sheet becomes a reflective plane on which an image forms. The reflection consists of two elements: a section of the background grid and the tops of two of the men's heads.

This reflected information fuses with the object to form an image. The reflected grid transforms transparency and invisibility into an image of embedded technology, implying calculation and perfection, while the reflection of the men's craniums suggests that this is a material made by thinking; the meeting of mental calculation

and material. The reflection acts as a visual signifier of the high technology and rationality that created this material, but which is no longer visible in the material itself.

The development of float glass is part of a significant change in the methodologies of glass production that started at the end of the nineteenth century, which Michael Wigginton describes as a change from ‘an empirical set of crafts, to technologies informed by science as the processes and the chemistries became understood.’³ Float’s successful development and the subsequent exacting control of the process, relied on a total understanding of the chemical and physical properties of this material and of this new process. Seven years in development, this was achieved by the application of logical scientific process by a team of scientists and engineers.

A comparison of this image with earlier depictions of manufacture, such as Diderot and d’Alembert’s depiction of glass production in the eighteenth century (which will be discussed later), demonstrates this fundamental shift in production. This is a different set of people involved in this material’s manufacture. These are not the craftsmen who have physically engaged with material and process, but technologists and scientists who have calculated the manufacture of this material. Following the public announcement in 1959 the development of float continued throughout the 1960s, the process only becoming a fully operational and economically viable proposition in the late 1960s.⁴ In this same decade, Jean Baudrillard, in *The System of Objects*, discusses glass’s ‘purity, reliability and objectivity’, writing that ‘glass eliminates all confusion’.⁵ Although Baudrillard’s text does not refer to float specifically, his terms ‘purity, reliability and objectivity’ seem to describe float precisely: ‘purity’ describing its unblemished surface and clarity; ‘reliability’, the exacting control and consistency of product; ‘objectivity’, its method of production, which takes place in a sealed chamber and is mediated through a computer terminal set in a distant control room (fig. 2). This is a manufacturing process of disconnectedness, of ‘distributed knowledge’. Float glass is a material synonymous with perfection and visually devoid of any sign of its manufacture. However, it is these qualities, and the lack of a visible trace of the manufacturing process, which make it a canvas for projected ideas, ideas in conflict with its technological nature.

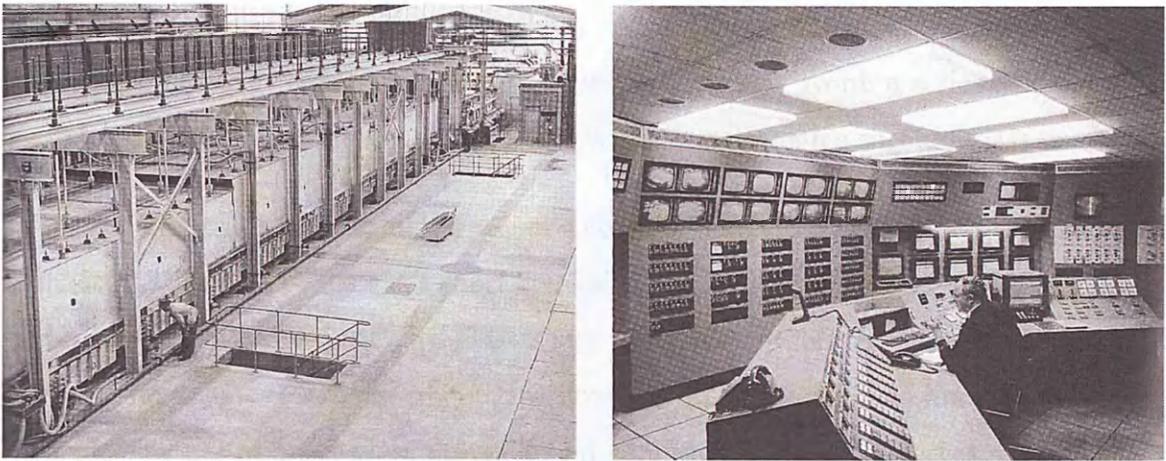


Fig. 2. Left: Float Bath CH3, 1962. Right: Bath control room, UK5, St Helens 1986. Images courtesy of Pilkington Group Ltd

The magician actively creating confusion

Moving from the production of float glass to an example of its use, I will examine the use of glass in magic and conjuring tricks, specifically looking at the way in which these tricks manipulate an audience's understanding of material. The following examples present ideas of material which oppose and contradict the objective and technological nature of float.

These ideas may be traced to float's historical manufacturing precedent: blown plate glass, and the physical effects of this earlier making process upon material. The information that resides in the object of this earlier manufacturing process continues to effect the perception of float.

In an online video, contemporary American magician Criss Angel performs a trick in which he seemingly climbs through a plate glass window in front of a live audience. At the beginning of the illusion, while tapping his hand against the glass, Angel says: 'Now a lot of people would say glass is a solid, some would say it is a liquid [...] and a solid cannot pass through a solid. Unless it was really a liquid?'.⁶

Earlier precedents of magic tricks in which sheet glass is penetrated are relatively common, although they usually take place on a smaller scale. A few examples from the 1950s include: 'Bending Glass', described by its marketing literature as 'a

practical demonstration of the impossible', 'Dove Through Glass,' and 'Warlocks Amazing Frame', in which, with the application of a magic word, a series of objects including a metal rod, a ribbon, and a magic wand pass through a sheet of glass.

In these historical examples and in Angel's contemporary trick, the same implication is made, that instead of the glass sheet breaking or its solidity forming an impenetrable barrier as we would expect, the glass sheet gives way, either bending or flowing, allowing the magic wand, the ribbon, the dove, or even the magician himself to pass through. The use of sheet glass in magic and conjuring tricks often serves to counter the suspicion of the audience. Employed as a transparent barrier, its transparency provides the audience with visual access, and suggests a climate of openness between magician and audience, as any interference from the magician would be seen. However, questions of the fundamental nature of glass and its classification as a substance (liquid, solid, or super-cooled liquid?) and the audience's lack of knowledge provide the magician with the opportunity to actively create confusion.

This is reflected in Angel's statement, which is an attempt to mystify or confuse the audience about the physical nature of glass. It is used to create a situation in which the normal rules of the physical world are confused, in the attempt to establish circumstances in which magic can be the only explanation of the events that we are witnessing.

The myth of glass flow

Angel's statement makes reference to a common urban myth that suggests that glass is a liquid and will therefore continue to flow after its manufacture and over the duration of its existence as an object. The myth cites as its evidence that cross section of antique glass windowpanes are thicker at the bottom than at the top, with the hypothesis that if glass is a liquid it will be effected by gravity and flow over time.

Any number of examples could be presented as evidence of this myth, but particularly pertinent to this paper is an example from the popular science program *How Do They Do It?*. In the film we see a Pilkington operative (wearing a Pilkington baseball cap and T-shirt) standing in front of the float production line, stating:

Glass is classed as a super-cooled liquid, that in as much as it's never in a completely

stable form, if you put it in your windows in twenty years time it will be slightly thicker at the bottom than when it was installed.⁷

The physical phenomena that inspired the myth (the uneven cross-section of antique windows) is in fact evidence of hand-making, and is the result of a manufacturing process called Crown Glass, which is an earlier method for the manufacture of flat glass used until the nineteenth-century and a historical precedent of float.

The Crown Glass process involved the blowing of a sphere, which was transferred from blowing iron to 'puntil' iron, and then heated and spun, using centrifugal force to 'throw' the glass into a flat disk. When cold, this disk would be cut into sections to be used as windowpanes. The physical effect of the centrifugal force created a varying thickness of cross-section. After the disk had been cut into sections for windowpanes, the glazier would position the thicker edge at the bottom of the window. It is the physical effect of process and this subsequent action of the glazier that has led to the myth of glass flow.

This common misconception has been categorically disproved,⁸ but the idea continues to prevail and infect the rationality and objectivity of float.

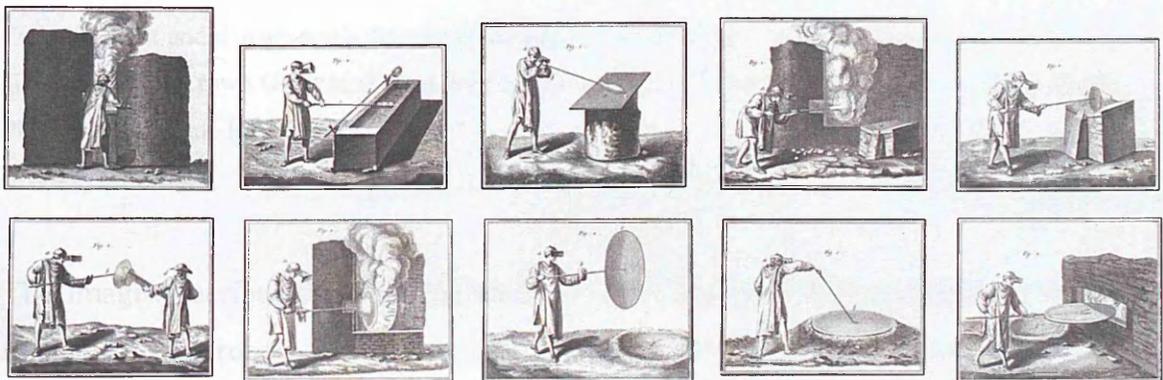


Fig. 3. Diderot and d'Alembert's *Encyclopedia* (1751) Crown Glass, Plates 1 – 18. Charles C. Gillispie, *A Diderot Pictorial Encyclopedia of Trades and Industry.*, New York: Dover Publications Inc., 1993, pp. 209–275.

