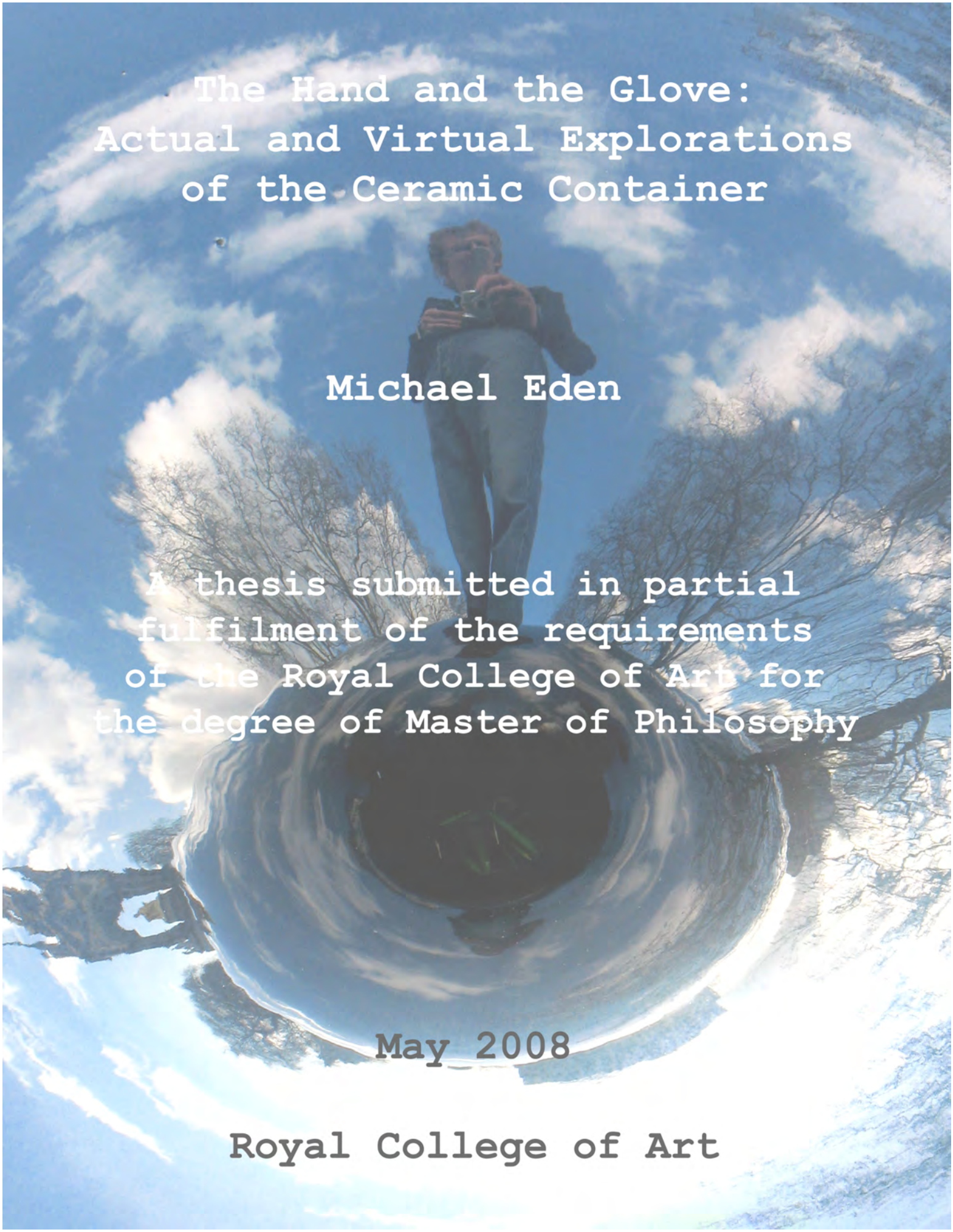

The Hand and the Glove: Actual and Virtual Explorations of the Ceramic Container

Michael Eden

A thesis submitted in partial fulfilment of the requirements of the Royal College of Art for the degree of Master of Philosophy

May 2008

Royal College of Art

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Copyright Statement:

Abstract:

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> The hand's action defines the cavity of space and the fullness of the objects which occupy it. Surface, volume, density, and weight are not optical phenomena. Man first learned about them between his fingers and in the palm of his hand.[1]

The project brings together the virtual and the actual, being both a tool and a metaphor for the exploration of the physical presence and the perceived experience of the containing object.
Over time, working with clay, repetition throwing and the making of functional pots develop a finely tuned sensibility. A tacit knowledge is gained where touch is as important as sight in the subtle investigation of form. The energy of a curve and the softness of a rim can be both seen and felt.
The result of the making process is often more than a simple object, it can have semiotic meaning, and its presence can extend beyond its physical form. The space around the object is inhabited and shared with the viewer. The relationship is real, yet it is based on the seen and the unseen, the known and the not known. The object is not alone, its physical presence is accompanied by implied or explicit significance.

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[1] Focillon, Henri (1963) *The Life of Forms in Art.* George Wittenborn. 162

The ceramic container is a familiar, everyday object, primarily designed and made to be used. Yet, within the form there is a paradox. When used, it is an object containing another object, when empty it contains a void.

The investigation of the ceramic container will explore the relationship of the virtual and the actual using primary geometric forms and mathematical models as vehicles.

A range of techniques will be employed to undertake the project. Hand making will be used alongside an exploration of digital technology. Crafting a computer-generated object shares some of the same manipulative skills. This research allows the opportunity to explore the relationship between the handmade and the digital.
The practical outcome of the project will be a body of ceramic works. The written report will document the practical work, analysing its development and comparing the efficacy and haptic qualities of the tools and techniques used.

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Outside the RCA, Ray and Jeannette Field very generously sustained me, my parents kindly sponsored me and my daughters looked on with interest and support.

My wife Vicky deserves special mention for the many ways in which she has helped and encouraged me, collecting me from the railway station late on Friday evenings and putting up with early morning dog walking through two Cumbrian winters.

Author's Declaration:

1. During the period of registered study in which the thesis was prepared the author has not been registered for any other academic award or qualification.
2. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Michael Eden
April 2008

Introduction:

The aim of this project is to put our *perception* of things in tension with our *conception* of them.

Part of the project investigates my experience of moving backwards and forwards between traditional hand skills and digital tools and techniques. The project evolved from work that I had been developing over the last 6 or 7 years before starting at the RCA and is firmly rooted in the making of functional pots.

Previously my work was designed to be used and to reflect the materials and techniques employed. I aimed to capture the fluid qualities of slip and freeze the effects of flame on glaze. At the RCA I wanted to question my previous practice, to justify thought processes and decision-making away from the isolation of my studio in Cumbria. It has been an opportunity for me to develop a new visual language and methodology.

The first stage was to see how my ideas fitted into the wider context of art, sculpture and architecture, as well as contemporary ceramics.

Initial reading on Minimalism showed that the term has been used to include a diverse range of artists, and that my exploration relates to some of its subject matters. For instance, the perceptive experience is central to my project and is an area explored by Donald Judd and Dan Flavin.

Materiality is a concern of some Minimalists such as Carl Andre, who wished for his work to reveal its natural state. In my project I transform material in a specific way; yet attempt to remove all signs of the making process.

Placing my work within a ceramic context has been more problematic, as I have found few contemporary ceramic artists, makers and designers where the exploitation of material properties, and the techniques of manufacture

largely dictate the end result.

To a certain degree Bodil Manz and Wouter Dam explore vessels and the way they enclose space. For me some architecture provides a similar experience. The architect Daniel Libeskind also seemingly deconstructs the vessel.

Artists such as the painter Ellsworth Kelly have had an influence on my thinking too by the way his compositions encourage the viewer to extend their gaze beyond the canvas; and a similar effect is present in the recent work of Martin Smith. Smith's work has an architectural dimension that for me relates particularly to the work of the Swiss architect, Peter Zumthor, whose *Kunsthaus Bregenz* creates gallery spaces where light becomes a tangible element, enhancing the experience of the simple, beautifully proportioned spaces. A space like this makes links for me to the *Skyspaces* of James Turrell, where materiality is questioned.

The placing of my project into this context led me to question whether I should confine myself to ceramic materials. After much thought and discussion I decided that the project has developed directly from my previous experience as a potter and should stay rooted in the medium.

Once I felt that I knew more about the context of my project I began some practical explorations of primary geometric forms related to the container. The cylinder, cube, cone and torus have been examined using a toolbox that includes the sketchbook, throwing, slipcasting, model making, CNC milling, computer-aided design and rapid manufacture.

The exploration of the torus form demonstrates how this expanded toolbox can be used to create a new practice model where an idea is realised through an appropriate use of tools and materials both traditional and digital.

This led me to a project that concentrated purely on the application of digital design and manufacturing.

The *Wedgwoodn't Tureen* represents a unique combination of rapid manufacture and revolutionary new non-fired ceramic materials. It has demonstrated the creative potential of the new tools in the expanded toolbox, and it also deals with perception and illusion, though in a different way from the other work in the project. In this case, there is material ambiguity and historical illusion. Like the torus and the cylinder pieces, the form is familiar, but the experience is not what the viewer might expect.

There have been a number of outcomes to this project:

- The development of a research methodology through the exploration and application of a range of tools in this project has resulted in a new way of working.
- My focus has shifted, my work is now concerned with communicating an idea, realising a concept. It employs an appropriate combination of tools in order to achieve a planned end result.
- I have made a body of work with the intention of encouraging the viewer to look again, to question what their senses tell them and not rely on preconceptions in interpreting objects.
- At the extreme digital end of the range is the technology employed in the *Wedgwoodn't* project. This is still at an early stage and has enormous potential to create a sophisticated new visual language.

Though my MPhil project is at an end I feel certain that I can use it as a springboard to continue the exploration of illusion and ambiguity.

1 Context:

1.1 Introduction

At the core of this project is the ceramic container, an object primarily used since clay was first made durable for the storing, holding, and mixing of materials useful to man.

Throughout man's history virtually all cultures have engaged with the ceramic container. It is ubiquitous, familiar to everyone from birth to death. We take it for granted; its use is obvious and instinctive. At times its role has been recognised as more than a humble carrier of goods and its form has been shaped and decorated to reflect the value of its contents or their symbolic meaning.

1.1.1 Transition

Throughout my ceramics career, my engagement with the container has been rooted in the details of function and form. The perfect spout, the flowing curve and a pleasing surface pattern were consistent aims. Pots were made to give pleasure to hand and eye and to commemorate and celebrate; their valued place within a family being a reminder of special occasions.

Fig 1.1 Wood-fired Teapot, slipware, h. 18cm (2006) Michael Eden

Slowly the focus started to shift, for aesthetic and economic reasons I decided to simplify the decoration resulting in a new awareness of the pots I was producing. As form and surface came together to create a more harmonious object I changed the way I looked at and thought about my work.

My exploration continued to revolve around the container, but with an awakening to the way that an object is viewed as a whole.

Fig 1.2 Rolling bowl, (2005) slipware Ø39cm. Michael Eden

As an established maker of domestic ceramics function could not be ignored, but it was reinterpreted creatively, with the sculptural qualities of the object dominating the process. I was drawn to other forms of containment, such as architecture.

In some ways there is a common perceptual experience of buildings and pots. In both forms there are openings and entrances, interior and exterior spaces, and often there is a blurring of the dividing lines between these elements. Materials are frequently shared. Buildings can be seen as large pots and pots as small buildings.

Fig 1.3 Grain Store and pots, Mali

Fig 1.4 Djenne Mosque, Mali

In some cases, such as in the traditional adobe buildings of West Africa the definitions are very indistinct. Cooking pots are enlarged to become grain stores; grain stores become dwellings.

1.1.2 Abstract Space

The ceramic container as a concept is perhaps not as clear-cut as it first appears. It is the focus for much ontological exploration and has been used as a vehicle for investigation and expression by a number of ceramicists.

The work I am continuing to develop for this project relates in different ways to the ceramicists described below. There is a strong overlapping of themes, for instance, primary geometric container forms are the starting point for the majority, and perception is explored in most, but I have been surprised during my research to find very few ceramicists whose work essentially deals with abstract explorations of space. Looking beyond ceramics I am drawn to artists and architects whose work extends my imagination beyond the object in a way that attunes me to the quality of the surrounding space. Scale is an important factor here, the work of James Turrell, Richard Serra and the

architects described below possess a dominating monumentality, where the senses are almost totally overwhelmed. For artists working at a more domestic scale, surroundings can divert attention away from the object; therefore sensory information received by the viewer has to be succinctly communicated for the intentions of the work to be made clear.

1.2 Ceramicists, Artists and Architects

1.2.1 Deconstruction

Wouter Dam is one of a number of Dutch ceramists whose work engages with abstract geometric forms, though he is predominantly concerned with the deconstruction of the vessel.

Fig 1.5 Wouter Dam Blue Form 2003

> This sharpness in the partitioning of the planes suggest an architectural approach to organizing space…… With this focus on space and the intersections of surfaces, these are undoubtedly sculptural works, yet their language is recognizably that of ceramics.
>
> At the core of Dam's preoccupation is an exploration of the potential of the vessels, of

> the multiplicity of ways that clay can enclose volumes.[1]

There is something of a shared approach in the work of architect Daniel Libeskind, for example in his Imperial War Museum North [IWMN]. In this case the earth is his vessel.

> The IWMN is fundamentally based on this world - the contemporary world shattered into fragments and reassembled as a elemental emblem of conflict. These fragments, shards or traces of history, are in turn assembled on this site and projected beyond it. An entirely new landscape will offer an environment in which the participatory experience of the public would begin long before the visitors enter through the actual doors. The building exists in the horizon of the imagination and is visible across the strategic points of the city and its surroundings.[2]

Fig 1.6 Imperial War Museum North

Fig 1.7 Imperial War Museum North

[1] Enright, Shane (1998) Wouter Dam, *Crafts* 154 Sept/Oct, 52
[2] Libeskind, Daniel: http://www.daniel-libeskind.com/projects/show-all/imperial-war-museum-north/ (accessed 15.10.07)

The vertical element of the building, the Air Shard, is a tilted, almost empty space, save for stairs and a lift that take the visitor to the viewing platform. The slatted walls allow sun, wind and rain to pass through, creating an edgy, thought-provoking space.
For me this blurring of interior and exterior space led to my interest in the Möbius strip, the one-sided surface that neither encloses nor excludes. Though intrigued by the form, I initially retreated to the conventional container form, exploring cubes, cones and cylinders, yet it has remained an important core idea throughout this project. The one-sided surface later reappeared as a torus.