Diderot and d'Alembert's *Encyclopedia* (1751) – the perfection of material

The Crown process is depicted in Diderot and d'Alembert's *Encyclopedia* (1751)

through a series of eighteen engraved plates. Each plate depicts one stage of the process, each contributing to the development of the sequence. Through the specific ordering of the engravings this manufacturing process is described (fig. 3).

The sixteenth plate in this sequence is significant because it appears to have a dual aim, describing at once the process and the product (fig.4). The image functions to describe a stage in the ongoing process, and the detail of the glass disk and the way that it is rendered suggests qualities specific to its function and use beyond the workshop.

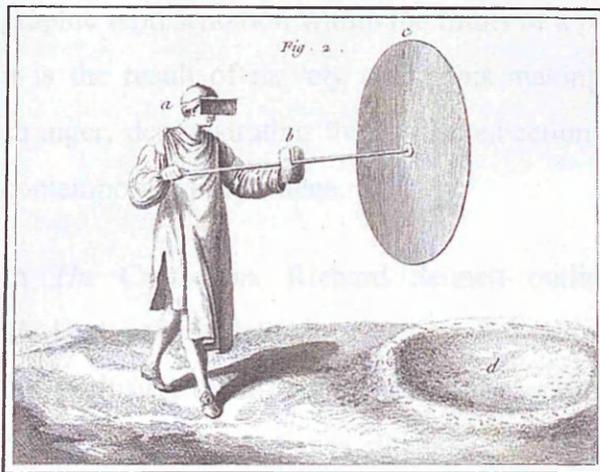


Fig 4. Diderot and d'Alembert's Encyclopedia Fig 5. Ingrid Phillips demonstrating the (1751) Crown Glass, Plate 16. Crown Glass method at the glass department of Edinburgh College of Art (May 2010). Photograph: Jerome Harrington

The image describes the point at which product becomes distinguishable from its manufacturing process. The previous fifteen images depict stages in which the glass is shaped and formed. We see nondescript shapes, where material is being coaxed towards product. In comparison, the sixteenth plate depicts a moment of revelation, where amorphous form is transformed into flat and perfect material. It is the first instance in the sequence of engravings where the output of this process – window glass – becomes visible. The methods used to render the glass disk seem to reinforce this juncture. The surface of the glass is depicted with a series of completely straight parallel lines which run from the top to the bottom, implying a uniform thickness and perfectly flat surface, and its edge has been drawn to look sharp and square. These

qualities imply that the disk is now a sheet of glass; usable material ready to be set straight into a window.

However, the drawing depicts the glass disk in a way that is physically inaccurate. A blown disk would never be this flat nor its thickness this uniform, and the edge would be rounded by the continual heating of the process. We see no evidence of the hand making that inspired the myth of glass flow.

It is difficult to discern whether this image intentionally sets out to communicate the material in this perfect form, or if this is the by-product of creating an understandable graphic representation within the limits of a particular medium. It is also possible that it is the result of naivety about this making process; maybe it was drawn by the stranger, demonstrating that a disconnection to manufacturing process is not just a contemporary phenomena.

In *The Craftsman*, Richard Sennett outlines the ways in which Diderot and d'Alembert's depictions of process are edited and composed; for example, through the exclusion of dirt or the serenity of expression on the makers faces. He writes: 'Throughout, the volumes illustrate people engaged sometimes in dull, sometimes dangerous, sometimes in complicated labor; the expressions on all the faces tends to be one of serenity'.⁹

A comparison of Diderot and d'Alembert's sixteenth plate with a contemporary photograph of this same moment in the process demonstrates the extent to which strain, heat and physical effort has been edited from Diderot and d'Alembert's depiction (fig. 5). The sixteenth plate communicates both perfection in the object being produced and – by the exclusion of effort – perfection in its manufacturing process.

Sennett explores how Diderot and d'Alembert's images portray the dignity of work and the worker, and the extent to which the *Encyclopedia* is an embodiment of the principles of the Enlightenment period in which it was produced. Sennett's text suggests that images of manufacture are products of their time, and of the circumstances in which they were made; which of course effects transmission (the ability of the images to communicate). Any subsequent understanding and relation to process and material that these images construct, is a relation based upon an

inaccurate description.

Conclusion – fantasies of making

The host

By exploring the specific example of flat glass production, this paper has aimed to demonstrate how a relation and understanding of manufactured objects is constructed from information both inside the object and outside it.

Float's perfection as a material is in evidence both in the perfection of its surfaces which are visually devoid of any sign of its manufacture, and in the images of its manufacture, which reaffirm its technological nature. However, it is exactly the lack of a visible trace of the manufacturing process that makes float a canvas for projected ideas. The perfection of float is effected by ideas generated by a much earlier object, the material of Crown Glass where the physical effect of process is evident in the cross section of the glass disk. The ideas of glass flow which are applied to float are hosted in this object, and are fueled by a gap in our knowledge, which is demonstrated clearly in the use of glass in magic and conjuring tricks.

The stranger

While writing this paper I have spoken with a number of people, giving a quick outline of the nature of the paper. When people are told that the idea of glass flow is a myth, there is a palpable sense of disappointment. We do not seem to want an objective material. This paper ends with a proposition: perhaps we want to remain as the stranger. This position allows us to continue to be amazed and fascinated by material and by process. These 'fantasies of making' allow us to form subjective positions to the products of 'distributed knowledge', forming personal relations to and understanding of the products of mass production.

NOTES

1. Peter Dormer (ed.), 'Craft and the Turing Test for practical thinking', in *The Culture of Craft*, Manchester: Manchester University Press, 1997, pp. 137–158.
2. Michael Wigginton, *Glass in Architecture*, London: Phaidon Press, 1996, p. 65.

3. Wigginton, *Glass in Architecture*, p. 63.
4. David Bricknell, *FLOAT: Pilkingtons' Glass Revolution*, Lancaster: Carnegie Publishing, 2009, p. 96. '[A]nd it was only in 1971 that the board was confident enough to plan to substitute all flat glasses, both sheet and plate with float'.
5. Jean Baudrillard (1968), *The System of Objects*, tr. by James Benedict. London: Verso, 1996, p. 41.
6. Criss Angel, *Criss Angel Walks Through Glass*
<http://www.metacafe.com/watch/37292/criss_angel_walks_through_glass/> [accessed 21 June 2010]
7. *How Do They Do It?*, Discovery Channel, 25 June 2006 [TV program].
8. Edgar Dutra Zanotto, May 1998 (pages 392-395), <<http://www.df.unipi.it/~leporini/DFWebSite/ReviewsTg/CathedralGlasses.pdf>> [accessed 21 June 2010]. The myth is categorically disproved in a paper called 'Do Cathedral Glasses Flow?' (1997) by glass materials engineer Edgar Dutra Zanotto, who investigated whether it is possible for glass to flow at room temperature. His research concluded that 'window glasses may flow at ambient temperature only over incredibly long times, which exceed the limits of human history.' In fact Dutra Zanotto's calculation demonstrates that significant flow would take well beyond the age of the Universe.
9. Richard Sennet, *The Craftsman*, New Haven, CT: Yale University Press, 2008, p. 93.

Appendix No.3

List of artworks / outputs

Artworks		
1	<i>The Archive of Manufacture</i>	From October 2009 Archive at RF2 presentation 24 February 2011
2	<i>Untitled (edge)</i>	2 days in glass department at ECA (20 + 21 May 2010) 2 September 2010 (1 st version) 11 April 2011 (2 nd version)
3	<i>Untitled (Diderot)</i>	22 February 2011
4	Small silicone with tin foil	March 2011
5	Mould works	25 March 2011 - Silicone mold lens
6	Porcelain experiments	9 May 2011 - experiment No. 1 16 August - experiment No. 2 4 January 2012 - experiment No.3
7	Coordinate Measuring Machine	12 May 2011
9	Mirrored disks	30 June 2011
10	Plaster works	23 June 2011 - Test 1

		28 June 2011 - Test 2 26 July 2011 - Test 3
11	Rapid prototype disks Rapid prototypes cylinders	5 th July 2011 15 September 2011
12	Mould works - Moveable mold	16 August 2011
13	<i>Making with Plasticine while thinking about glass</i>	July 2011
14	<i>Plasticine Diderot</i> First Plasticine figure Diderot model (Nick Palmer produced second Plasticine figure) Began experimenting with methods of squashing / reconstituting Squashing model	11 th July 2011 6 th , 7 th , 8 th September 2011 13 th October 2011 2 November 2011
15	Workshop <i>The Plasticine Disk</i> (Mart students) Workshop <i>The Plasticine Disk</i> (BA students)	7 November 2011 9 November 2011
16	Workshops <i>Delineating an understanding</i>	1 st and 8 th March 2012

Exhibitions

1	S1 Show (Testing Space)	17 May 2011

2	S1 Show (<i>The Plasticine Disk</i>)	19 November 2011
3	<i>An object described by fragments</i> Sheffield Institute of the Arts Gallery	17 March – 15 April 2012
4	<i>Glass eliminates all confusion</i> (Version 1), Glazen Huis, Belgium	March 2013
5	Exhibition in Arundel Gate Court studio's	July 2014
6	S1 Artspace – <i>3 Act Structure</i>	August 2014
7	<i>Glass eliminates all confusion</i> (Version 2) Clarity, National Glass Centre, Sunderland	March 2015

Papers / presentations

1	<i>Fantasies of Making</i> Transmission: Hospitality Conference	3 July 2010
2	<i>Plasticine, Ekphrasis and Imagined Making</i> The Edge of Our Thinking, Royal College of Art (student conference)	19 November 2011
3	<i>Plasticine, Ekphrasis and Imagined Making</i> The 4th Annual Research Student Conference in Art & Design	10 May 2012
4	<i>Why is glass?</i> Orientate, Glass society of Ireland, Cork	2 November 2013

5	<i>Making an object in Plasticine while thinking about glass</i> Glass Context, Denmark	16 September 2012
6	<i>Glass making and myth making,</i> Society of Glass Technology Annual Conference, Cambridge	13 September 2013
7	<i>The Archive of manufacture</i> Transmission Annual	October 2013
8	<i>The glassmaker [without glass]</i> Northlands Creative Glass, Lybster, Scotland	6 September 2015

Appendix No.4

Making with Plasticine while thinking about glass

Making with Plasticine while thinking about glass [Artwork No.13], is a short film that records the making of an object in Plasticine (DVD: Film No.2). The object is made to explore the depiction of Crown Glass production in *Diderot and d'Alembert's Encyclopedia*. The Plasticine object is made as an attempt to copy the eighteen stages depicted in the engravings. The work aimed to explore examples in *The Archive* where material is effected by process (such as Crown Glass Object, Mugridge's reading of the historical bricks), Plasticine functioning as a material that would 'record' a process of making.