1.2.2 Construction

In contrast to Wouter Dam, Natasha Daintry makes simple containers, using colour to draw the viewer into the surrounding space. Her aim is to encourage a quiet contemplation of the perceived form, inviting an enquiry into how emptiness can be shaped and transformed.

Fig. 1.8 Pots by Natasha Daintry

My forms have been reduced down to a horizontal and vertical shape, to a cylinder and disc, to try and express such abstract qualities more fully.[3]

[3] Daintry, Natasha (2007) *Testing the Zeitgeist*, Ceramic Review No. 223 Jan/Feb, 52

The common starting point for all the ceramicists discussed here is the vessel, a simple container left whole or modified, used as a vehicle to challenge the viewer's preconceptions in different ways. In her essay *'The Essential Vessel'*, Natasha Daintry talks about the making of a vessel.

> …this simple making of a cup or bowl is also an essay into abstraction, a clothing of emptiness. For a vessel is as much defined by the negative space in and around it, as the skin of ceramic itself. This skin is a sort of negotiation between inside and outside… and is an effortless three-dimensional manifestation of form and formlessness.[4]

1.2.3 Light

James Turrell's medium is light, with it his desire is for the viewer to see themselves seeing – actually and directly perceive the process of their own perception[5]

Fig. 1.9 James Turrell, Kielder Skyspace 11.08.07

Walk into James Turrell's Kielder Skyspace, and the relationship between inside and outside space is made tangible, defying all conventional experiences. Through the knife-edged oculus the sky is given weight and mass, it appears

[4] Daintry, Natasha (2007), 'The Essential Vessel', in: Cigalle Hanour (ed) *Breaking the Mould*, London: Black Dog Publishing

[5] From a conversation between the artist and Andrew Graham-Dixon. (2006), *James Turrell, A life in Light*, Louise T Blouin Foundation. Paris: Somogy Publishing. 22

more solid than the smooth grey walls enclosing the viewer. At dawn and dusk internal ambient lighting reacts to the changing external light, re-instating the materiality of the building, creating a tangible experience of 'form and formlessness'[6].

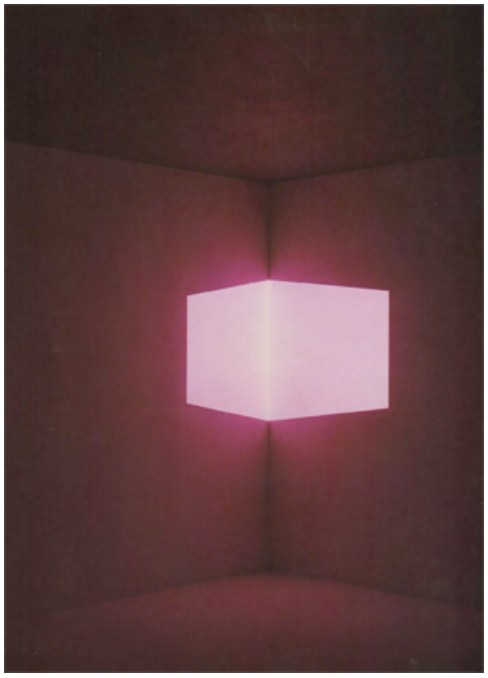

Fig. 1.10 James Turrell, Catso, Pink 1968

This is more obvious in his projected light series, where a geometric form appears to float in the corner of a darkened room or a wall of light of uncertain depth faces the viewer. In all of his projected series the light is contained, precise and controlled. In creating the illusion of objects, light appears to be brought to a halt, hovering in space. The Skyspaces, on the other hand engage with the vagaries of natural light, allowing the viewer to be sensitised to the perception of material, light and space.

Bodil Manz also uses light to blur the dividing line between interior and exterior space. She is best known for her translucent cylindrical porcelain containers, decorated with simple vertical and horizontal patterns, designed so that the ghost of the interior surface is visible through the wall, breaking

[6] Daintry, Natasha (2007), 'The Essential Vessel', in: Cigalle Hanour (ed) *Breaking the Mould*, London: Black Dog Publishing

down the barrier, allowing the combined decoration to float free. Yet Bodil Busk Laursen says:

> In spite of the ultra-thin walls and transparency of the cylinders they stand with weight on their base, thanks to their precision and the vigorous power of the decoration. This contradiction is part of their magic.[7]

Fig. 1.12 Bodil Manz Cylinders, 2004, various sizes, porcelain.

1.2.4 The Dividing Line

Fig. 1.11 Nicholas Rena, (2005) Small Jug

In contrast to Bodil Manz, the work of Nicholas Rena deals with the solid, monumental mass of material, perhaps informed by his previous career as an architect. Walls are thick, emphasised by a squared-off rim, colour is monochrome, adding to the density, yet the forms always relate to domestic containers, firmly capturing the internal

[7] Larsen, Bodil Busk. (2005) *Bodil Manz* Galerie Besson.

space. The viewer is drawn to explore the hidden interior. There is no ambiguity here; the space within has a discrete presence.

One series, first exhibited in 2003 as 'Transit Space' at the Barrett Marsden Gallery in London, is thin-walled, white and slip-cast, adding to the anthropomorphism of the work. There is more action in these pieces, a strong impression of exhalation from the open mouths.

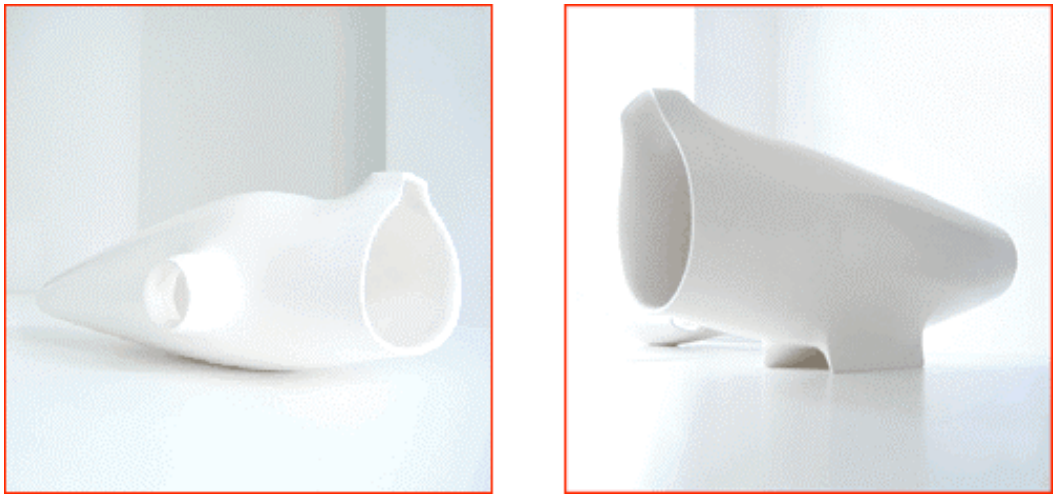

Fig. 1.13 Nicholas Rena, from 'Transit Space',
Puls Gallery, Brussels 12.06.04 – 17.07.04

> [There is] an intimation of a chin, throat and thorax. The polished clay surfaces have a bone-like tactility, which is both sensuous and inviting. The interplay between line, edge, interior/exterior has become more complex and has pushed Rena to the forefront of a new generation of artists exploring fresh possibilities with the language of abstraction.[8]

[8] http://www.pulsceramics.com/nicholasrena.htm (accessed 03.01.08)

The rim is the crucial dividing line in most of the ceramics discussed here, the contrasting effects of square and thick, and sharp and thin clearly demonstrated in Rena's work.

The current trend for torn rims, such as in the fine porcelain of Carino Ciscato, draws attention to the dividing line. Initially it may be aesthetically pleasing, but it can create an unsettling focus, demanding a disproportional amount of attention.

Rims simultaneously unite and divide, they are rarely dormant.

Fig. 1.14 Michael Eden, torus form 2008

In my torus pieces I have attempted to create a container without a defined rim, with a non-existent bridge. Combined with a highly reflective black glaze the interior space sucks in the surrounding space, becoming a diminutive event horizon.

1.2.5 Extensions

The work of Martin Smith shares the monumentality of Rena's, but there is a different relationship between internal and external space.

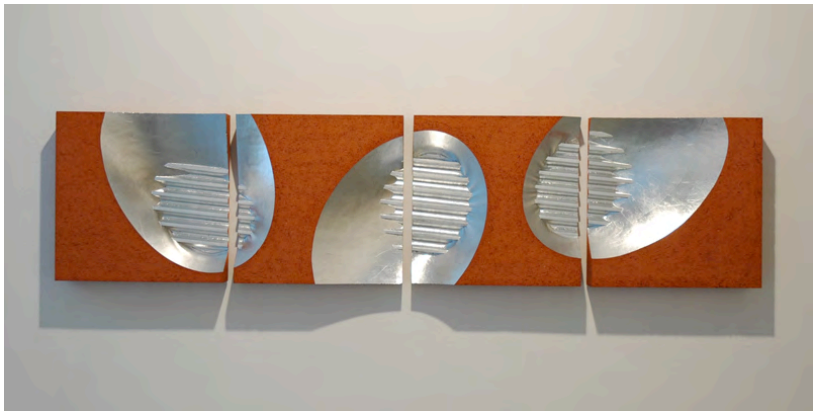

Fig. 1.15 Martin Smith. 'triptych in four parts' 2007.

In 'triptych in four parts', Martin Smith not only bridges the staccato spaces, but gently extends the viewers gaze beyond the structure, allowing the fabrication of a network of invisible planes, lines and forces. The artist Ellsworth Kelly writes,

> The space I was interested in was not the surface, but the space between you and the painting[9].

Fig. 1.16 Martin Smith
'Squaring the circle II', 2007

In a similar way, Smith abstracts reality to provide a perceptual experience that takes the viewer well beyond the material composition.

[9] Kastner, Jeffrey. (2003) *Ellsworth Kelly's Journey, From All Angles*. The New York Times. May 4, 42

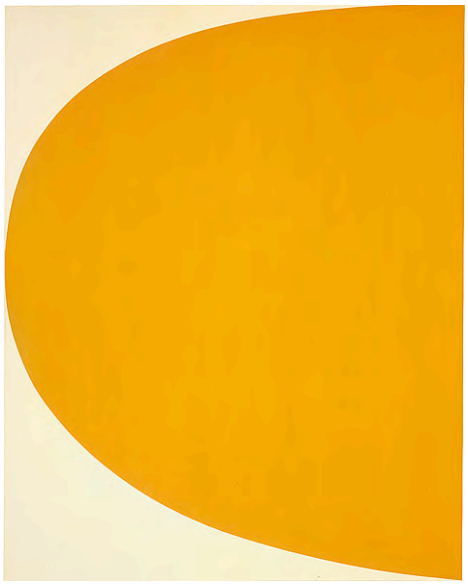

Fig. 1.17 Ellsworth Kelly. Orange curve [Orange white] 1964-65

Kelly goes on to say,

> The new works were to be paintings/objects, unsigned, anonymous[10]

About painting he says,

> I like to leave it… a little unfinished. Half-open or maybe quarter-open. And not exactly about something. It's mostly about perception. I guess I have to satisfy my eyes[11]

In Smith's 2007 - 2008 'wall works' exhibition at the Barrett Marsden Gallery, there has been an obverse process to that which Kelly went through in 1949 when he blurred the line between painting and sculpture by hanging them a short distance from the wall and painting the edges of the unframed canvasses.

Martin Smith has taken his characteristic three-dimensional vessels/objects from the plinth, and almost removed a dimension to create the 'wall works' series. However, the result allows for ambiguity, an investigation of actual or perceived volume.

For many years architectural space has been referenced in Smith's work, often using the container as a site-specific vehicle [as in the 2001 'Wavelength' installation at Tate St. Ives] to investigate how the

---

[10] ibid

[11] Burn, George. (2006) *Touching the void.* The Guardian. March 16, 20

slowly changing natural light shapes and reshapes the internal space.

1.2.6 Containment

For me there is a personal resonance to the work of Swiss architect Peter Zumthor, particularly his 2005-7 Brother Klaus Chapel. It is almost a ceramic container, having been 'cast' around a stack of softwood poles, arranged to form a water droplet shaped oculus. On completion of the exterior, the wooden former was ignited, transforming the 'pot' into it's own kiln.

Fig. 1.18 Peter Zumthor, interior, Brother Klaus Chapel, Mechernich-Wachendorf, Germany, (2006)

Fig. 1.19 Peter Zumthor, Brother Klaus Chapel, Mechernich-Wachendorf, Germany, (2006)

An important aspect of Zumthor's work is how his buildings affect the senses. They are regarded as elemental and contemplative, his Kunsthaus Bregenz

creates a quality of even light perfect for the quiet study of the artworks. He has created a space where the light has a tangible quality; it becomes part of the experience.

In the same way, the sculptures of Richard Serra are designed for interaction. His medium is dense, heavy steel plate, a material firmly rooted by gravity, but used to define and give shape to the most ephemeral of materials- the surrounding space. His work deals with containment, not just internal, but how the piece relates to its environment. He talks about transforming the surrounding area from an architectural to a sculptural space.[12]

Scale is a crucial factor in his work, determining how the viewer experiences the piece. He decides the height of his pieces in relation to his body movements. If too high the physical space won't be registered with his body, it would become like a building.

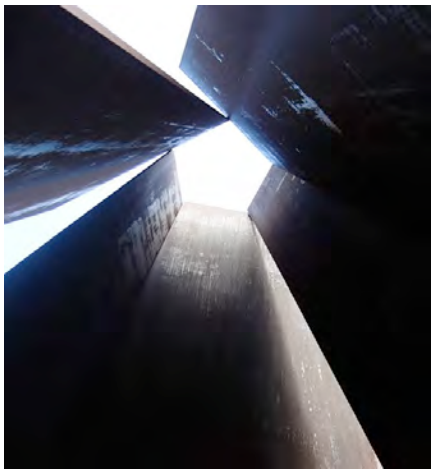

Fig. 1.20 Richard Serra, interior, Fulcrum (1987). London

The 1987 'Fulcrum' piece pre-dates the development of his torqued ellipses, spirals and toruses, and relates to the surrounding high-rise office architecture, giving the piece an austere monumentality.

[12] Richard Serra interview (2007) Museum of Modern Art, New York *Sculpture, Forty Years*
http://moma.org/exhibitions/2007/serra/flash.html (accessed 13.08.07)

Fig. 1.21 Richard Serra, Fulcrum (1987). Broadgate, London

His later flowing, tilted, curved work encourages the viewer to explore; interior spaces can be apprehended easily, though the leaning walls can be disquieting. The external surfaces have to be mapped to make sense of them, confusion arising when the external becomes the internal.