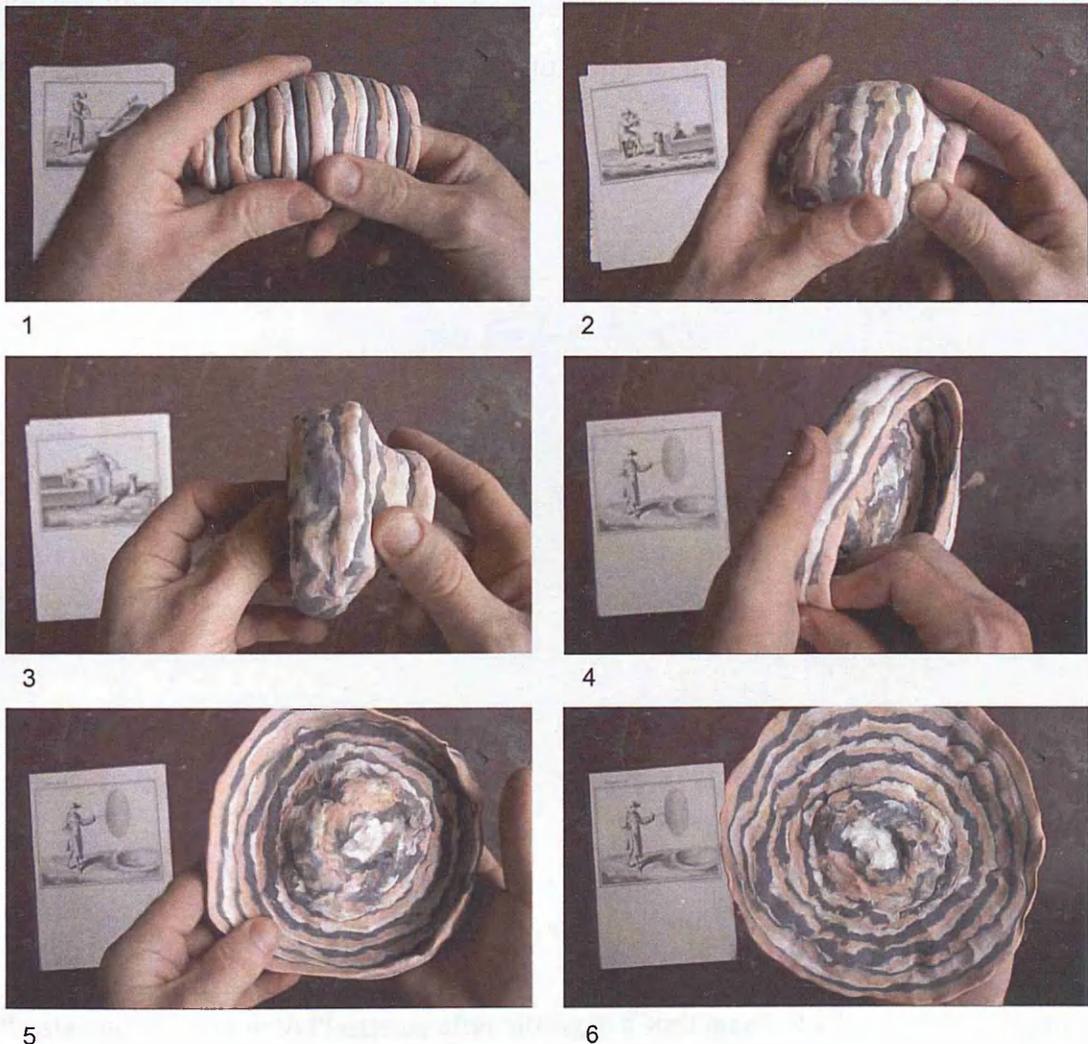


Fig.1: Stills from *Making with Plasticine while thinking about glass*

At the beginning of the film, the Plasticine form is made up from alternating bands of three colours (white, pink, grey).³⁴⁴ Each band of colour is distinct from the next and in pristine condition (Fig. 2 top). From this initial shape, which represents the beginning of the glass blowing process, the Plasticine form is worked through numerous stages to form a disk. Each stage responded to the eighteen stages depicted in the Encyclopedia (Fig. 1 stages 1 – 6). As the making process progressed, the colours began to blur together and become ‘muddied’ (Fig. 2 bottom). The final form captures traces of its making, including fingerprints and fluctuations in the thickness of the material.

This was a ‘transitional work’ which allowed me to test materials and to explore ‘information in’ the object. These ideas were subsequently extended in *Plasticine, ekphrasis and imagined making* discussed in Chapter 4.

³⁴⁴ I started to work with Plasticine after sitting in a staff meeting where the son of one of my colleagues was playing with a ball of Plasticine. The ball was made up of a tangle of different colors – absent-mindedly I started to wonder what previous forms / object / figures this lump of material had been.



1



2

Fig. 2: Stills from Making with Plasticine while thinking about glass (start and finish of process)

Appendix No.5

Showing *The Plasticine Disk* to BA student group

(9 November 2011)

Student No.8A, Student No.10A, Student No.6A
Ventriloquism

Student No.8A

'We had a bit of trouble of applying the idea of ventriloquism to it (the object) – for us the idea of ventriloquism is where you give a voice to an object and are projecting to others (an audience... So in our discussions we talked more about its making – for us it looks to have been made – and when you look at it that's what you understand, it was either quashed ball, that had been kneed, rolled into a ball – squashed under pressure and rolled... either - first squashed and then rolled or the other way around... the reason that I said that is its thinness, it just makes me think of when you roll out pastry, you see the cracking around the edge and see and it is more even on one side than the other – and that is what a machine wouldn't do perhaps... we wondered that when you stopped (rolling it) it was something to do with the pattern – that you were guided by the aesthetics...of the colors and the patterns...'

Student No.6A

'How it is unique, you could make it a million times over and you would never get that same pattern, so if it was to speak... it would speak about its uniqueness.'

ME

'And did you say it was a ball because this is round (the disk)?'

Student No.8A

'Yes I think so, that is the only way we could imagine getting it to that shape'

Student No.10A

'Visually the image that came out of it at first, was the deep space views that you get looking through a telescope to the nebular and such like.'

ME

'So there's an image, even though it is abstract?'

Student No.8A

'As you look at it ... by looking at those shapes you come away from the object and make connections in your imagination and the cracking and the marks on the surface ... bring you back to the object'

ME

'So there's two layers of looking...?'

ME

'And what are the other imaginative images? One is the image of deep space images, but are there other images that form?'

Student No.8A

'I guess you could see other images in it... so there that telescope image, but it could equally be a section of an organic object... a tree or something or something that you see under the microscope even...'

ME

'So there's a macro micro possibility?'

Student No.4A, Student No.7A
Seeing in + 1628 engraving

Student No.7A

'We came to a similar conclusion with the ball and the flattening... at the same time it looked quite pressured... to me there was the initial pressure and then there were small workings and small little manipulations and bits that had been fine tuned... so in one sense it was quite random and in another quite contrived...'

Student No.4A

'Yeh, it looks like its made from a lot of separate pieces that haven't really been handled a lot, because it's the sort of material that because it has a lot of colour it would get mashed together – so it looks like they have not been handled a lot, but they have been forced together under pressure...so we came up with a

spherical form or mound type form which has been put down under pressure because it suggests that its been pressured from the top mainly, because if you have got a sphere for example all the colors on the top then become the center if you squash it down and the sides obviously force out from the movement type thing...'

ME

'So the middle of this (the disk) is the top of an object?'

Student No.7A

'It feels like its had a bit of manipulation but its not been very precise because the centers a bit off and the edges ... different thicknesses and its cracked.'

Student No.4A

'It looks like its take a bit of time because in the center its quite soft still... because there is more mass to it and its been pushed out and that's what has caused the cracking because it is drying quicker at the edges...'

Student No.7A

'Looking at it I got a very kind of 'thumby' feeling...'

ME

'A 'thumby' kind of feeling?..'

Student No.7A

'You need to go and touch it..,'

ME

'Yeh, the other group was asking similar things...(if they could touch it)'

Student No.7A

'I feel as though my thumbs are dry, because play do dries out your thumbs, I feel like a lot of what you have done to manipulate it, you have done with your thumbs...'

Student No.4A

'It reminds me of a mountain forming, how physics or whatever...so you have plates push to together and form the mountain, but this feels as though it has done the opposite... that the physics have decided the outcome... so you do it and you don't know what it is going to look like until its done...'