Fig. 1.23 Richard Serra, 'Joe', (2000) The Pulitzer Foundation for the Arts, St. Louis

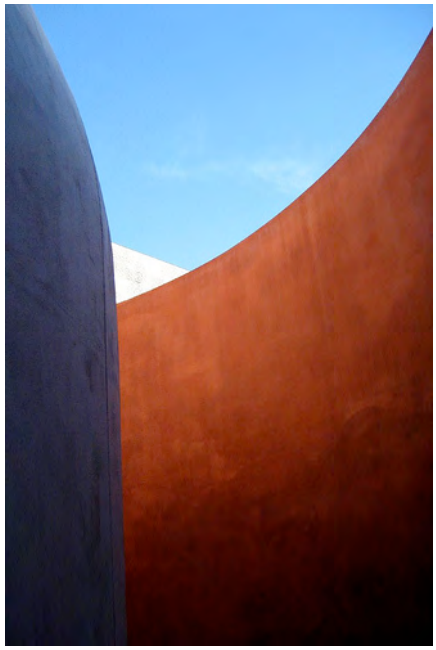

Fig. 1.24 Richard Serra, interior, 'Joe', (2000) The Pulitzer Foundation for the Arts, St. Louis

1.2.7 The Form

My project utilises some of the same devices as the artists discussed here, to "put our perception of things in tension with our conception of them".[13] In my case the 'thing' is the ceramic container, by association firmly rooted in the domestic. I have deliberately chosen to use ceramic as the core medium, but many of the same considerations are necessary in my exploration. Scale, for instance. Work the size of Serra's bombards the viewer with sensory information, stimulating positive and negative memories of urban space; cathedrals and dark alleyways, forests and caves. Whereas ceramic containers, even deconstructed ones like those of Wouter Dam, strongly awaken thoughts of function, at least initially. They may be followed by abstract spatial considerations, but those perceptual insights are harder won.

Size matters, it helps to bridge the perceptual space between sculpture and function.

In scaling up ceramic work there are many practical considerations to be made, choosing the appropriate clay and making techniques, surface treatment and firing. The question of why to burden myself with the technical difficulties is a valid one, but this project grew from my direct pottery experience, and has to remain firmly rooted within the field of ceramics, adding to its language.

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[13] Foster, Hal (2001) Torques and Toruses from *Richard Serra, Torques Spirals, Toruses and Spheres*. New York: Gagosian Gallery pp 7,8

2.1 Sensing the Container:

To paraphrase the art critic Hal Foster[1], the aim of the project is to put our perception of the container in tension with our conception of it. In other words, it explores the difference between what the object appears to be and what the object actually is. Fundamentally it's about looking and seeing.

The material itself affects how we react to the container- red earthenware, stoneware or porcelain, each have there own particular materials qualities that will affect your experience of them. The characteristics of the material can determine your experience of the container; for instance, red earthenware tends to be both visually and physically heavier than porcelain.

2.1.1 The Container

The word itself implies use. There is an expectation of function.

In the kitchen cupboard the piled up pots patiently wait their turn, deprived of an autonomous existence. Just the rims of a stack of plates can be seen; bowls are nested together, doing their duty even when at rest. Mugs are upside down on the draining rack, arranged by size, waiting to be selected. They were made, selected and bought with a particular purpose in mind.

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[1] Foster, Hal (2001) *Richard Serra, Torqued Spirals, Toruses and Spheres.* New York: Gagosian Gallery, 6-7

The pie dish is waiting for apple, shepherds or homity to fill it, the teapot, ready for the spoonful of leaves and boiling water.

2.1.2 The Mug

I have made thousands of mugs, cups and saucers, bowls of different sizes- ceramic containers of all sorts of shapes and sizes. Function and aesthetics were the main concerns in their gestation. The mug for instance, is a humble, everyday pot but one of the most difficult for the potter to successfully make. Being practiced and attuned to subtle differences will determine its success. Fingers should fit the handle comfortably, there should be a sense of balance when lifting it, it should hold the preferred amount of liquid and the mug is almost unique as it is often in intimate contact with one of the most sensitive parts of the body- the lips.

So we use sight and touch to perceive the mug, sight, touch and smell to perceive the contents. Even hearing plays a part in the experience when the tea is poured (and my youngest daughter hates anyone to slurp his or her tea).

2.1.3 Drinking Tea

We analyse and respond to all that sensory information just to have a cup of tea and we are barely conscious of the complex processes involved. If we stop awhile to look again, what do we see? There is the form- it could look like a small bucket, a barrel or a can. It has an interior and an exterior surface, is that one surface or two? A barrel shaped mug will make you

think of two surfaces, an open form can be more ambiguous. The rim is the dividing line, but pour a cappuccino and the rim doesn't restrain the contents, it foams outwards to the 'exterior'. So where is the dividing line between the inside and outside space?

I like to drink Darjeeling tea, it is a golden translucent liquid and if the interior surface of my mug is pale I can still see its form. Sight, taste and touch are brought together to give me a complex sensory experience, an engagement with material, volume, and space.

When empty, the mug is actually full; air is matter and energy in the same way as tea, but our perception of it is liminal. However, looking at my empty mug isn't a lot different than my experience of looking at it when filled with tea.

The essence of the container is the space itself. Kakuzo Okakura illustrates this through Taoist philosophy:

> The reality of a room, for instance, was to be found in the vacant space enclosed by the roof and the walls, not in the roof and walls themselves. The usefulness of a water pitcher dwelt in the emptiness where water might be put, not in the form of the pitcher or the material of which it was made."[2]

The container actively frames and shapes the matter around it.

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[2] Okakura, Kakuzo (2006) *The Book of Tea*, Japan: Kodansha International Ltd

2.1.4 Space and Scale

My investigation into the nature of the container, exemplified in the drinking a mug of Darjeeling is a sensory journey into space. Scale up this experience, and you have sculpture such as 'You and I, Horizontal III 2007' by Anthony McCall.

Fig 2.1.1 Anthony McCall, You and I, Horizontal III (2007) Installation view at the Serpentine Gallery, London, 2007

This is one of a series of QuickTime movies of simple sine waves and lines, projected through a haze contained by a darkened gallery space. The images slowly move and transform, altering the shape of the light streaming across the space. For the viewer, the light takes on a material quality, it becomes gossamer; people interact with it, or even duck under to avoid contact with it.

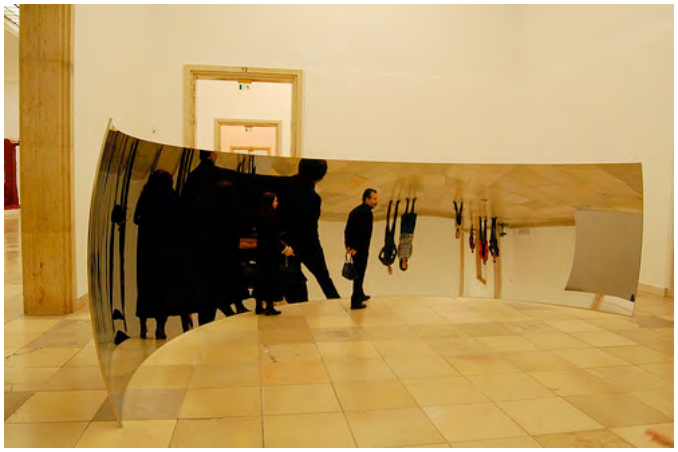

Fig 2.1.2 "Vertigo' by Anish Kapoor, is a concave mirror that alters the perception of the space between the sculpture and the viewer. The artist asserts,

> …these works have a focus, they are quite manipulative… they position you… the sound as well as the eye is focused to a point… which I think is quite mystical[3]

The space between the mirror and its focal point is altered; the invisible is transformed; it is unseen, yet the modification profoundly affects the senses.

Both artists create work that changes the surrounding space. In Anthony McCall's work the space engaged with by the percipient is made tangible, in Anish Kapoor's it remains invisible, but is directly altered by the object. The shiny, dominating mirror takes over the gallery space, attracting attention, drawing the viewer's attention away from the subtle intention of the piece.

They are both 'of the moment' experiences, easily overlooked, yet when attuned to, provide a deeper insight into our place in the world.

Returning to the ceramic container, my project attempts to provide a similar perceptual experience by subtlety altering a familiar domestic object. My practical work uses contrasting reflective and matt black surfaces to break down the line between interior and exterior space and produce indefinite boundaries to the object. In some pieces light is used to represent the contents of the container, creating an ambiguous sense of depth. My aim is for the percipient to be made aware of the sensory processes involved in apprehending the objects around us.

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[3] Hardtalk Extra (2006) *Anish Kapoor*, from an interview with Gavin Esler. programme broadcast on BBC World 10.11.06. http://news.bbc.co.uk/2/hi/programmes/hardtalk/6143008.stm

A similar awakening can be gained through being taught to draw. According to the teacher and writer Betty Edwards,

> The global skill of drawing something that you see 'out there' [a perceived object, person, landscape] requires only five basic component skills, no more. These skills are not drawing skills. They are *perceptual* skills, listed as follows:
>
> One: the perception of edges
> Two: the perception of spaces
> Three: the perception of relationships
> Four: the perception of light and shadows
> Five: the perception of the whole, or *gestalt*[4]

Perception is more fully discussed in the next section, but what Betty Edwards outlines above are also the very first stages we go through when using our visual sense to apprehend an object.

[4] Edwards, Betty. (1993) *Drawing on the Right Side of the Brain*, New Revised Edition. Harper Collins

2.2 Perception:

2.2.1 Introduction

One of the clearest, most concise definitions of the word perception is:

> perception n. (in psychology) the process by which information about the world, as received by the senses, is analysed and made meaningful.[1]

This simple explanation is at the root of some of the most fundamental questions that man has asked, such as- how do we know what we perceive actually exists? Are your sensations of 'yellow' or 'cold' the same as mine?

We rely on sensation and perception in order to safely negotiate our way through the world; evolution has provided us with a number of sensory mechanisms- sight and touch etc. that allow us to apprehend our surroundings and react in an appropriate way.

Natural selection has developed our sensory mechanisms to process only the information needed for us to survive and prosper in our particular environment. We have no need to register ultra-violet light wavelengths as butterflies do, or infrared vision for detecting warm-blooded prey as snakes can. Our sight is not as developed as a bird of prey, our hearing works very differently to a bat. What distinguishes man is,

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[1] "perception n." Concise Medical Dictionary. Oxford University Press, 2007. Oxford Reference Online. Oxford University Press. Royal College of Art.
31 October 2007
http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t60.e7532

> …the development of additional brain space used for more abstract activities such as memory, association and speech.[2]

The senses that gather the necessary information are vision, touch, smell, hearing and taste. The practical work in this project is designed to engage with some of the spatial senses – predominantly vision, and touch to a lesser extent.

> *http://www.edenceramics.co.uk/diary.html*
>
> *26.10.07- writing about perception [and making moulds]*
>
> *Monday was spent reading about perception and starting to put down some words towards that section of the thesis. I remember coming across the writings of Richard L Gregory FRS, the Emeritus Professor in the Department of Neuropsychology at Bristol University last year and was interested in his work on illusion, which he uses to further his investigations into how sensations are interpreted as perceptions. In looking for online definitions of perception I came across his website. It's a valuable resource that allows readers to download all his research papers….*

2.2.2 Processing Information

In a split second our ears pick up a sound that is quickly becoming louder, the brain interprets the roar, our head turns, our eyes take in the movement and shape of the approaching object, our brain decodes those sensations, and we stay firmly on the pavement, avoiding the oncoming bus.

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[2] Bloomer, Carolyn (1976) *Principles of Visual Perception.* The Herbert Press

How did we know how to react? The decoding that saved us from a potentially fatal accident relied not only on sight and hearing but also on our brain testing the sensory information against prior knowledge, and deducing the likely outcome combined with an inherent genetic survival instinct.

Without the brain constantly using sensory information to create and test hypotheses the world around us would be a meaningless jumble of sensations. So we have a need to know, to constantly use our senses to build up as accurate a picture of our world as possible.

The information we amass can only be an approximation or representation of the real thing. In the same way that a photograph is just paper or my description of the passing bus is just words, the mind uses them to create a vivid image by referencing previous close experiences, sometimes adding an association to a past event. Listening to a piece of music often takes me vividly back to the time and place I last heard it.

In addition to what the senses can register, there is almost certainly a vast world of sensations that we cannot apprehend as we do not possess the necessary apparatus. Science has taught us of the existence of ultrasonic sound waves that bats use. If we cannot perceive a stationary, colourless, odourless gas or wavelengths of light that other species perceive, then what other sensations go unnoticed?

2.2.3 The Unsynthesised Manifold

The philosopher, Immanuel Kant divided the world into the phenomenal, meaning the world, as we perceive it, and the noumenal,

> …which is the world of things as they are in themselves.[3]

Kant described the whole of this as the 'unsynthesised manifold', which is

> in the original sense, everything that is out there, regardless of whether we perceive it or not. As we can't sensibly talk about matters of which we are unaware, we can use the expression more usefully to describe the endless flood of undifferentiated sensory data we accumulate throughout our waking hours. Our conscious and subconscious attempts at organising this stuff and getting it to make a kind of sense are attempts at synthesis. Because of the way the brain routinely edits and translates the raw data, what we perceive is not reality itself but a model of reality as encoded by our individual software, even before we start trying consciously to make sense of it.[4]

Philosophers since the Ancient Greeks have studied perception. During that time the dominant theory has been 'passive perception' – whereby perception came predominantly from the interpretation of sensations, in a linear way. However, the theory of 'active

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[3] Magee, Bryan (1998) *The Story of Philosophy*. London, Dorling Kindersley, 135

[4] Greer, Germaine, (2006) *The Guardian*, December 4, 28

perception', is gaining momentum. The neuropsychologist Richard Gregory states that perceptions are an interaction of 90% or more stored knowledge, plus sensory information governed by rules based on previous experience.