Student No.1A, Student No.3A

Images from *The Archive*

Student No.1A

'When we first looked at it we thought... because its like ply do isn't it plasticine? ... having it in a ball and rolled out with a rolling pin, but then when you look at the images there like ...on there, there are loads of different ways of making it'

Student No.3A

'The images suggest an order to how it would have been made ...its going from clay, to metal to melting to glass, back to metal again'

Student No.1A

'In that one it looks like it has been poured, pressed down and set ... there's loads of different ways in which it could have been done, so not entirely sure how you made it from those (the images)'

ME

'You spoke a little about the blind men making baskets...could you say a bit more about that?'

Student No.1A

'By the end product of the basket you wouldn't know it had been made by a blind man because it ...you wouldn't know about the difficulty they had had making it compared to someone who could look at it and do it really fast...you don't know the process that has gone into it by those two different ones ... by a seeing person and a blind person...'

ME

'I was really interested that you read those as a sequence (reading the archive images from left to right) because when I put them up, I put them up really randomly because I was in a rush, but you have read them as a sequence from left to right'.

Student No.2A, Student No.9A

Object as prompt - palimpsest

Student No.2A

'We think to relate it to our text it was done in layers, the idea of using one base colour, and then putting it into a ball or however you got it into that shape and then adding the extra lines of colour...but we think its possibly been spinning or something because it has blurred parts...'

ME

'So it was made in layers ...as a slightly bigger object?'

Student No.2A

'What do you think? We think that because of the text as well...'

Student No.9A

'No not really a bigger object, but we think that you got the shape of it by spinning it out...'

Student No.9A

'Everyone says that its been flattened down but ... its not the same level is it ...so you obviously haven't rolled it...it looks like you have got it in a ball and spun it out... that's why its thin and cracked around the edges ...'

ME

'Was it difficult that one (the palimpsest) because it sets off a very particular way of looking at it?'

Student No.2A

'Yeh, it kind of made up our minds, kind of thing, because of the layers and things...'

Student No.12A, Student No.5A, Student No.11A

Texts as prompts (soul)

Student No.12A

'Because of the fact that you can't really touch it, or take it apart... we could really say if it has a soul or not, but then we started talking about the saying... when you make something you put your heart and soul into it...'

Student No.11A

'So its like everything has a soul anyway...'

Student No.12A

'Yeh, but I do want to pull it apart, so...'

ME

'So, what would you find though, in there...?'

Student No.11A

'I don't know, its just that

ME

'But would you be disappointed though, like the child has melancholy and gloom, would you be disappointed?'

Student No.11A

'I don't know if I would be disappointed because I really want to touch it so...

ME

'Well maybe it some point I can organize an autopsy and you can do it...'

Student No.11A

'Perhaps I would be disappointed I suppose, but I don't know what to expect so I wouldn't be...'

Student No.2A

'Would you expect layers?...'

Student No.11A

'I don't know...'

ME

'How would you go about taking it apart? How would you take it apart?'

Student No.11A

'I'd put my finger in it first...'

ME

'Give it a good prod...'

Student No.11A

'I don't know I would probably cut around the shapes and colours to see...'

Student No.12A

'Yeh, that's how I would do it as well...'

Student No.11A

'...to see what is beneath those areas...'

ME

'So it would be a cross section through it, but they would be dictated by the shapes? (on the surface)'

Student No.11A

'Yeh...'

ME

'And what did you write? Because you have done loads of writing...'

Student No.11A

'We said it is funny that you have used a Play Dough or plasticine because its related to what a child would play with anyway and the fact that the text is about a child and playing... which is interesting that you have related that to art... does a child and toys have anything to do with (art making)...you have made a link between it, its interesting...'

Told group about plasticine Diderot model

ME

'I was really interested in turning him (the figure) into the object that he is making, so he is making a disk... I wanted to test what was left...so there was a real intensity of skilled making going into that... so to test if any of that would be in this new object or whether that would get totally separated... so that's why I wanted to do this in this way, of not telling you at the beginning but get you to speculate... and it was really fascinating...some of you picked up on really interesting things... I think that one of the things that I maybe found out is that there is a separation ... the skill from that doesn't transfer across... but in terms

of the process of that (the disk) being made a lot of you where really very clear... you talked about a sphere, and it was like that ...I got him into a sphere, by rolling him like that (gesture) by constantly rolling him from a squashed figure very slowly into a ball and then from the ball I took him to the wood workshop and there is this massive mechanical press and I pressed him in the mechanical press... so that's the making process, and hopefully explains why I am interested in getting your fed back...'

Student No.8A

'So we didn't guess then?'

ME

'No but that's what I wanted to find out, is there anything of that previous incarnation left in this new object?'

Student No.11A

'...there might be something when you cut it open...'

ME

'Yes I am going to have to consider employing you guys (Student No.11A, Student No.12A) as autopsy experts...I think that that might be a stage that I need to go through, but I need to show it first and document it...'

Student No.8A

'So the blending...this model maker did they make it by hand?'

ME

'Yes'

Student No.8A

'So there's that hand blending' and the different colours involved...'

ME

'So some of that making...'

Student No.8A

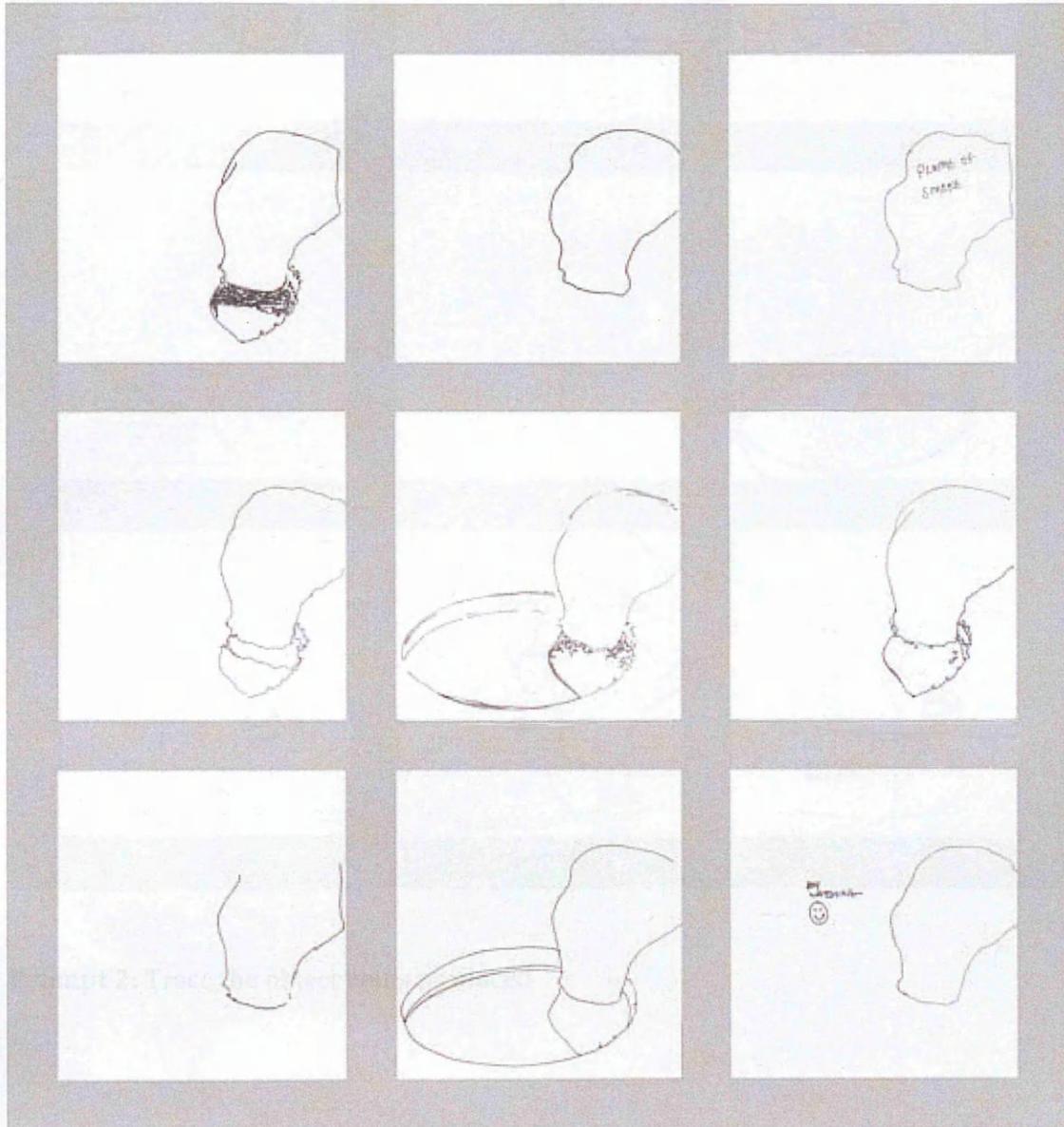
'That's what's left...'

Student No.6A

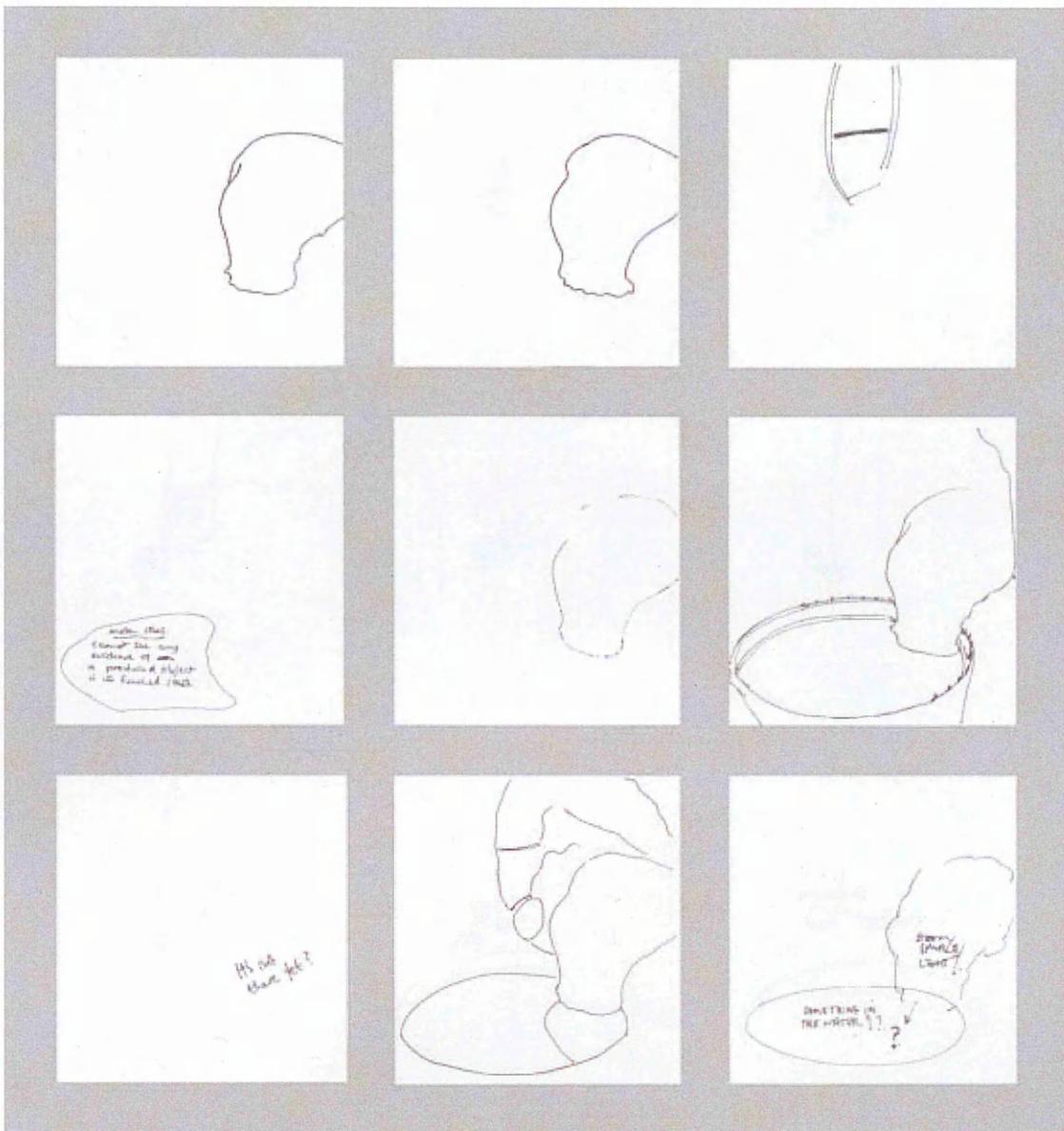
'Maybe now it would be easier to use ventriloquism and to think what it would say...'

Appendix No.6

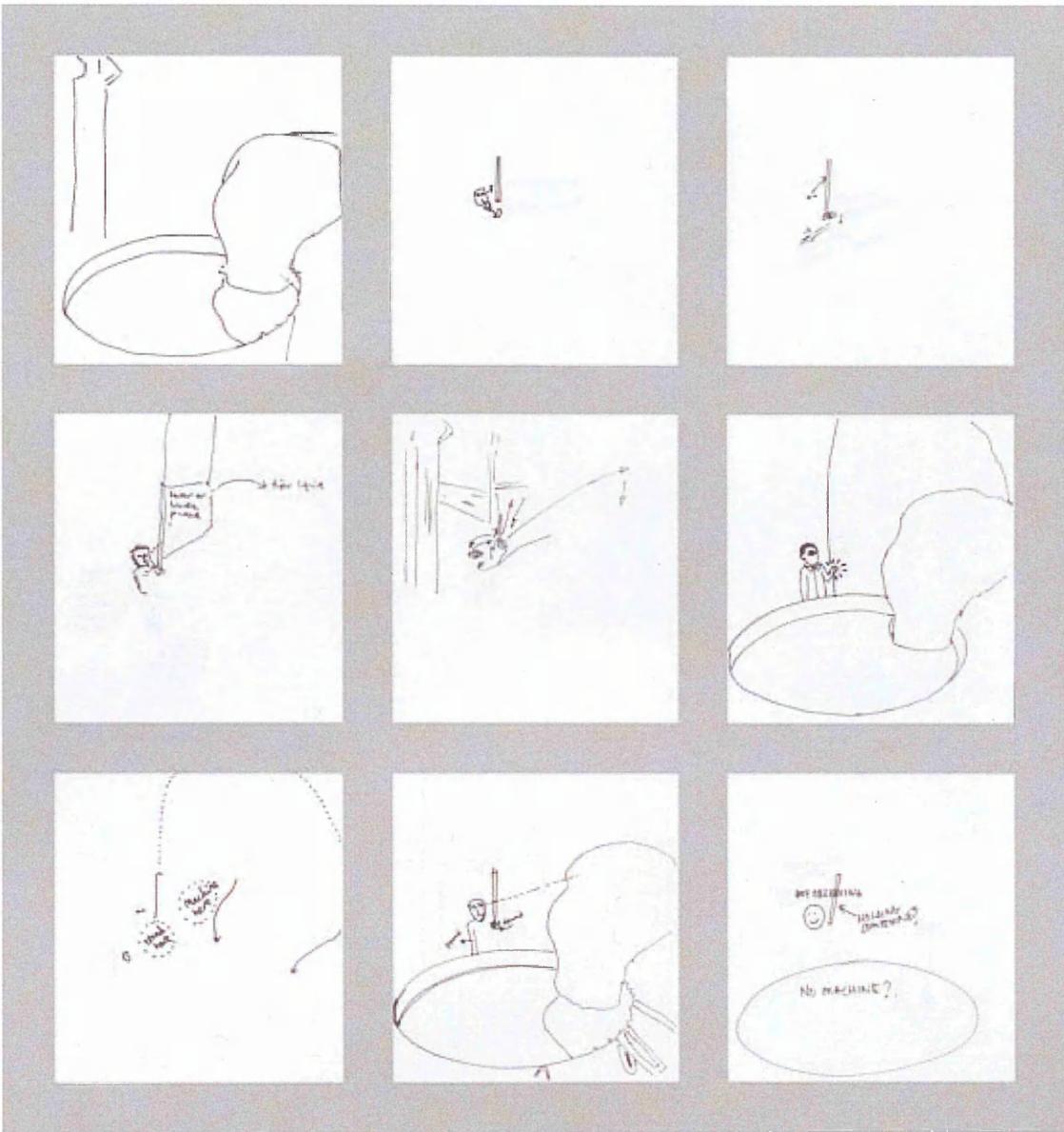
Delineating an understanding – tracings



Prompt 1: What is the most important aspect of the image – what was the first thing that you noticed?