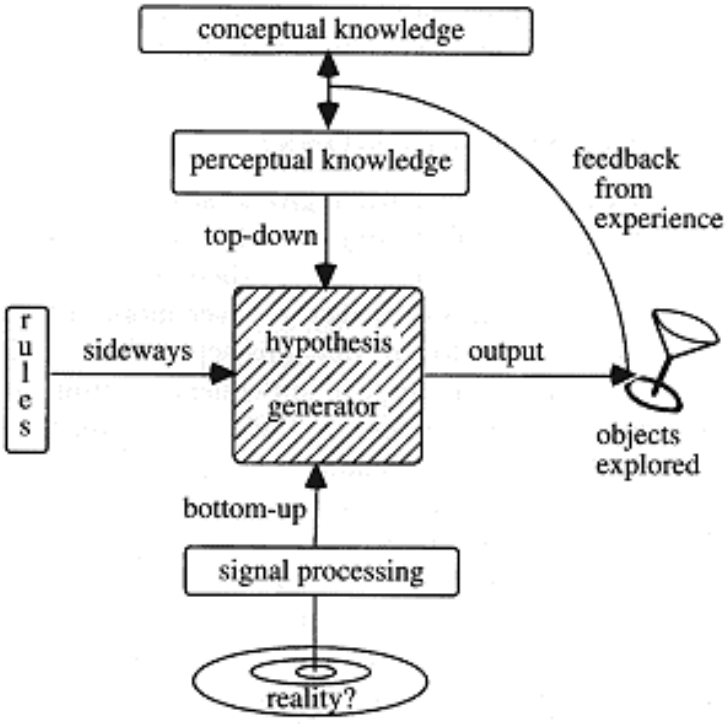

Figure 2.2.1
Tentative 'flat box' of vision. Signals from the eyes and the other senses are 'bottom-up'. Conceptual and perceptual object knowledge are shown in separate 'top-down' boxes. Knowledge as embodied in the general rules is introduced 'sideways'. Perceptual learning seems to work largely by feedback from behaviour.[4]

According to J.M.Malnar and F.Vodvarka

> …the comprehension of place relies… on sensation [the flow of data received through the sense

[4] Gregory, Richard L. (1997) Knowledge in perception and illusion, *Philosophical Transactions of the Royal Society B: Biological Sciences* 352, 1121-1128, 3

> organs]… (and) perception [the data after it is processed and interpreted].[5]

They go on to suggest

> …that humans commonly experience three kinds of sensory response: first, an immediate physical response to stimulus; second, a response conditioned by prior knowledge of its source, and third, a response to stimulus as it has become identified in one's memory with a particular time and place.[6]

'The comprehension of place'[7] can be substituted for the comprehension of the object, as the same sensory and perceptive processes take place. For instance, if we go back to the cup of tea, my first reaction to the sight of it is gained from visual information responding to the first and second sensory responses. My physical response is determined by recognising and interpreting various signs – as I have prior experience, I recognise the form to be a cup; steam tells me that it contains hot liquid and that I should be cautious of it's temperature; the colour and smell of the liquid tell me that it is tea; the shape of the cup and the level and temperature of the tea makes me careful when lifting it. However, prior knowledge gives me the confidence that I am about to have an enjoyable experience and with some care there will be little risk involved. The third sensory response may awaken emotional or intellectual memories, which could

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[5] Malnar, Joy Monice and Vodvarka, Frank (2004) *Sensory Design*, University of Minnesota Press, 21
[6] ibid
[7] ibid

range from a particular occasion, a particular taste to the design and manufacture of the cup.

All this happens in a split second; we are constantly bombarded with sensory information, our survival depends on its rapid interpretation. In our effort to manage the stream of sensory data a process known as adaption takes place.

Perception is mostly a bottom up process, where previous knowledge is used to short cut and speed up the process of apprehension. Adaption is the part of the process where the brain makes comparisons. Sensory input is constantly being compared to previous experiences, shortcutting the interpretation process, allowing decisions to be made at a faster rate. It helps us to focus on what is most important in our immediate environment, ignoring irrelevant details. A child can recognise its mother’s voice in a noisy environment and it is the reason why workers on pig farms are oblivious to the odours that visitors can find offensive.

In other words, when I look at my cup of tea, I unconsciously register that I will be able to sustain myself by drinking it; it’s a recognisable container so the contents are unlikely to poison me. It is likely to be a pleasant, satisfying experience.

It is also very likely to be a very different perceptual experience than when another person apprehends a cup of tea. An extreme example would be a Japanese tea master whose training would alert his senses to subtle nuances of material, form, surface, light and taste.

2.2.4 Defects of the Senses

We are limited by the efficiency of our sensory apparatus, for instance I have astigmatism. This is a defect of the eye where unequal curving of the refractive surfaces, usually the cornea causes a particular distortion. It can mean that vertical lines are focused on more easily than horizontal ones or vice versa. In my case I suspect I that I do not possess full stereoscopic vision. It may be one reason why I have always strongly felt the need to physically explore the surroundings of my home. I have to walk the view from the house in order to map my situation, to place myself in the environment. I then notice subtle changes to the patterns of fields, hedges and woodland. Changes in light bring out the rise and fall of the land that I may not fully be able to interpret without my ‘mapping’.

On a domestic scale, astigmatism makes it difficult for me to judge the position of the teapot spout in relation to the cup when stretching to pour tea across the table. However, I do not need to depend on sensory information alone, I have poured tea before and have an innate understanding of the mechanics of the process and how to avoid spilling the tea. In my case, previous experience is feeding information back to my sensory apparatus and controlling my physical movements. Without it, there would be a lot of spilt tea! My astigmatism may be one of the reasons why my interest in perception has developed.

2.2.5 Illusion

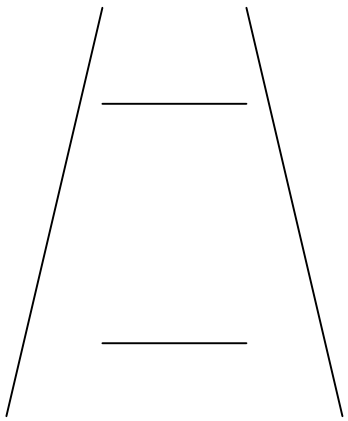
In previous work I noticed that the application of areas of slip to a form could create an ambiguous effect. The object could appear to be leaning, when it is vertical, the rim sloping, when it is horizontal. From this point I decided to use this effect to create a series of forms that exploits this sensation.

Fig 2.2.2 Vessel 2006. Earthenware with red & black slips.

The ceramic container pieces made during this project use geometric illusions to create distortions that challenge our previous knowledge and the rules that govern the perception of sensory data. They have been created to give the viewer an experience of form and space where the relationship between the interior and exterior spaces of the object is questioned.

As previously stated, viewing a conventional container such as the teacup will trigger an understanding based on past experience of similar objects. The works made for this project attempt to disrupt that process by

providing some sensory information that is accepted by our perceptive processing based on previous experience and information that confounds those expectations. New sensory information has to be gathered in an attempt to 'ground' the experience and create an understanding. At this stage the proportion of bottom-up information from our sensory apparatus to top-down information from knowledge may have to be altered and may never provide a full understanding of the form. The illusion may continue to exist as in well-known examples such as the Porzo illusion:



The converging outer lines create the impression that one of the inner lines is longer than the other, whereas they are of equal length. Even when measured the illusion continues. Our experience of using perspective to interpret the three-dimensional world is so profound that logic will not overcome the illusion.

Fig. 2.2.3. The Ponzo Illusion

I chose to experiment with primary geometric forms, the cylinder, the cone, and the torus, as I perceived these as being the most familiar, easiest to apprehend objects. They also relate to the ceramic container around which this project is centred. However, my choice was a partly instinctive decision to explore forms containing angles and sharp curves. Research has

demonstrated that our eyes tend to concentrate on as these features as they give the most information.[8]

> For the physical sciences illusions are nothing much more than threats to be avoided; but these out-of-this-world phenomena are important for suggesting and testing theories of how we perceive things. That there are illusions shows that at least some perceptions are not tied to the object world, as they float free of physical reality. Does the fact that some perceptions take off from object reality indicate that all perceptions are essentially separate from the physical world? This is a central question for theories of perception.[9]

It is impossible to know whether two people share the same experience, as one persons understanding of 'yellow' may be not be the same as the others. There may be physiological reasons for this or perceptual reasons associated with past experiences or cultural associations. Our perceptions are a construct where physical reality plays a small part in our apprehension.

There are different categories of illusion- optical, physiological and cognitive.

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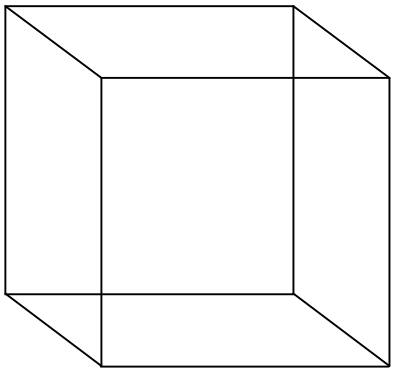
[8] Noton, D., & Stark, L. (1971). Eye movements and visual perception. *Scientific American offprints,* 537

[9] Gregory, Richard L. (1987) "illusions" *The Oxford Companion to the Mind.* Oxford University Press. Oxford Reference Online. Oxford University Press. Royal College of Art. 31 October 2007 <http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t159.e441-s2>

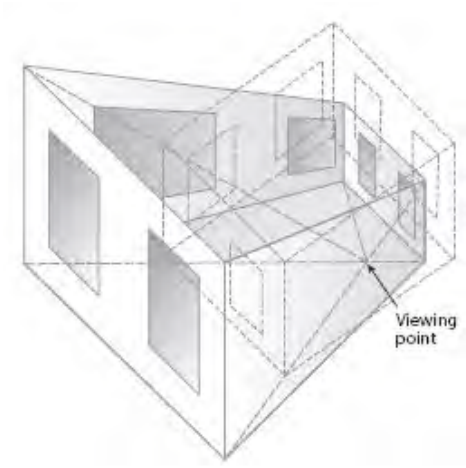


The Necker cube is another example of a cognitive illusion. In this case there are two equally probably interpretations. The cube can be seen at an angle as easily from below as from above.

Fig. 2.2.4 The Necker Cube

Illusions such as the Ponzo effect [see page 50] are a cognitive distortion caused by the brain filtering sensory information by adaption and using stored knowledge of perspective and spatial awareness to create a misreading.

The Ponzo and Necker illusions are two-dimensional; the Ames room is a three-dimensional example:



The odd-shaped room gives the same retinal image to the eye (placed at the right distance) as a normal rectangular room. So it must appear the same, and does, until there are objects, such as people, inside it.

Fig. 2.2.5 The Ames Room

Then they appear oddly out of proportion whilst the room continues to look (falsely) like a normal rectangular room.[10]

[10] Gregory, Richard L. (1987) "illusions" *The Oxford Companion to the Mind.* Oxford University Press. Oxford Reference Online. Oxford University Press.

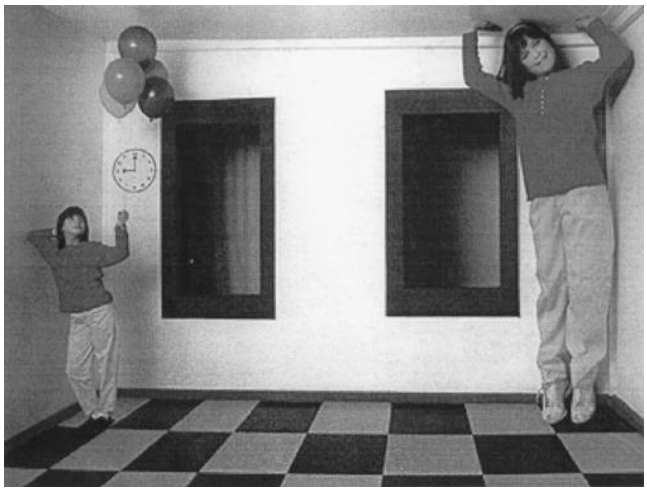


Fig. 2.2.6 The Ames Room effect

Three-dimensional cognitive illusions are explored in the practical work of this project. The pieces have not been designed to test theories of perception, but to simply allow the viewer an opportunity to be aware of the processes involved in engaging with the ceramic container.

Throughout the project I have engaged with illusion in the designing and making processes. There have been the two dimensions of pen on paper, used to visualise and guide the making of the three-dimensional object, and there have also been the in-between two and a half dimensions of the virtual object on the computer screen.

The ability to apprehend the 2D representation of the 3D object is not a cognitive illusion in the same way as the Ponzo or Ames Room effects, because our exposure to paintings, photography and the moving image have provided us with the necessary experience to interpret and make sense of the information. Since the Renaissance and the development of perspective, artists have understood how to create the illusion of

three-dimensional reality, taking the viewer through the picture plane to the imagined landscape beyond. We now take this facility for granted, it is used in computer-aided design [CAD] where an object can be panned, rotated and even passed through in its virtual world.

Pen and paper have been of limited use during this project. First ideas in the form of sketches have mostly been plans, almost cutouts of the proposed forms. These have then been developed on Rhino 3D software that has given me accurate top, front, side and perspective views that can be rendered to create a surprisingly realistic impression of the proposed object.

Slightly more sophisticated versions of Rhino 3D software, used to create computer generated imagery [CGI] produce sophisticated visual illusions that can elicit some of the same emotional reactions as a real life experience. In this case the absence of one dimension is of no consequence for the brain.

2.2.6 Touch and Sight

To design and produce a ceramic object by traditional methods such as throwing, both the senses of sight and touch work together in harmony. The eyes take in the scene, appraising the material, tools, and working space, able to focus on small details when necessary. The hand, in contrast, adds another layer of sensory information; touch produces an instant reaction- rough or smooth, light or heavy, flexible or rigid?

Together, with skills amassed through experience the maker will coordinate hand and eye to produce the desired object. Neither sense will dominate the process though at certain stages one of the senses will take precedence. A repetition thrower will know the form to the extent that the hands will act as the eyes, building a picture of the object in the mind. Only at the end of the process will the eyes be used to take in the whole form, confirming what the sense of touch has communicated.

When the actual object is replaced by the virtual, the physicality of hand-eye coordination is broken by the medium of the screen. The hand no longer subtly measures the mass, volume and texture of the material. The mouse becomes a dislocated hand, the cursor an almost senseless finger.

Haptic devices that replace the mouse are available where some of the sense of touch is replicated. Resistance can be measured; virtual clay can be shaped, carved and modelled, but the end result does not possess the material associations of the actual object, all is consistent, nothing is unpredictable as in nature.

Research to improve the sensitivity of haptic devices that will allow the applied artist and designer to work more intuitively is underway.[11] The technology is at an early stage of its evolution, being led by the very competitive gaming market.

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[11] For instance, the Tacitus Project at Edinburgh College of Art. http://www.eca.ac.uk/tacitus/index.htm (accessed 12 November 2006)

I have chosen to use this technology, despite its shortcomings because it is an extra tool that adds something to the creative process. I use it to extend and develop the visualisation of new work. It suits the precise geometry of my chosen forms; strict proportions can be adhered to throughout a series of related pieces. The on screen perspective view allows me to tilt, pan and zoom the piece with enough confidence for me to refine the virtual object rather than having to make a series of actual test pieces.

The virtual object, even with sophisticated rendering cannot replace the actual; though our brains understand the illusion, the eyes alone do not provide the intense sensory experience of engaging with the real thing.

In my case the lack of on screen material knowledge is of little consequence to me, as I bring the virtual object together with many years of actual previous experience.