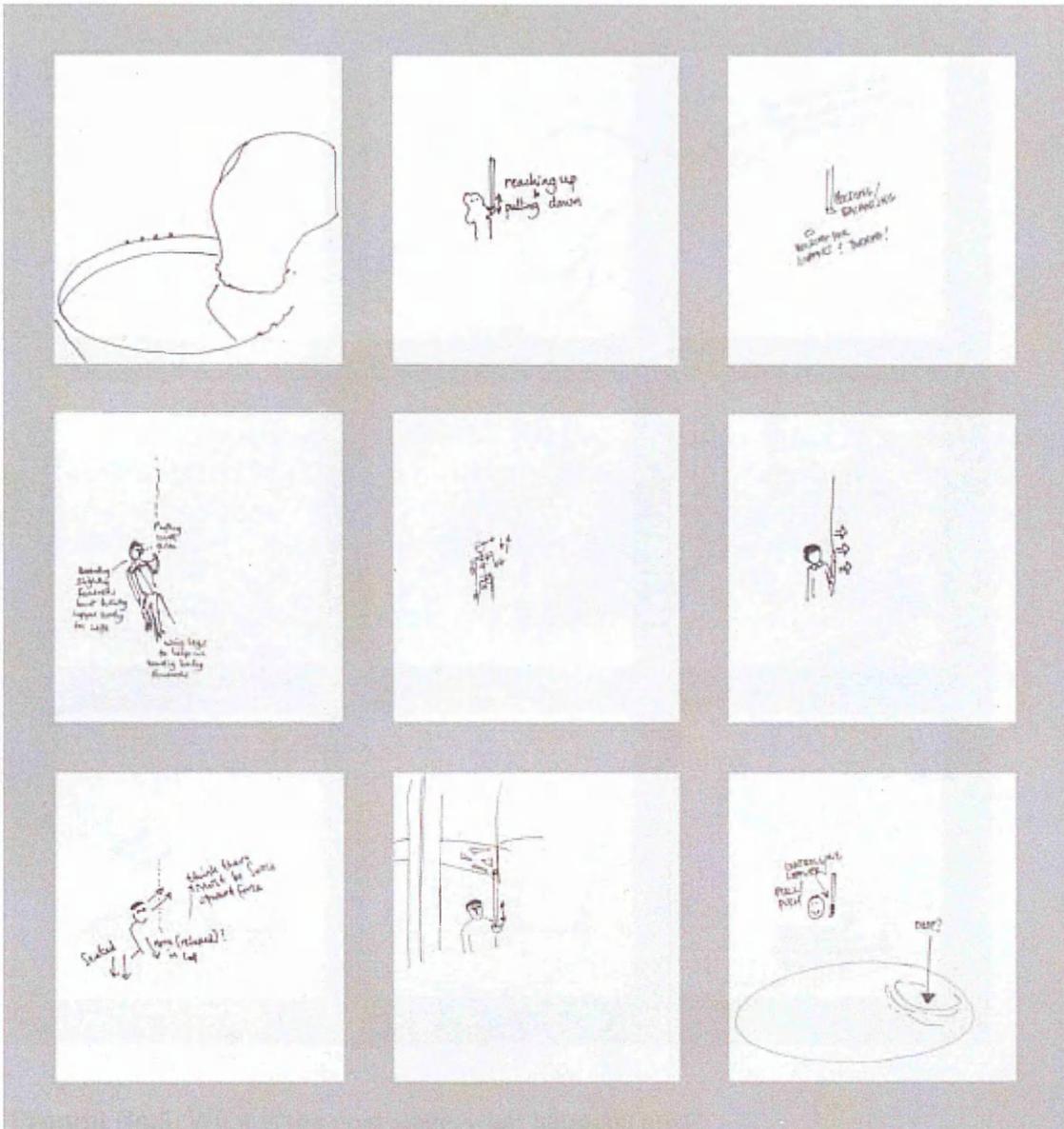


Prompt 2: Trace the object being produced

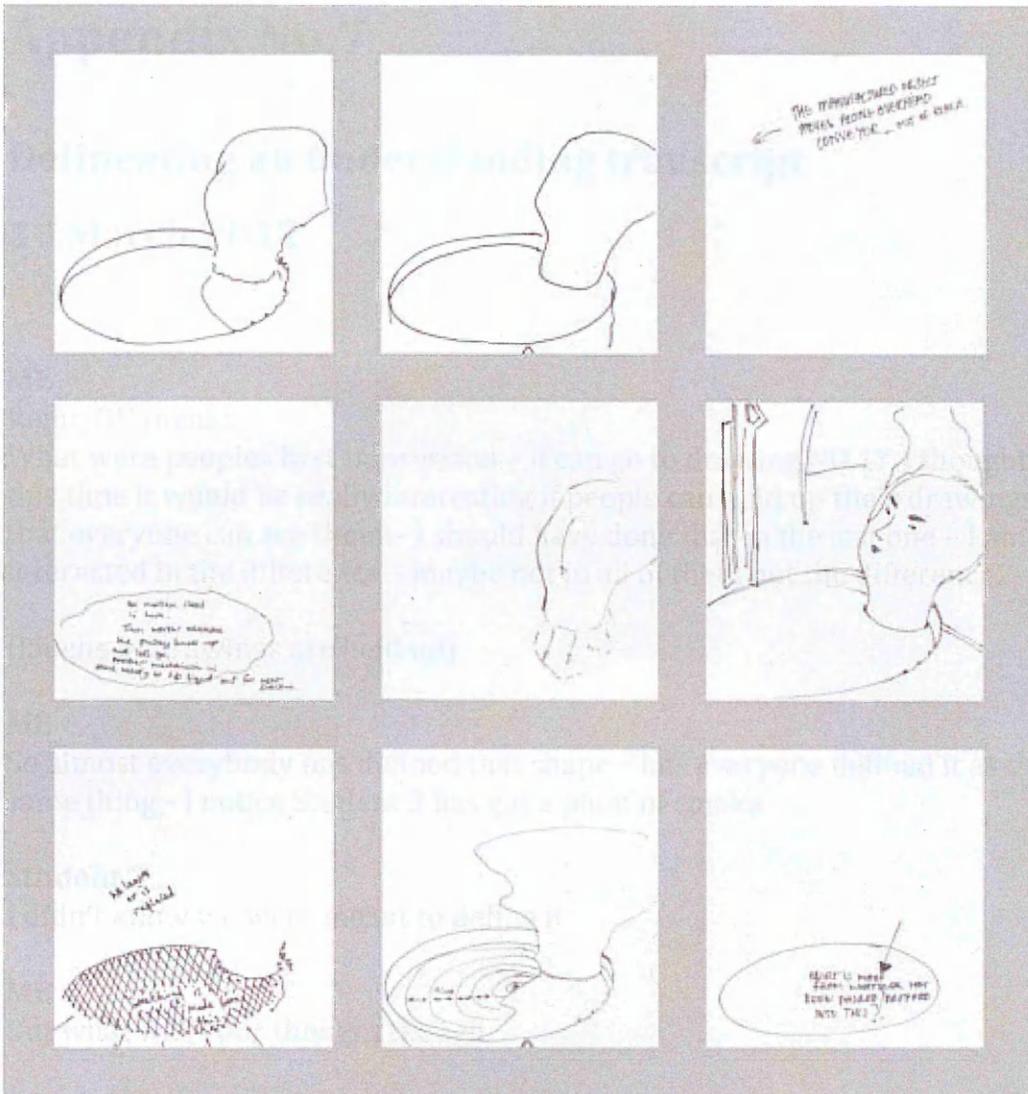


Prompt 3: Draw / trace the relationship between eye, hand and machine

(drawing, tracing, etc.)



Prompt 4: Trace the position of the body. What forces are present? (pulling, pushing, lifting, dragging etc.)



→ Prompt No.5: What is the next stage, what happens next?

Student 3

Oh right - I thought - you know when you cool something off.

Student 2

It's really weird though. It looks like it is too far this way.

ME

Yeah, why not... in by too far, this way?

ME

That's... what's that?

ME

That's... that's... that's... that's... and that's... that's...

And what's... if that's... that's... that's... that's... that's...

Student 1

Appendix No.7

Delineating an understanding transcript

1st March 2012

ME

Right, OK thanks.

What were peoples first impression – if can go to drawing NO.1? I thought that this time it would be really interesting if people can hold up their drawings so that everyone can see them – I should have done that in the last one – I am quite interested in the difference – maybe not in all of them but the difference...

(laughs as drawings are held up)

ME

So almost everybody has defined that shape – has everyone defined it as the same thing - I notice Student 3 has got a plum of smoke

Student 2

I didn't know we were meant to define it

ME

But what was your thought though

Student 1

I thought that it was molten glass or metal

Student 3

Oh right - I thought – you know when you cool something off

Student 2

Its really weird though - It looks like it is too far this way...

ME

Sorry what do you mean by too far this way?

Student 2

That's its not going to make it

ME

That it is going to spill on the floor and burn the mans legs...

And what is it that makes you think glass or steel – what is it about the actual...

Student 1

I think because it is glowing, it looks like it is glowing

Student 3

It looks like its glowing because it is so white...

ME

Its very white and the rest of the image is very dark – is that why you get glowing? Because I know what you mean there is a definite glow to it – its partly because of the darkness of the rest of the image – it think?

Student 1

Yes I would say so...

Student 2

And it looks really hot because its going bubbly there – when it hits

ME

That point of impact yes

For me there is almost a noise that goes with it actually, at that point

Student 4

For me I think back to images that I have seen of steel works – you associate it with images that you have already seen – so you make up a lot of stuff around it

ME

So there is a memory bank of images?

Student 4

Yes and also because of the type of clothing that the man is wearing as well – I have just sort of made it up...

ME

What is it about the clothes that he is wearing?

Student 2

God you are doing bloody well to see his clothing – I can hardly see him...

ME

It's a very dark image isn't it...

Student 4

Its working class men's clothes that they used to wear in the steel works – again I feel I am going back to images I have formally seen – and there are bits that I can't see so I have just made them up

ME

So can you tell us what information you can see?

Student 4

Well, he's got a flat cap on and I imagine he is wearing a overall, with a shirt underneath ...and I would think ... people used to wear suits to work didn't they in the 1920's and 30's – I probably think he got on some brown overall's – and a flat cap...

Student 3

You think brown not navy blue?

Student 4

Maybe – yeh I don't know really – I just – it's a bit pale so that sandy brown colour

ME

Its nice that you are seeing colours in a black and white image – that's quite...

Student 4

You just go back to what you are used to seeing don't you – if you live in Sheffield you are used to seeing these images so many times – I might be making it up as I go along

ME

Well that's one of the things that I am interested in – that you do do that – so you its absolutely steel?

Student 4

Yes I think so – it have never occurred to me to think of glass – although I know that you are looking at glass – so

Student 2

I thought oh yeh it does look like glass

ME

So what is it that makes it glass?

Student 2

Because its so white

Student 1

Its so fluid as well

Student 2

When you said that - I thought Oh god I should have said that [glass]
Because it's the wrong colour isn't it really, to be...

ME

What colour is molten steel in a black and white image? I not being funny...

Student 2

I don't know – but I don't think that it would be as white as that – so

ME

Yes – it's the glow

Student 7

The little 'swoosh' marks

Student 2

Yes which would be more – I don't know what it would be –

Student 4

Its those little bits – they would be a bit more delicate than steel....

ME

Is it something also about the way in which it is pouring – its viscosity

Student 2

Yes its like glass

ME

Its more treacly than fluid – I think – it looks like you could stretch it

ME

And so can we go on again – and hold them up – I think it is actually quite interesting to see and be able to compare – and I am not doing that because there is a wrong or a right but...Its just really interesting to see what other people...
So this is Prompt 2 – trace the object – what is being produced?
Can we just go around actually – because we have enough time...
Student 3 do you want to start?

Student 3

Well I I don't know if I have been completely misreading it listening to other people now – I thought the chap was working on this – and I really felt that he had it dunked in here as some sort of cooling process and then it had come along...

ME

So – OK that's really interesting – that piece is the object being made – and its been dunked and this is the machine and that plumb is the smoke...

Student 2

Which is the object?