However sophisticated CAD becomes it will not replace the experience of skilfully engaging with material; it will add another extremely useful tool to the range at our disposal, one with enormous creative potential and one which should be used when appropriate.

3 Making the Container:

3.1 Introduction

This research project is an exploration of the container, using the design and making of ceramic objects to explore the relationship between the interior and exterior space of the container and the way in which they are perceived. As part of the project I have used and compared traditional design and making techniques to digital technologies such as computer-aided design (CAD) and computer-aided manufacture (CAM).

Before starting this project I had been making pieces that gradually moved their focus from function to how they were perceived. Over the last few years the forms had been simplified and the surface treatment of slip decoration pared down to a few simple techniques. I was using the application of coloured slip to create three-dimensional illusions that challenged the viewer to look again. I had become interested in how the form and decoration could be made to work together to create the perception of something that may not exist as expected.

3.1.1 Clay

At an early stage in the making of test pieces I began to question whether I should struggle with the technical difficulties of ceramics. Could the simple geometric forms that I have explored be more effective made from polypropylene, acrylic or metal? Why should I even make them myself?

http://www.edenceramics.co.uk/diary.html

18.05.07

Thursday:
Took the small cone mould down to the large vacuum-forming machine in the basement. The third attempt was successful, but doesn't bear close inspection as the styrene is of uneven thickness. My first impression is that it will appear insubstantial, though with the inclusion of a light source this could be an advantage.

Friday:
Made another attempt to put together the ceramic cone, but the thickness of the clay walls is preventing the pieces from fitting. I then took a 'cast' of the inner cones, which after firing will be about 10% smaller and from which I can make new moulds.
The process is slow & frustrating, however it's partly due to learning new techniques and partly that practical works takes longer in the college than in the workshop at home.

As shown above in my blog, there have been frustrating periods during this project, but after a period of reflection and discussion with my fellow research students I came to the conclusion that if I abandon the ceramic element I am not only moving away from my practical and contextual ceramic knowledge, but will have to engage with the justification of the material I choose to use.
Each material comes with its own set of connections and connotations; clay is not the only material associated with the container but as this project has led directly from over 20 years of making and becoming attuned to domestic pottery, for the purposes of this project it is fundamental. However, perception, not

materiality or function is the central focus of the work. As discussed later in Chapter 4, I have had to develop the appropriate application of tools, techniques and materials in order to realize the concept.

3.1.2 Surface

To explore the abstract qualities of the ceramic container, the surface of the form should be free of distracting visual information.

Unlike some of my previous work that was concerned with its material properties and attempted to capture the act of making, this work needs all signs of the manufacturing process removed.

I first experimented with a flat, inexpressive, matt glaze that created a material uncertainty, but decided that the surface should make an active contribution to the ambiguities created by the form. Coloured glazes have been avoided, as I wish to steer clear of metaphorical associations that the use of colour may bring.

3.2 The Electric Potter

From being able to make a pot without the use of electricity,[1] I am jumping two or three hundred years into the 21st century world of digital design and manufacture. I have no desire to turn my back on the skills and knowledge gained from over twenty years as a professional potter, which in themselves were built upon skills passed down by generations of potters.

[1] Potentially the use of kick wheel and wood fired kiln would use no electricity directly. However, electricity would be used indirectly in the manufacture of ceramic materials.

Throughout history new tools and techniques have been assimilated into all creative processes and the situation is the same today.

This time the jump is radical; it is not a refinement of a tool or technique, but in the case of rapid prototyping [RP][2], includes the creation of a new manufacturing system. For the first time there is an additive process, rather then a reductive [such as carving or milling] or a shaping process [such as throwing]. Also radical is the use of computer software as a design and manufacturing tool (CAD/CAM).

In the past, developments have built upon the previous technology, a refinement of tools and processes.

In the first Industrial Revolution manufacturing was refined and made more efficient, but the greatest change was the introduction of division of labour.

For the contemporary practitioner there is a temptation to reject past technologies, as CAD/CAM appears very seductive. There is no need to serve a long apprenticeship; software can soon be mastered to a level where even rudimentary designs can be produced to a commercially acceptable level. The world is flooded with these objects.

Both traditional and digital tools have their positive qualities and limitations. This project aims to use both to explore their relationship and contribute to the creation of a contemporary creative practice.

[2] RP is the most common name for this developing technology. It is also known as 3D printing, Rapid Manufacture, and includes specific building methods such as Selective Laser Sintering (SLS), Fused Deposit Modelling (FDM) etc.

appearance of a container but is actually one-sided. It can't have an interior and an exterior surface, as they are one and the same. Initially, I made some tests from paper and card and then attempted to reproduce the form in clay. Made from a long, narrow slab, the resulting Möbius strip did not have the even distribution of curve and twist that an illustration or even card versions possess. As a result it was only semi-successful. Having seen illustrations of a Möbius strip with an oval section, I tried to work out a way of producing an accurate model, but soon realised that conventional techniques were of little use and even drawing the form with pencil on paper was beyond my capabilities.

Fig. 3.1

3.4.2 Rhino 3D

This was the point where my interest in the use of digital technology in ceramics was kindled. CAD software is sophisticated; the user has a choice of many packages, competing on price and function. I chose to use Rhino 3D software as it has all the functionality I need, the price is accessible for most users, and the RCA also uses Rhino 3D, so technical assistance is available.

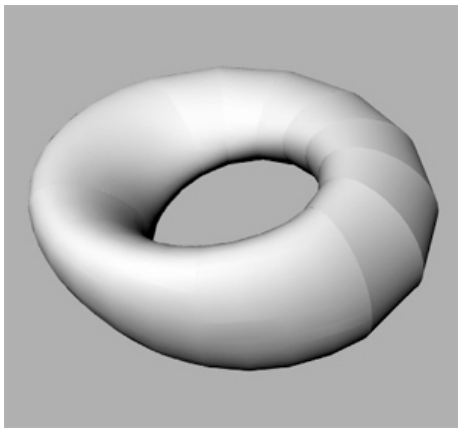

Fig. 3.2 Rhino rendering of Möbius strip

3.4.3 Choices

At the commencement of this project I decided that I would need to set limits to the type of forms explored. The College has facilities to explore a wide range of materials and techniques and the Ceramics and Glass department tempts the maker to take advantage of techniques new to the student. From the outset I felt strongly that I should justify the materials and techniques I chose to use, questioning familiar working methods for their appropriateness to this project. As the pieces created are not designed primarily to serve a functional purpose the normal considerations of the studio potter don't apply. For instance, I need to think about the profile of a rim not in terms of how it will feel against the lips, but in terms of perception, and how it acts as a dividing line. However, as a potter producing domestic ware I had developed a language built around form and function. This language is one of the defining characteristics of a hand made pot, the signature of the maker that helps to identify it as a unique creation. I have consciously chosen to remove all

those signs, for the work to show no evidence of the maker's hand. I wanted to avoid the viewer being drawn to the material qualities or the methods of manufacture. The overriding aim is for the viewer to be engaged with the form and it's surrounding space.

3.5 Investigations

According to Herbert Read the second stage in the creation of art is the perception of the arrangement of material qualities of an object into pleasing shapes and patterns[1].

It is widely recognised that both 2D and 3D objects that conform to the basic mathematical proportions of the Fibonacci series and the Golden Section[2] are found to be the most pleasing. In accepting and conforming to this theory there is a constant factor present in all the work I have made.

I have chosen to explore the container using simple geometric forms designed in aesthetically pleasing arrangements so that the initial apprehension of the object is straightforward, comfortable and acceptable. It is after the initial recognition that the illusions I have created within a piece have to be interpreted, a process that questions the act of perception.

---

[1] Read, Herbert. (1931) *The meaning of Art* London: Faber & Faber, 7

[2] The series refer to a sequence of numbers that start: 0,1,1,2,3,5,8,13,21,34,55,89. Each number after the first two is the total of the previous two numbers.
e.g.1+2=3, 3+2=5, 5+3=8 etc. They relate to the Golden ratio, (1:1.618 or 0.618:1) known as Phi, represented by the symbol φ. When consecutive numbers are divided by each other, the higher up the sequence, the nearer the sum is to φ. The Golden ratio is found throughout the natural world. It governs the way the arrangement of seeds in a sunflower, the spiral of a snail shell and the relationship between parts of our bodies. When employed consciously or unconsciously by artists the resulting arrangements are thought to be more aesthetically pleasing than those that do not conform.

Throughout the project I have used the Fibonacci series to determine the proportions of all the test pieces made from non-clay materials and when designing forms on Rhino 3D software. To accurately produce clay forms using conventional making techniques that conform to the same geometry is more difficult. Throwing is probably the most problematic. For instance in the torus form, where it is difficult to control the relationship between inside and outside curves. More accurate control is possible where forms are designed for press moulding and slipcasting.

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17.08.07

Last week was spent writing about the making process and throwing some torus forms based on the model I had designed on Rhino. Like all attempts to develop new work there is a need to adapt skills and improve techniques. I was keen to reproduce the Rhino design as accurately as possible, the first attempts [torus 01-08] were thrown the 'right way up', but I found it was very difficult to create a shallow, open bowl form. Throwing the form 'upside down' meant that I had gravity assisting me, particularly useful in forming the outside wall. Much more control was possible and the resulting toruses [09 and 10] are quite pleasing. However, the cross section is not an accurate reproduction of the Rhino design. I am looking forward to producing the Rhino model by CNC milling, to be used as a mould for slipcasting or pressmoulding the piece. It will be interesting to compare the results of the two methods. Which will prove to be the most successful, what are the criteria I will use to make a comparison?

3.5.1 Initial Tests

The first series of tests investigated basic geometric forms relating to the container- the cylinder, cube and cone.

I speeded up the production of cuboid test pieces by extruding a hollow rectangular section. Initial tests were given monochromatic surface treatment to disrupt the apprehension of internal and external space.

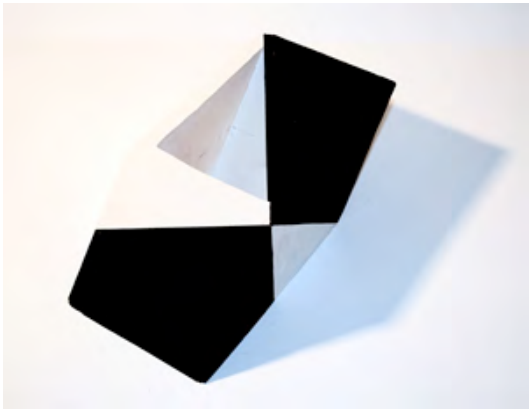

Fig 3.3 Cuboid test piece

The extruded pieces were disappointing due to the wall being of disproportional and uneven thickness. Their 'success' relied on them being viewed from one particular viewpoint, from others the effect was lost.

In order to carry out a large number of tests it was decided to use materials other than clay. Card and polypropylene were chosen as they have the advantages of strength, precise edges could be cut, creased and folded; they have a neutral surface and are relatively inexpensive.

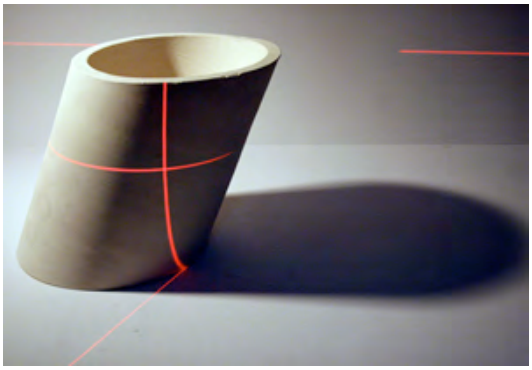

Fig 3.4 Cylinder test piece

15cm diameter cardboard tubes were used to make a series of tests. A laser level, commonly used by builders and tilers was used to project precise lines around the curved surfaces.

Depending on the relative positions of laser level and the objects to be marked, perspective can be used to create illusions of depth.

Fig 3.5

A number of paired cylinder forms were created. In these tests I attempted to 'link' the parts with a precise cut out section that created a tangible bridge.

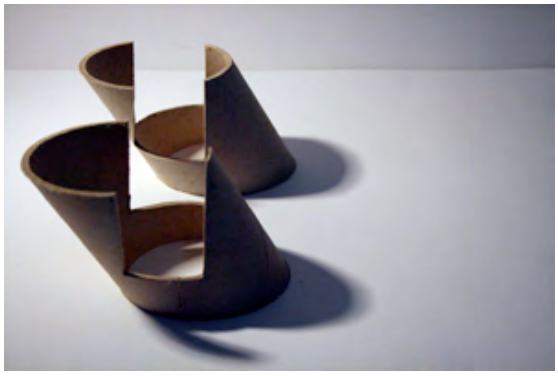

Fig 3.6

I was aiming to create the illusion that the space appears to be filled with a transparent, solid object. The space or 'contents' of the space would become the focus of attention.

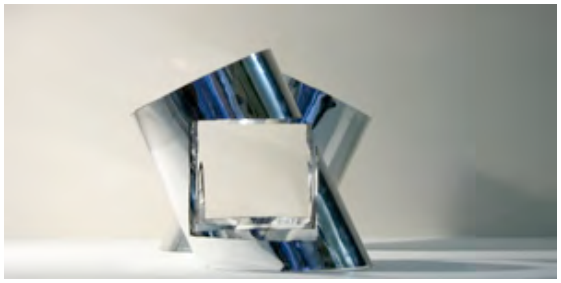

Fig 3.7

Further tests aimed to highlight the space by increasing its size to the maximum possible and to camouflage the form with reflective material.

Fig 3.8

However, the curved surfaces produced a confused visual effect, shifting the focus of attention from the space to the form.

3.5.2 Cubes

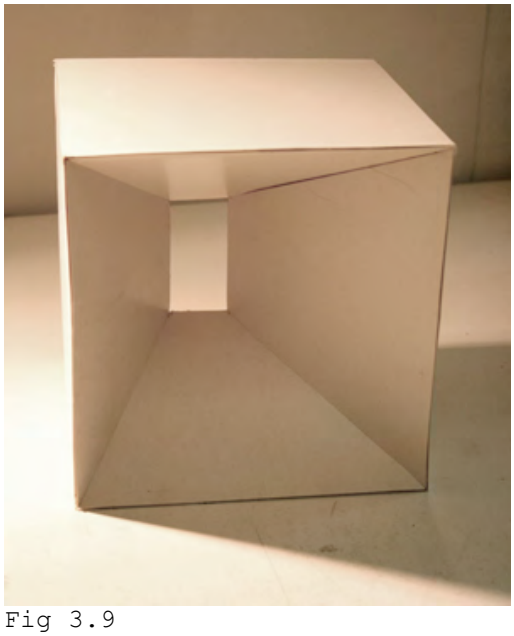

Fig 3.9

The cube was the next primary geometric solid to be explored. My aim was to make a two-sided open form where it appeared that the inner rectangular space appears to be positioned either in front of or behind its actual position.

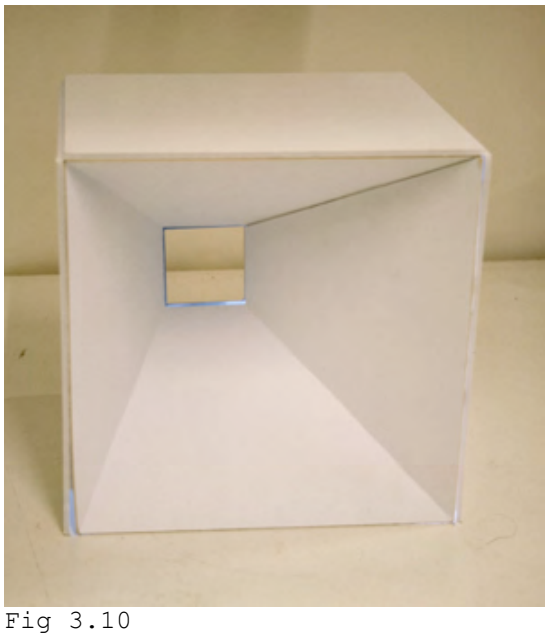

Fig 3.10

At this point I introduced light to fill the inner space. My aim was to develop the space or 'contents' that connected the 2 parts of the cylinder series.
The first method explored was to create and fill a gap between the internal pyramidal shapes with a piece of 'live edge' Perspex.

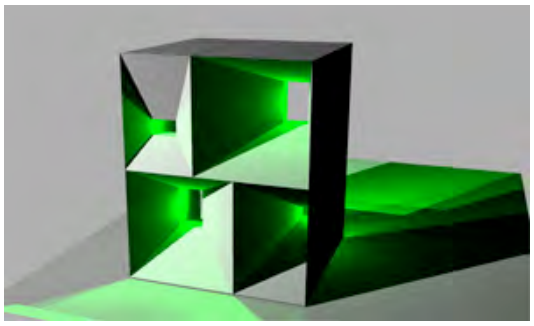

Fig 3.11

Rhino 3D software is more useful as an exploratory design tool with the cubes series than with the cylinders. They tended to be produced directly, using cardboard tube, Laser level, band saw and scalpel. The geometry of the cubes can be drawn accurately in Rhino 3D.
The virtual cube can then be dissembled and each of the internal surfaces is then produced as 2D Illustrator files, used with a plotter/cutter to produce a printed full size template. The shapes were then cut out of polypropylene or card and assembled.

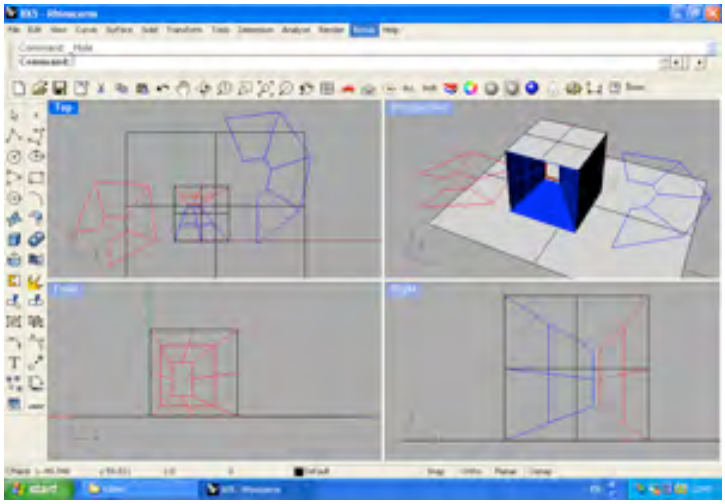

Fig 3.12 The red and blue internal surfaces have been translated into 2D plans [see top windows].

The obvious visual association of the cubes is to architecture rather than to the domestic container. They resemble window openings or a distorted view into a building's interior. Though I feel there are conceptual links between pots and buildings, this project is firmly rooted in the ceramic container. The next stage therefore, was to explore some of the same effects but in a more ceramic-like form.

3.5.3 Cones

The cone, or truncated cone has been used to produce a wide ranging number of tests in which there exists the potential to include light to suggest the 'contents'.

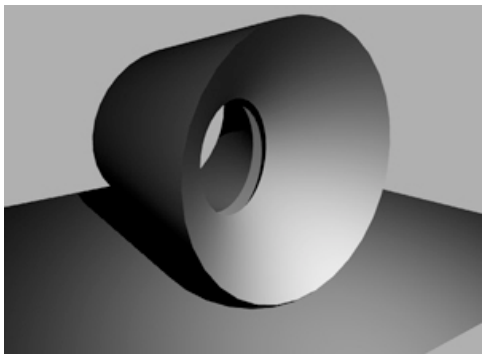

Fig 3.13

The truncated cones produced on Rhino are not true cones. To create a central space from which light could be issue the section has to be a pair

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04.05.07
Back at the RCA to a busy week making the moulds for press-moulding and looking into rapid prototyping a model to produce a vacuum forming mould from. First of all I had to explore whether the cone pieces use true cones. Martin suspected they aren't so I spent a few hours on the train & in the afternoon testing whether it's possible to bring 2 truncated cones together with an even 2cm gap separating their 'sharp' ends. In the end I came to the conclusion that it's not possible, the centre must be started from 2 circles, each lofted to the outer ends of the cones, then those lofted to each other.

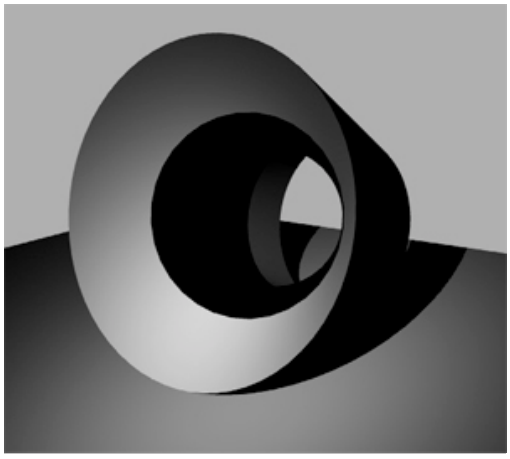

Fig 3.14 cone 03 Rhino rendering

The effect is to create the uncertainty of which is a circle or an ellipse. As the perspective of the piece is affected it is difficult to perceive the position of the central space.

Fig 3.15 cone 03 Polypropylene model

The black central section was created to represent the contents of the container and to test whether that section appeared to float or become visually detached from the surrounding form.

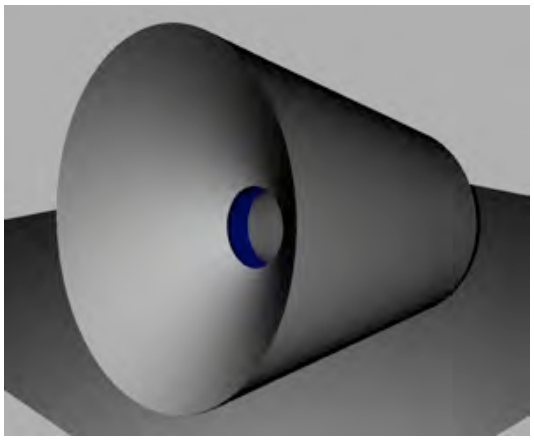

Fig 3.16 cone 02 Rhino rendering

Fig 3.17 cone 01 Thrown ceramic

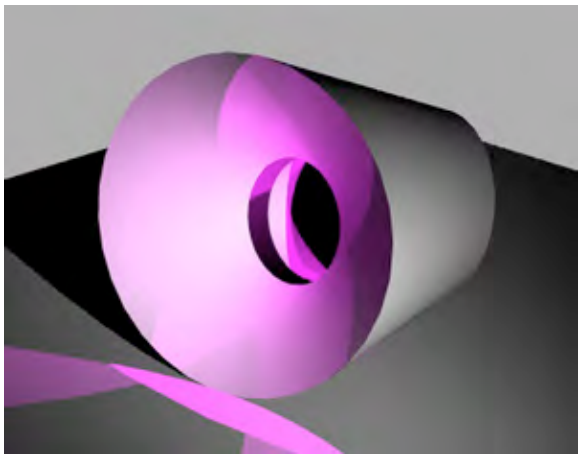

Fig 3.18 cone 04 Rhino rendering

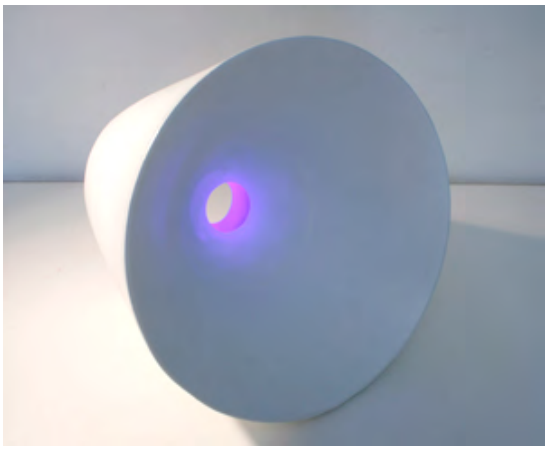

Fig 3.19 Thrown ceramic cone 02 with LED lighting.

Variations of cones were designed, each conforming to basic Fibonacci series geometry. Some were made into polypropylene models; others such as cones 01 and 02, illustrated above, were produced in clay on the wheel. Cone 02 then had LED lights installed that filled the central space with colour. Light is used to represent the contents and to test whether it adds to the illusion of uncertainty.

To throw and assemble these cone forms is complex and fraught with technical difficulties. I therefore designed a simplified version that could be press-moulded or slipcast.

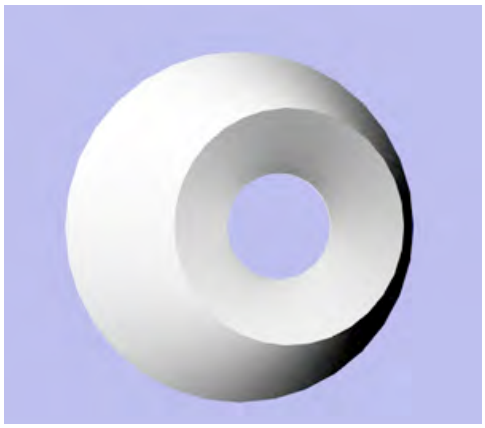

Fig 3.20 cone 05 Rhino 3D rendering

The same geometry has been used to create this series. Two versions were chosen to be made, using a press mould of the outside cone that can have either of the two inner cones attached.

Fig 3.21 The first press moulded cone 05

Initially, I produced press-moulded pieces from the moulds, but later successfully speeded up their production by slip casting a number of them.

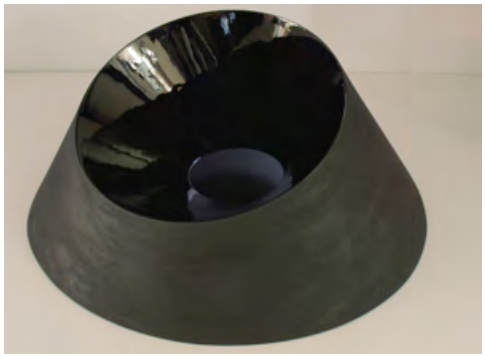

Fig 3.22 Cone 05 with LED light and a Perspex base.

I wish to draw the eye to the space surrounding the object, to help give it form. By the use of a reflective surface, the eye does not rest on the material; it flits between investigating the object and making sense of the inverted mirror image.

A series of experiments were made to produce a black reflective glaze, black chosen because it adds solidity to the object, and in it's apprehension creates a balance between the form and it's reflected surroundings.

Lead Sesquisilicate	60
High Alkali Frit	3.5
Whiting	10.5
China Clay	15
Flint	11
Cobalt Carbonate	2
Manganese Dioxide	10

The recipe chosen has a high percentage of Manganese Dioxide, which has possibly been the cause of pinholing problems.[1] Another reason could be the choice of clays- the cylinders and some of the cones are made from white earthenware, the remainder from a fireclay casting slip. Both are secondary clays that contain organic matter that needs to be burned out during the biscuit firing otherwise gas is released during the glaze firing creating pinholes.

3.5.4 Cylinders

Experiments with the cone form led logically to the exploration of the cylinder.

As a starting point, the cylinder is closer in form to functional vessels such as the mug than the cone, and as such is easily apprehended and understood. My intention was to make use of contrasting matt and

[1] According to visiting tutor and glaze expert Nigel Wood. He says that Manganese Dioxide degrades to Manganese Oxide at 1080°C giving off Oxygen at the maturing temperature of the glaze.

reflective black surfaces to create an ambiguous sense of depth. In some pieces a light source has been included for the same reason.

Again, Rhino 3D software was used to create a number of variations on a theme. The geometry remains consistent throughout, based on the Fibonacci series. Each piece has a base that varies in form, some domed, and some concave or convex. On pieces that are designed for the inclusion of light, the wall and base are separate parts, fitting together with a recess for electroluminescent wire.

Familiar, traditional techniques have been used- mostly throwing, but not in the usual production style. Where the piece has required a two-part construction the precision required is almost at an engineering level. Allowances have to be made for the rate of shrinkage and the way that clay retains a 'memory' of the forces that have been exerted upon it. Clay does not naturally obey such precise demands and a number of pieces have to be made in order to ensure a successful one.