Student 3

The object is this overhead - This piece over here was what I felt he was working on - But it looks like I am misreading it completely

Student 2

No not necessarily

Student 3

So I imagine that that was on some sort of overhead pulley and he had it in here

Student 2

Oh – alright

Student 3

The smoke was the result of moving it from that – that was some sort of cooling process and it was then swung around

ME

Is it because the position of him as well?

Student 3

Yeh...because I thought he...

ME

He's doing something isn't he

Student 3

Then that's going to come out of view [out of the frame of the photograph]

ME

So can we just go around. The object being produced, what did you?

Student 5

I also thought that it was molten steel – so I just drew that going into that...

ME

So when you draw... – so when I say object – it's the material of the object that you have drawn –the objects not really there – its on its way to being cast
Is that more or less the same? So is there a mould there?

Student 4

I just put – I can't see any evidence of the object being produced [inaudible]

ME

OK

Yours is really interesting because you have got the mould and the material

Student 6

I thought this had come from this bucket –

ME

So we are going from the bucket, up and out?
And is it being pulled out of the bucket? And what material is it?

Student 6

Actually when I first saw this picture I thought it was a boy looking at a ghost coming from this bucket

ME

Oh right

So this glowing shape is a ghost?

That's very interesting...

Sorry I don't know everyone's names – sorry

Student 7

I didn't draw anything because its not there yes [the object] its being made

ME

OK so you have not drawn the object because its not formed – its being formed

Student 7

Yes – its just the material

ME

And yours is really interesting – tell us a little bit more about that one?

Student 8

There is liquid here in the bucket and the gas comes out ... both objects are [inaudible]

ME

So the glowing shape is a gas? And all these other shapes that are up above it – is that more...

Student 8

I don't know I just saw them so thought that I would draw them – they are gas or something else...

ME

Vapors? Steam? OK – You have been ... - its really nice that one – you have been quite specific – you have said this is one part of the gas cloud and this is another part – you have actually split the gas cloud into parts – almost identifying different densities of gas...

Student 9

I thought that this was a cooling tank – and the glowing bit was smoke or steam

ME

OK like Julie...

Student 9

Or steam – so when you said identify the object – I didn't think it was visible – it was in the tank still – so there's something in there...

ME

OK so similar to Student 3 but Student 3 has identified the object up above, having been pulled out and about to be moved to the next process, where as you object had been sunk into a tank of – what water?

Student 9

Yes water – or something to cool it

ME

So what is the object in the tank? Why do they need to cool it?

Student 9

I think it is hot metal – something that has been cast – to be put onto a machine – I don't know ...[inaudible]

ME

OK – so like was said down that end [of the table] – have that image bank of Sheffield factories or ...

Student 9

No.

ME

This is really fascinating – the difference...

So can we go onto prompt number 3 (Drawing the relation between hand, eye and machine)

And again if we can hold them up – we should have done this on the first one...

Did everyone see the figure?

Student 2

Only just...I could barely..

ME

Yes I was watching you and I saw you thinking what the hell is he talking about ... [that there wasn't a figure there]

Student 1

Are you on about the little man here - I thought that was a puppet - he didn't look right - he doesn't look real

Student 2

He does look a bit peculiar

Student 1

The bit at the top [inaudible] is someone moving in the background – so I thought that was much smaller than that [inaudible] kind of thing...

ME

Oh right – so when you puppet – what is the whole image – is it the image out of a film or...

Student 1

I don't know I just thought that it had been left there [inaudible]

Student 3

I want to rewrite this –surrealist version – the ghost and the puppet

ME

Yes - We have ha a ghost and a puppet

Student 2

You wait until you get to Student 6's last picture...

[laughs]

ME

So the whole scale of this image is completely different actually

Student 2

I wasn't convinced he was a man – I thought he might be a boy because he kind of looks...

Student 3

But he looks really elderly

ME

Yes he does look elderly

Student 2

To me he looks a bit elf like

[inaudible – too many people speaking at once]

ME

So what different ages is he?

Student 7

I thought he was a boy

Student 4

A wizened old man – that probably smokes a lot

Student 9

I put boy as well – I didn't really look at him that much – he just looks young from the quality of the image

ME

And you have drawn him as a smiley face, but is he a smiley face?

Student 9

I don't know – I could see him properly through the tracing part so I just did a smiley

ME

I am interested to know how quickly people saw him – that's the other thing... Because when I first saw this image I didn't see him for a very long time and when I saw him it really scared me that – he was next to this thing – glass or steel or what ever it is its very very - very hot and its pouring in on his head level

Student 2

And he's got no [protection]

ME

This sort of level

Student 2

There's no barrier or anything is there? – No gloves

ME

No not at all – he's got his hat and his brown suit

Student 4

That's before health and safety

ME

But it was funny for me because when I saw the image of the man – it became a really quite scary image – it really changed it quite significantly. So what is the man doing? In prompt 3 I have asked you to draw the relation between his hand eye and the machine – what is he actually doing there?

Student 2

I thought he was pulling a lever down to release what ever that was...to go in

ME

Yes OK its flowing because he has ...

Student 2

Yes its flowing because he has pulled in down and when it has finished he will let it go

ME

Is that similar for most people?

Student 5

I wasn't sure if it was at the point that he had pulled it down and it was about to come up again or if he was still pulling it down – so I did arrows going in both directions

ME

Ok so for you its wasn't clear [at which point in the process we are seeing] before or after I suppose...

Its really complex what you have drawn. So you got the lever – can you just explain the parts... it's a really complex what you have drawn

Student 5

I couldn't see him through the tracing paper so I just drew an eye and a hand and I was interested in the way that he didn't seem to be looking at what he was doing – he's looking in another direction somewhere.

So this arrow is the relationship between the eye and the hand. So I wasn't sure what relationship this bit had to the lever and whether it was supporting something above or if it had a direct impact on it – so I drew that in as well and then I drew some arrows to show there's a relationship [inaudible]

ME

So sorry – so to be clear – that piece is almost part of the machine that – is maybe...

Sorry I don't want to put words in your mouth... but that part can you explain it a bit more?

Student 5

So I didn't know but I thought it might be to do with something – so I put it in...

ME

Yes so its significant to the process...

Student 2

It might fall down with out it – so you need it in?

ME

What else have we got? So you have got that same...

Student 1

Well what it is - I thought it was a puppet so I didn't...

[Laughs – inaudible]

I thought it was a lot smaller- a small bucket - So I thought there was someone over here

[Laughs – inaudible]

ME

No its brilliant – its brilliant

Student 2

That's what happens when you ask art students isn't it – if you asked scientists no one would ever find a puppet would they?

ME

Well one of my things is do these images actually tell us anything – do they confuse as much as they clarify – yeh so its really fascinating that you said that [the puppet and scale]

Student 4

I have got similar - pulls handle to release liquid ...

ME

And then - Yes its similar but you have got a much longer connection between the mans hand and something happening up above the image – is that right?

Student 6

Because I thought he saw the ghost and then he threw the stone – so he grabs something [in fright grabs onto something to secure himself]

[laughs]

ME

Where is that man then? Is he at home? Where is he seeing the ghost – what is the context?

Student 2

Is he in a house or...

ME

Is he at work?

Student 6

After he opened the door – then he saw the ghost

ME

Yes - So this is an interior – what is the inside?

Student 6

Like a factory

ME

So the ghost is haunting the factory – the boy has opened the door and grabbed the thing...OK

Student 7

I don't really know to be honest..

ME

Just talk us through what you have drawn there it looks really fascinating

Student 7

I have drawn two eyes and a hand – but I thought he was sat down and then there is the lever which is doing something up above which makes the thing pour in

ME

OK quite similar to some of them but you have got him sitting down... And for you the chain of his action goes up and outside of the image and down and the consequence is the pouring

Student 7

But there is something next to the plum or the whiteness that is circular – that's something mechanic

ME

Yes – that barrel shape

Student 7

Yes that round thing there - I think that's part of it – I have circled it ...

ME

It is quite odd that bit because around it its completely black -but it stands out

Student 2

So it looks like it is something important...

Me

Yes it does

Do you want to tell us about that one – it sounds like you are quite similar to other people?

Student 8

The only thing that I feel is that what is in his hand is more connected to the left side of the image – the physical part not the gas part, so I ...

ME

OK so he has got a thing in his hand – it goes up but it goes to the left of the image
OK that's really interesting

ME

Nathan are you concurring or are you different?

Student 9

I thought it was a boy and he is holding something - But I didn't really see a machine sort of thing – I thought it was a manual process

Student 2

So you didn't think he had any control of what was going on? He just happened to be there?

Student 9

He is controlling whatever is going into the tank thing but...I see machines as electrical – computer sort of thing...

I thought it was really manual – that he is pulling on something – I don't know how to explain it...

ME

You know this – you have identified that – what is that? That round circle? [the mould]

Student 9

The cooling tank...

ME

Yes Ok – sorry you've said that earlier...

OK can we move onto number 4 – so trace the position of the body – what forces are present?

Again can we start by holding them up – its really fascinating...

Just at a glance there seem to be two different versions – the man being the center of the picture and then in the other version it is the tank and the fluid being the center of the thing [the picture]

That's my first glance but can we just go around again?

Student 3

I thought he was holding – maybe there was a bit of balancing going on – and his other hand – I am wondering if he wasn't holding something for support there – either support or maybe turning something...

ME

And if it was support?

Student 3

Because he is a bit off kilter...

Student 7

Maybe he is at a gauge or something on the side?

ME

And that is some sort of control panel type thing...

Its quite weird isn't it because visually there is nothing there or discernable – but just from the position of his body you start to put something there – or fill in that gap – which is quite interesting.