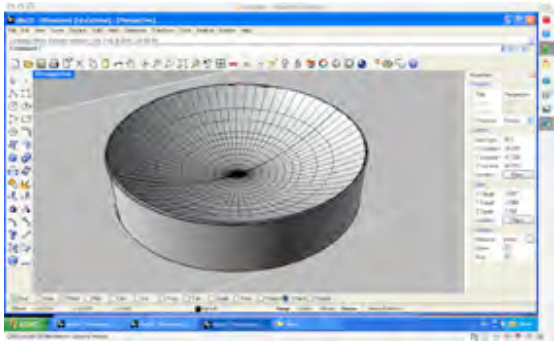

Fig 3.23 Cylinder 01

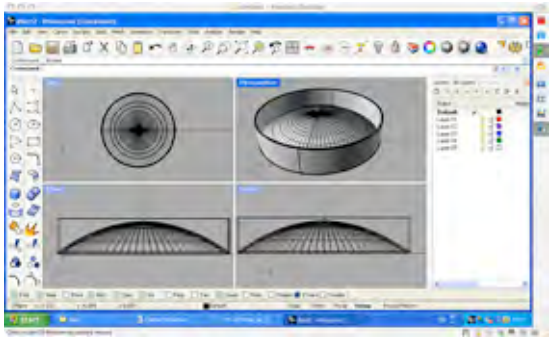

Fig 3.24 Cylinder 02

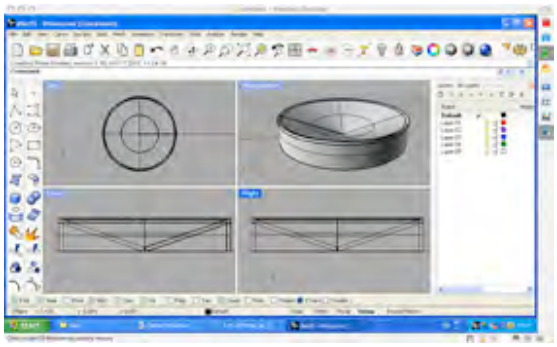

Fig 3.25 Cylinder 05

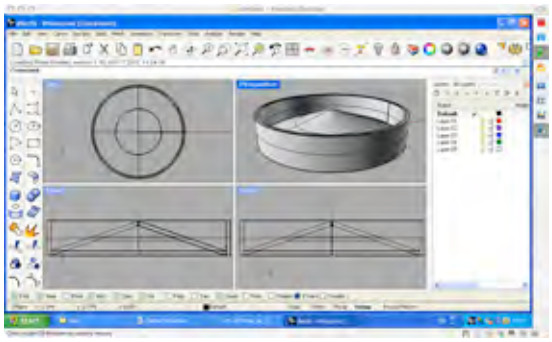

Fig 3.26 Cylinder 06

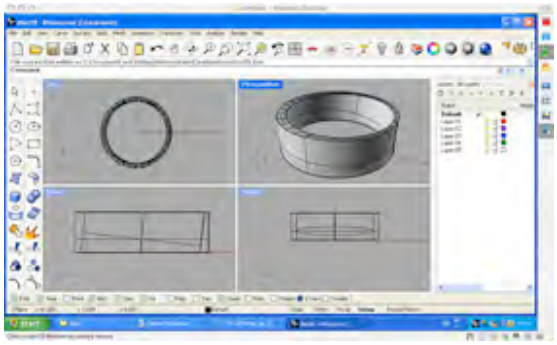

Fig 3.27 Cylinder 08

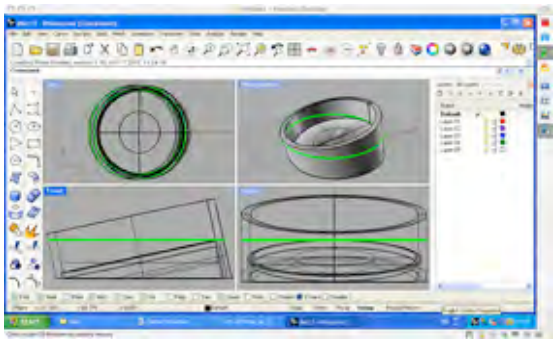

Fig 3.28 Cylinder 13, (showing position of light wire in green).

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22.02.08: Poetry and Pottery

The other enjoyable incident happened, surprisingly on the tube on Thursday. I spotted one of the Poems on the Underground, one by Elizabeth Cook called 'Bowl' that perfectly compliments my project.

'Give me a bowl, wide and shallow. Patient to light as a landscape open to the weight of a deepening sky.' *

Fig 3.29

** From 'Bowl' by Elizabeth Cook, published by Worple Press 20*

For me, the poem illustrates what I am aiming to achieve- a viewer going beyond the accepted normal sensory reaction, making connections to the abstract, or possibly in this case, an actual experience of time and place.

3.5.5 Torus

Having shied away from the Möbius strip at the beginning of the project, I started to look at other ambiguous forms. Topologically the torus is a closed surface, the Möbius strip a one-sided surface. I do not profess to be a mathematician, but my perception is that the two forms are quite closely related and for the purposes of this project the torus is worth investigating.

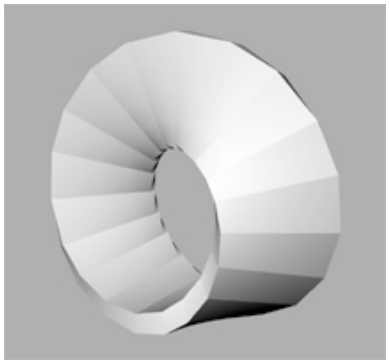

Fig 3.30 Möbius strip- Rectangular section

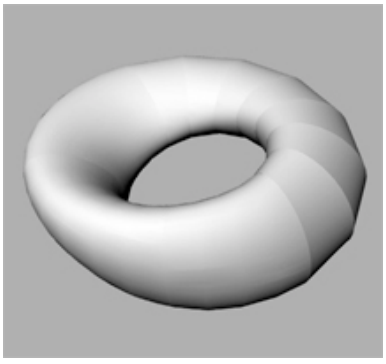

Fig 3.31 Möbius strip- Transforming to elliptical section

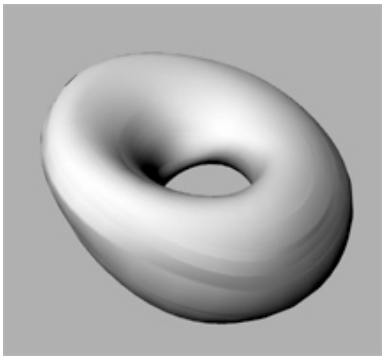

Fig 3.32 Möbius strip- elliptical section

My interest lies in that the torus can be container-like, yet does not have a dividing line between interior and exterior space like a bowl. This time my investigation started on the wheel, attempting to throw some simple torus forms that could be used to evaluate the actual object.

Once the basic form was mastered, I then used Rhino 3D to design the forms and the wheel in an attempt to accurately reproduce them.

Fig 3.33 thrown torus forms

http://www.edenceramics.co.uk/diary.html

17.08.07 - throwing the torus

Last week was spent writing about the making process and throwing some torus forms based on the model I had designed on Rhino. Like all attempts to develop new work there is a need to adapt skills and improve techniques. I was keen to reproduce the Rhino design as accurately as possible, the first attempts [torus 01-08] were thrown the 'right way up', but I found it was very difficult to create a shallow, open bowl form. Throwing the form 'upside down' meant that I had gravity assisting me, particularly useful in forming the outside wall. Much more control was possible and the resulting toruses [09 and 10] are quite pleasing. However, the cross section is not an accurate reproduction of the Rhino design.

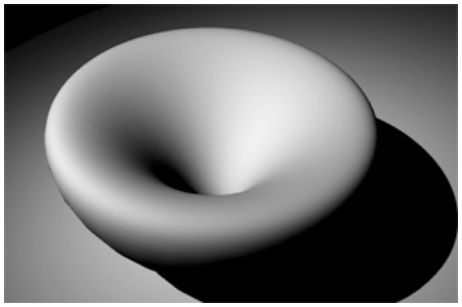

Fig 3.34 Rhino 3D rendering of torus 01

The aim of exploring the torus on Rhino was to arrange it's geometry into a bowl like form rather than the standard 'doughnut' forms that I had thrown.

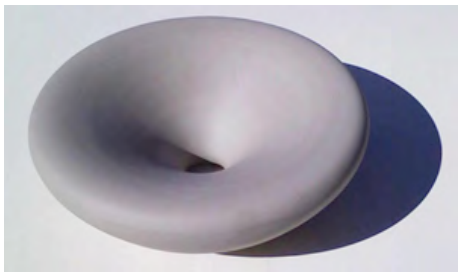

Fig 3.35 torus 09, thrown

Torus 09 is the thrown version of the Rhino 3D torus 01 shown above. The translation from virtual to actual object appears accurate, but it is almost impossible to reproduce the exact geometry.

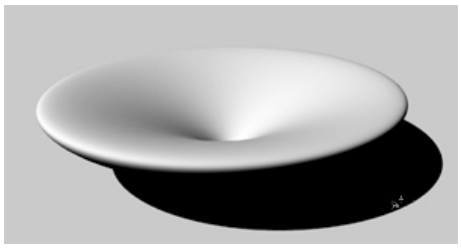

Fig 3.36 Rhino 3D rendering of torus 02

The hole in the centre has been reduced in size and the ellipse has become overly elongated in torus 02. Explorations of the form are possible that would be very difficult to achieve in reality.

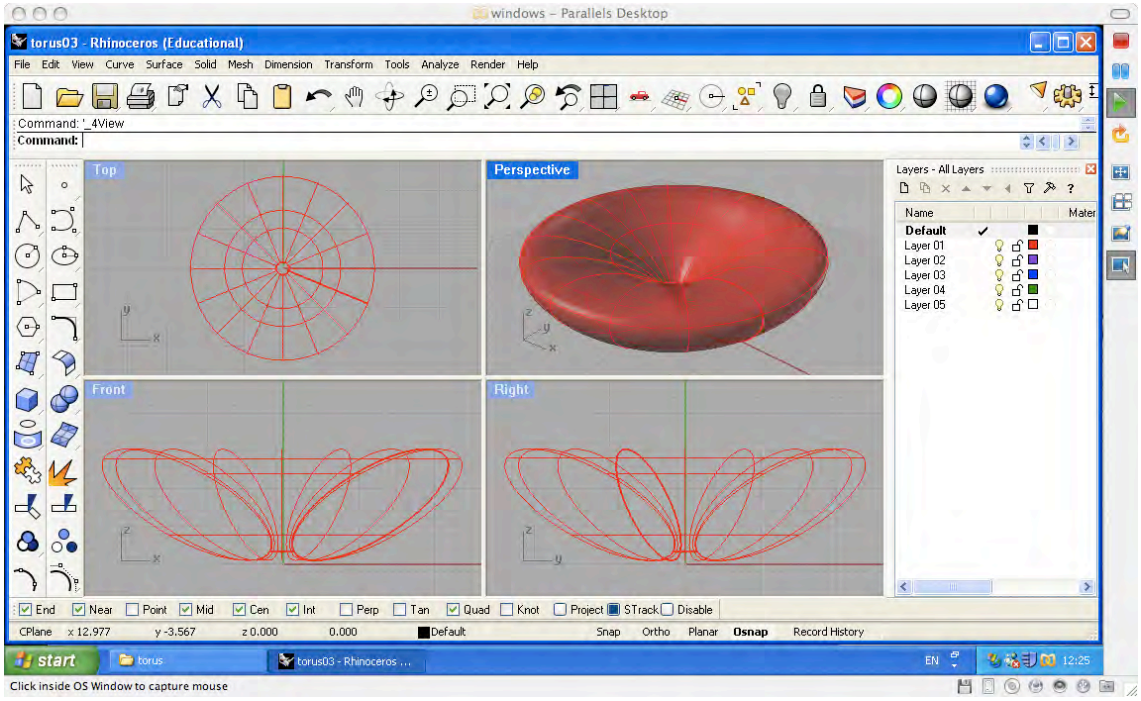

Fig 3.37 Rhino 3D torus 03

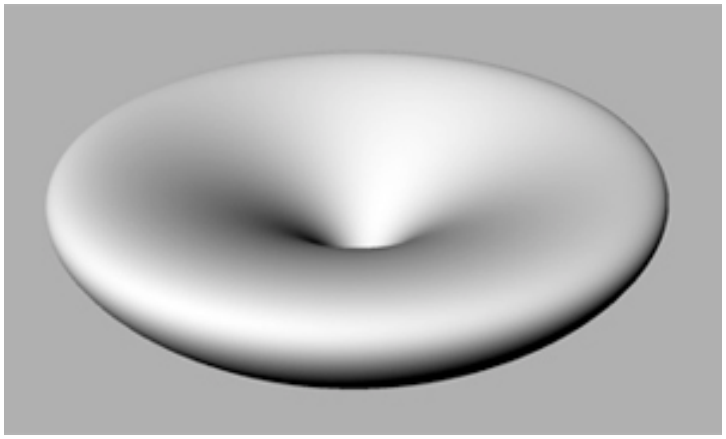

Fig 3.38 Rhino 3D rendering of torus 03

Torus 03 was chosen as the design to be used for a comparison between throwing and CAM assisted manufacture.

At the beginning, I threw a number of pieces, trying to achieve both an accurate cross section and the diameter of 480mm. I'm sure this could be done after numerous attempts and expending a great deal of energy. However, the results would not justify the means, as throwing would not achieve the level of precision required.

The next stage was to produce a CNC (computer numerically controlled) milled model from which a mould could be taken. The process was very successful, the model accurate, but slightly stepped on the tighter curves. This was easily sanded producing a very smooth polished surface from which a mould was taken.

The early part of the milling process. The model was made in two parts, glued together, then filled and sanded after completion.

Fig 3.39

http://www.edenceramics.co.uk/diary.html

18.10.07 - The Actual and the Virtual

On arriving at College I went straight upstairs to the Darwin workshops to see how Neil had got on with the CNC milling of my torus 03 form. I felt like Christmas had arrived! It was finished and looked superb.
The difference between visualising the virtual form on Rhino 3D and having the real thing in front of me is profound and also shows up the difference between what I have carefully designed and the thrown test forms. 3D modelling software has many advantages, which include the ability to visualise a design, to create an extremely realistic render of it and to save that information to fabricate the design by various methods such as CNC milling and rapid manufacture.
On close inspection of the model various slight imperfections could be seen, there was 'stepping' on the curve at the centre of the form, and a slight ridge where the two halves met. Neil was as interested as any craftsman in how the tool had performed under skilled guidance regardless of the fact that he controlled the tool through the computer keyboard. The making of the form was not an automatic process; there were choices to be made in planning it as there are with traditional methods.

Fig 3.40 torus 03 CNC model Ø480mm

Fig 3.41 2 piece plaster mould

The next stage was to produce a mould for slipcasting the piece. With technical assistance a high quality two-piece plaster mould was made.
I was advised to find a casting slip that would be suitable for casting large forms and with help from Martin Hunt and Robin Levien obtained a supply from Ideal Standard, manufacturers of sanitaryware.

This is the first completed test piece. The surface is not prefect, but the form produced is an accurate version of the torus 03 model, designed on Rhino 3D.

Fig 3.42 torus 03

As I became more proficient at handling such a large mould the quality of further casts improved.
Once dried, they were biscuit-fired to 1000˚C, sanded down to remove the seams, and then were given a second biscuit firing to 1140˚C. This was to help prevent the glaze from crazing in the subsequent firing.

3.5.6 Torus explorations

During making my first torus tests I wanted to explore the relationship between a torus and Möbius strip.