Student 5

I thought that he looked really awkward and I couldn't understand how his body was positioned but now – you said [referring to Helen] he was sitting down and that is starting to make more sense – so I was just trying to figure out what position he was actually in and the strains that was having on his body...in the awkward crouched position.

ME

That's a great little drawing – it sums up all these conflicting forces – he's pulling this way and he's doing this ...

So when you say awkward – its that...?

Student 5

Well he doesn't look comfortable position – you wouldn't want to stand like that all day...

ME

No not at all...

Student 1

I have got mine [inaudible]

It was moved up and down and pulled across and

It was stretched, brought back again and then turned around

So it was stretching it.

That's what I thought was happening

Me

Tell more about the stretching?

Student 1

I don't know – it just felt like it would be pulled away and stretched back again and then turned around – I imagined it being hand made or something... so it had been hand spun kind of thing...

ME

So you were saying glass weren't you – so the glass is being poured out – pulled away

Student 1

Yes and wrapped around again - That's what I had in my head

ME

I can't remember what you said was the object – this kind of pulling – pushing and spinning – what was the object?

Student 1

No idea – I think its glass – I was trying to get a smooth shape and to break it off... from the rest of it

ME

Sorry?

Student 1

So without cutting it through – because its so hot – they would wait for it spin so that it would go really thin and then it would pull away and you've got...

ME

Like treacle – you would do that until it goes thin and then pull away

Student 1

Yes, something like that

Student 4

I put that he is pulling with his arm and bending slightly forwards, but twisting around to watch this thing as it tips out – so he has got his shoulders really forward but twisting – I thought he was standing and leaning forward and I imagined that he would be using his legs to help his body bend forward - So maybe one of the legs would be bent so he would be leaning on his legs really

ME

So you concur with this awkward position –

Student 4

Yes

ME

So he's having to move and keep watch of something...

I am interested that you say that he is having to keep watch on something – can you talk a bit more about that – what bit of it is he watching I suppose?

Student 4

He is watching the lever tip this white molten stuff down but you can almost see his eyes looking upwards – you can see these tiny bits of white so – his eyes are upwards and so I think he is looking and operating that lever and making sure that it is done properly [inaudible]

ME

Its amazing with the darkness of that photograph – how much information you can understand about his body movement and his un-comfortableness you can get – quite incredible.

Student 2

I have just got him reaching up and pulling down

ME

Ok - so it's the release of the liquid?

Student 2

Yes

Student 6

So he throws something down – or throws something at the ghost ...

ME

OK - so is he holding a stick or a?

Student 6 –

Yes – like a weapon

Me

So the thing he is holding is because of his fear actually?

Student 6

Yes

ME

Its quite interesting because although yours is the ghost – that sense of fear I would agree with you to that point, but there but – this is from my point - there is this molten stuff pouring down and awkwardness of his body and that really intent looking of that moment – I would agree with that – but then it is interesting that we separate at that point and for me it becomes about material – maybe because I know where the image comes from actually – and for you it goes in a different direction. I m not saying that’s wrong but really fascinating that all...

Student 7

Yes I think that he is sat down because there is a down ward force but he is also looking up - almost diagonally – that arm which is reaching or steadying or pressing buttons or something...

Yes he is sat down – you can see the tops of his legs as his arms cross over - He is sat with legs to one side...

ME

So he is almost involved in two activities – one is the control panel type thing and the other is this thing that has been picked up quite a lot which is the release of the material

Student 7

Yes the up and down thing

Student 8

Yes I have something similar

ME

Yes we have talked about that before haven’t we – that piece on the left because you said his action connects to that thing on the left...OK

Student 9

He has a controlling lever and he is either pulling or pushing it and it releases something to drop into the tank

ME

So you know for you – you said that there was something in the tank – the thing being made is submerged in the tank – so you know that bit there – some people said was a splashing – because you have identified it in your drawing but what is that bit for you?

Student 9

Its just the impact of the water – the ripples sort of thing...[inaudible]

ME

It's the trace of the surface of the water being disturbed?

Ok so can we now go onto the last one - so this is what is the next stage – what happens next?

So we have talked quite a lot about yours Julie – in terms that it is lifted out and moves to another stage of processing.

Student 5

I just thought that it was about to be poured so it would just continue to be poured...

ME

Ok – so the next two or three minutes – yes what is the time frame?

Student 5

I don't know – I hadn't thought about that...

ME

What would you just guess? How deep is this vat? Or mould?

Student 5

I wouldn't say as long as two or three minutes – maybe a minute or minute and a half

That's a complete guess

ME

OK so you're what happens next drawing is about one or two minutes long essentially and then something else happens?

Student 5

Yes then something else happens which I don't know

Student 1

I thought it might be cooling down and then be shaped into another shape – a proper shape – and maybe a continuation of what is currently going on for a few minutes – that's what I had

ME

OK

And you have gone for options there – or not options but ...

Student 1

I just couldn't decide – I thought maybe there were different things about to happen... so

ME

Is that because there just isn't enough information

Student 1

Kind of and I just couldn't make my mind up - which one would make sense... so

ME

They all sound very credible – yes

Student 4

All the molten steel is in here and then the workmen releases the pulley back up and lets go and another mechanism is in place – I thought that this liquid then got tipped out with some moulds or shapes ... for the next bit

ME

SO for you is the liquid – the steel is going into this vat and then is it remaining molten and then tipped out again into another process – another mould

Student 4

That's what I guessed - yes

Student 2

I thought that this was the mould – so I thought that it was pouring into there and I thought that there was water in there so that it would cool in there and then it would come out and there would be one big disk

ME

And why is there water in there?

Student 2

To cool it down

ME

But visually what is the evidence?

Student 2

Because it has gone fuzzy as it goes in – there's a bubbling bits where the heat meets the water and also because of the surface being reflective...

ME

Yes when you said that – its that reflective surface for me – did anyone else pick up on that reflective surface? Because I can't quite work that out actually – why the surface is reflected – its such a dark image – there is no light source to me apart from the glow of the material...

ME

It's a man ghost – is it a man ghost?

Student 6

It's a female and she has long hair that flies on top of her head

ME

So the wavy lines like that are her hair?

Student 6

Yes

ME

You know her head – there is something sort of happening around her neck – is her neck...?

Student 6

She only has a head and no body

ME

So is she...So when I look at that she is coming up out of this drum or...
OK thanks...

Student 7

I thought that the molten stuff would be poured out – but looking at it now - there are supports half way around this circular shape

ME

Oh yes

Student 7

I think that the supports are then going to be removed and like Madeleine said the disk can then be taken out – the thing that has been cast can then be taken out – I think - these are supports and its propped up as well

ME

Sorry where is it propped up?

Student 7

There are some diagonals there – so I think they are holing it in place...

ME

Yes – Yes - So we have a ring

Student 7

Its half way round - so that once it is cooled down then that half moves

ME

Oh god yes

They are half way round aren't they

Student 2

You can see some sort of mechanism there is it – like you have on a cake tin

ME

Yes it is a cake tine isn't it

So [Helen] can I just go back to your drawing?

Student 7

Yes but I have changed my mind since

ME

So that's almost what you have got to now – but can you tell us about the drawing – because it is only a few minutes ago – only ten minutes ago and yet – can you tell us what you saw at that point...

Student 7

At this point I thought the hot molten liquid which is probably going to be a solid when it cools – remains hot in this drum and from the drum get poured into the mould

ME

OK so like a secondary processing... and you know you have cross hatched it – what does your hatching tell us?

Student 7

That it cools down and becomes a solid at some point

ME

So the hatching is the material going from a solid to a liquid – almost like a crystallization

Student 8

I thought that the liquid was going to be gas – and the gas is more and the liquid is less – and this would in turn be used to create mechanical energy

ME

So the gas coming off is the actual stuff coming off that they want?

Student 8

Yes to create some sort of mechanical movement

ME

Like in electricity generation? Where they boil water to make steam to drive a turbine?

And in your drawing – in the round tank you have got – not a whirlpool - but these concentric circles?

Student 8

Yes the way I wanted to show it – was that it was getting less – I just imagined it going and getting smaller and smaller – because at one point it is going to be gas – not the whole tank...

ME

So the circles getting smaller and smaller is time – over time what ever is in this tank is going to evaporate – if it is water its going to evaporate – so its starts as this much – and it starts to (noise) decrease and then it is all gone

Student 8

Yes - exactly

ME

So in your drawing there is – its an animation really your drawing? But you have put it all in one drawing – there are stages and time
I like the way that you have drawn that...

Student 9

I have put that the object will be made from what ever has been put in there to cool down – so you cant see the object because it is submerged in water – but I was just thinking the... is there a relationship between the two [Image No 1 and 2] – that the satellite is a circle and this is a circle – so I am wondering if there is a relationship between the... [two images]

ME

What do you think – just off the top of your head? That's very interesting that you said that – and if you concur that they are [both] glass then it starts to make sense. The only thing then is that this is a colour image....

[inaudible]

Student 3

Although it's a completely different era!

ME

Maybe there is another question – could you date that image? We have talked about the age of the man – I suppose we have touched upon it in terms of health and safety – in that the Health and Safety nature of that image is not now – so when is it?

Student 2

I thought it was pre war

Student 3

1930's

Student 4

1940's

ME

Did you date it?

Student 9

I just thought it was pretty old

[laughs]

ME

Give us - a date?

Student 9

1900 - I don't know

ME

Ok so before everyone else

So roughly what date is that one? [the satellite image]

Student 9

1990's

ME

Its really interesting that you said about the circle I am really pleased that you picked that up - actually

Student 2

So what is it?

ME

So yes we are running out of time so maybe I should stop... its actually from a book by Pilkington glass - the book is from 1959...

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