Fig 3.43

The dissection of a thrown torus is described in the section from my blog:

> *http://www.edenceramics.co.uk/diary.html*
>
> *14.09.07 -The Torus & the Möbius Strip*
>
> *To explore whether a torus and Möbius strip are related a cut was made that spiralled up the inside of the torus and back down the outside connecting seamlessly to its starting point.*
> *In theory the torus had been bisected, but was very much still one complete form.*
> *If a Möbius strip is bisected lengthways it just doubles it's circumference, which makes me think that the same thing was happening here. [What would have happened to the torus if it was made of flexible rubber?]*
> *I went on to widen the cut & remove a 1cm wide strip of clay from the torus, producing an unsupported gap between the two 'halves'. At that stage I found it impossible to work out whether the strip of clay was a Möbius strip.*
> *From the workshop it was back to Rhino 3D on the computer in the hope that I could analyse and develop this phenomenon. At this stage I had the feeling that the exploration of the torus was taking me back to the Möbius strip that played an important part in the genesis of this project. After some additional instruction from the very helpful technicians at Simply Rhino I described the spiral line onto the surface of the torus. In the ceramic test piece I was trying to visualise what the strip of clay would look like if it could be removed in one piece from the torus. In Rhino it is possible to take*

and develop the line into a 'solid' ribbon form. A single spiral strip doesn't have a strong visual link to the torus it evolved from, so I went on to produce a double spiral, then a quadruple spiral, the latter appearing like a skeleton of the torus.

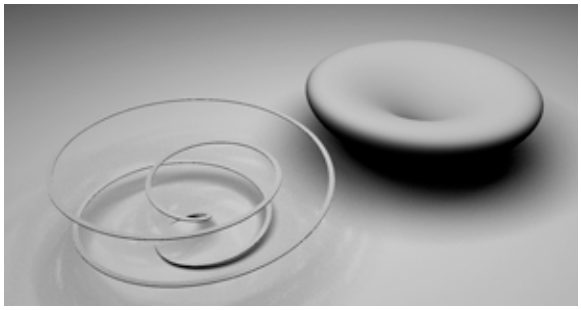

Fig 3.44 Rhino rendering of torus 03 with 2 spiral band.

A single revolution spiral removed from the torus does not describe the form well enough.

Fig 3.45 Rhino rendering of torus 03 with two 4 spiral bands

Both spirals revolve 4 times around both the inside and outside surfaces. One has a vertical, the other has a horizontal orientation.

Fig 3.46 Rhino rendering of torus 03 with a 4 spiral band

The spiral revolves parallel to the surface of the torus, helping to describe the missing form.

Having created versions of the spiral, I found that they do not form a Möbius strip. However, I became interested in how the spirals suggest the torus from which they had been taken and decided to produce one by rapid prototyping (RP).

The stereo lithography (SLA) process was thought to be the most appropriate technique, but it was not a straightforward process.

Fig 3.47 Failed Spiral

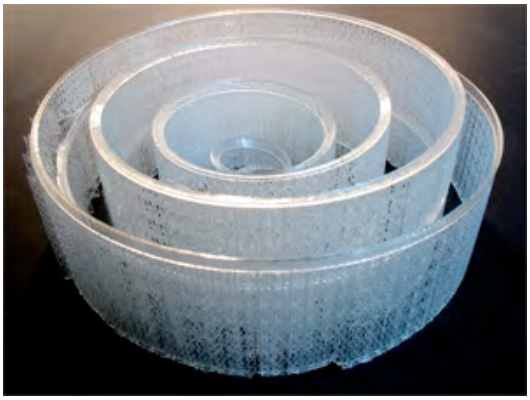

Fig 3.48 Successful Spiral

Fig 3.49 Spiral with partly removed support matrix

Fig 3.50 Spiral with fully removed support matrix

A matrix had to be created to support the piece during its build. The first test piece failed (see Fig. 2.46) because of uneven support. After the problem was rectified the second test piece was successfully built. (Fig. 3.48) After removal of the matrix the spiral was not strong enough to be completely self-supporting (Fig 3.50).

This problem could be overcome by increasing the dimensions of the cross-sections or by using a different RP process.

On reflection, I felt that the investigation of the spiral form was potentially a distraction from the main exploration of the ceramic container.

3.5.7 The Wedgwoodn't Tureen

Whilst working with RapidformRCA, the digital manufacturing section of College I was introduced to Axiatec, a company exploring 'eco-ceramic' materials that can be used with the Z Corp RP process.
The process is still at the development stage, but when I contacted the company they were very keen to invite RapidformRCA technician, Alastair Hamer and myself to visit their laboratory in Paris.

> *http://www.edenceramics.co.uk/diary.html*
>
> *16.11.07*
> *On arrival at Euston this week I went straight to Waterloo, met Alastair from RapidformRCA and caught the Eurostar to Paris.*
> *We had arranged to visit a French company specialising in postproduction techniques for rapid prototyped products.*
> *Alastair had arranged to spend just one day in Paris, learning as much as possible about their services and finding out about licensed use of their products. I had arranged to stay for the rest of the week in order to do some practical work. The company is based in a technical college and we spent Wednesday in the classroom learning about the treatment of Z Corp pieces that allows them to be used as durable finished products. This includes ceramic and glass coatings, infiltration and curing that allow their use as moulds for glass blowing and casting, low temperature metal casting, thermoforming and rotation moulding. The ceramic coating also comes in another version that can be cast. It is incredibly versatile, can be coloured, is food safe, acid and alkali resistant, provides a gas barrier etc. There seems that to be a vast number of potential applications, and the company are still only at an early stage in its development.*
> *Thursday was spent in their lab, casting and spraying ceramic materials. It's a straightforward procedure. I would like to have had some of my own designs to work with, but it was not possible this time. I used children's plastic moulds of cherubs and numbers instead! Even so, I learnt the basic technique…*

As detailed in my blog entry above, the eco-ceramic material is potentially revolutionary, and could possibly mean the redefinition of ceramic, as firing is not required.

I have long held that RP and RM have the potential for enormous creative freedom and if ceramic materials could be used in the process, either through use of a binder or by direct laser sintering, objects could be produced that are not constrained by the effects of gravity or centrifugal force. The eco-ceramic materials are a step in that direction.

To test all aspects of the production of an eco-ceramic RP object I decided to produce a piece as an entry to the RSA Design Directions, Ceramic Futures competition.

http://wedgwoodnt.blogspot.com/2007/11/josiah-wedgwoodnt.html

01 - Josiah Wedgwoodn't

Josiah Wedgwoodn't have been able to undertake this project, but as one of the fathers of the first Industrial Revolution he would certainly be at the forefront of the second Industrial Revolution if he were here today.

The Second Industrial Revolution:
Rapid manufacture [RM] and rapid prototyping [RP] are methods of 3D printing using digital data. A range of materials, from plaster, starch and plastics through to some metals can now be fabricated with increased precision and speed. As yet there are few ceramic materials for use in RM.
The technology has advanced dramatically over the past twenty years and is talked about as the Second Industrial Revolution, yet the present stage of its development is the first Industrial Revolution equivalent to the year 1800.

My entry:
My entry for the RSA Design Directions Ceramic Futures competition uses RP and highly innovative ceramic materials to reproduce an iconic ceramic object from the first Industrial Revolution in a way that was impossible in the early 1800's.

Fig 3.51 detail from the 1817 Wedgwood creamware catalogue

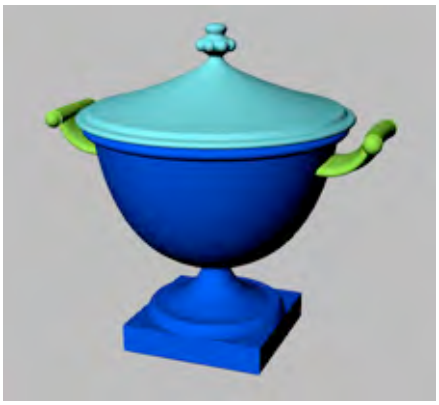

Fig 3.52 Rhino 3D rendering of Wedgwoodn't tureen

The Wedgwood 1817 creamware catalogue was used as a starting point for the design of a generic tureen. Bone was chosen as a natural material to imitate due to its associations with RP.

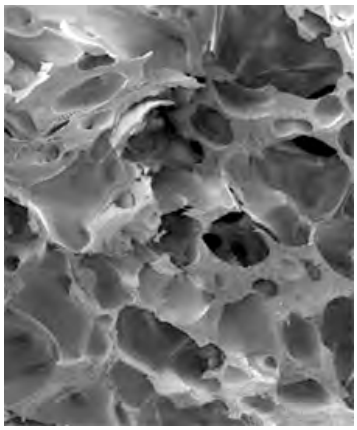

Fig 3.53 bone detail

Fig 3.54 RP bone detail

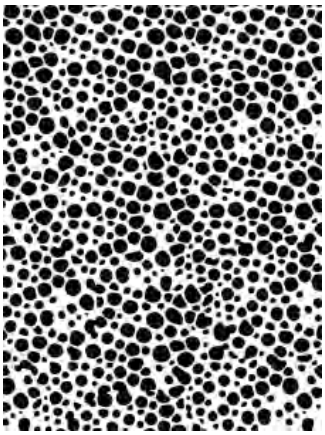

Fig 3.55 'bone' design

The 'bone' pattern (Fig 3.55) was created using slips, which was photographed and digitally rendered in 'Photoshop'.

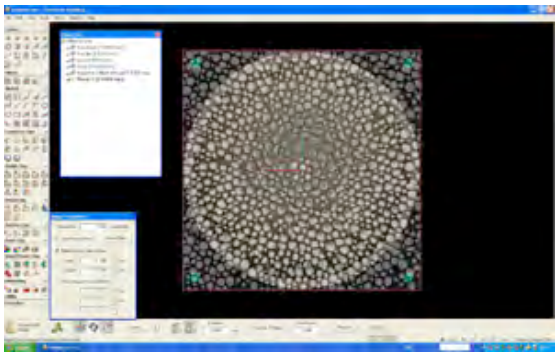

Fig 3.56 plan view of 'bone' design projected over tureen lid

Fig 3.57 plan view of tureen lid after 'bone' extrusion

Fig 3.56 shows how the bone image is 'projected' or 'draped' over the plan view of the tureen lid, using Freeform software with a SensAble haptic arm used to make adjustments. In Fig 3.57 the bone has been trimmed and extruded to give a 5mm thickness. The original 'material' is then removed leaving a 'bone' version of the tureen lid. This process was repeated for the tureen body and the data prepared for production on the Z Corp machine.

Fig 3.58 detail of tureen lid

Fig 3.59 The first test piece emerging from the Z Corp RP machine

Refinements had to be made to the design to ensure that the fragile object could be removed from the Z

Corp machine. This involved increasing the thickness of the handles and the area where the bowl meets the pedestal.

The next stage in this new process is the infiltration of the Z Corp body. This converts the fragile starch into a hard durable material. When completed, the object can then be sprayed with the eco-ceramic coating and cured. No firing is required.

http://wedgwoodnt.blogspot.com/2007/12/211207-almost-complete-tureen.html

21.12.07
I returned to college on Monday this week as Michel from the French company was arriving at 8.00am on Tuesday morning. He came over to bring some equipment and materials and to demonstrate the infiltration process.
Alastair had completed a second tureen base, so I now had one set, plus a tureen with thin handles. The equipment was set up in the cold glass workshop, first experimenting on some test pieces of tureen. By the end of the day all was infiltrated, cured with the UV lamp and dried in the oven, or so I thought.
I carefully packed the two pieces and took them to Paris by Eurostar the following day. When Michel inspected the pieces he thought that they should have been cured and dried in the oven for longer. There were tell-tale blotchy patches which show the uneven curing. Michel had made a second lid for me, so in theory I have two tureens.
The day in Paris was spent making some tests for the black ceramic topcoat. Michel also proposed to make another tureen on their Z Corp machine using 131 powder as it is stronger than the 130 that College uses. It was decided to produce it in black to make the application of the topcoat far easier.

Once the test pieces were completed the data was emailed to Axiatec in Paris, where 2 black Z Corp versions were made.

The production of an eco-ceramic coating to emulate Wedgwood black ‘jasper’ required numerous tests, in the same way that a glaze needs refining before it is ready for production.

http://wedgwoodnt.blogspot.com/2007/12/211207-almost-complete-tureen.html

09 - The [almost] Complete Tureen

21.12.07

The day in Paris was spent making some tests for the black ceramic topcoat. Michel also proposed to make another tureen on their Z Corp machine using 131 powder as it is stronger than the 130 that College uses. It was decided to produce it in black to make the application of the topcoat far easier.
The following day I brought the test samples into College and compared them to a Wedgwood artist's proof of an Eduardo Paolozzi 'Newton' sculpture. Surprisingly the colour that I thought would be the closest was far too dark, an iron oxide stain being far closer.

Fig 3.60 Rhino 3D rendering of the Wedgwoodn't Tureen

Fig 3.61 The completed Wedgwoodn't Tureen.

http://wedgwoodnt.blogspot.com/2008/03/th-complete-tureen.html

10 - The Complete Tureen

Yesterday I collected the completed Wedgwoodn't Tureen with it's black 'Jasper' look-a-like ceramic coating. It has turned out just as I had hoped, but perhaps not expected.
The project has been a technical challenge at all stages, but that was partly the idea as it was designed to test the materials and technology at each step.
I feel deeply relieved to have got it to this stage!

4 Evaluation:

4.1 Criteria

This project is primarily an investigation of the essential abstract qualities of the ceramic container, an exploration of how the contained and surrounding space relates to the object.
There are a number of considerations to be explored in order to evaluate this project.

- The context and position of the practical work in relation to concept and making
- The relationship between traditional and non-traditional technology

4.2 Thesis

The outcome of this project is a thesis, comprising two related parts- the written report and the ceramic works.

4.2.1 The Report

The written report is a record of my research, and the aims and thought processes used to achieve them. It also includes a record of the production of the practical work, an evaluation and conclusion. I have included excerpts from my blog, an almost weekly record of the project as it happened, unedited, and written without the benefit of hindsight.

4.2.2 The Ceramic works

The production of the practical work has been supported and informed by developing a context, applying a methodology, and by studying how the perceptive and cognitive visual processes work.

4.3 Territory

The context in which I work has never been confined to ceramics. My interests in the wider world of art and design came from the development of my drawing skills whilst on a Foundation course over 30 years ago. It awakened a more analytical way of looking at the world, where I became increasingly conscious of my place in relation to my surroundings.

This project has allowed me to focus on significant interests that provide a context in which to develop the practical work. The artists, sculptors, ceramicists and architects described previously have provided the conceptual framework, against which my ideas have been tested and refined. In addition to this, there has been my interest in materials, tools and processes. In this respect the timing of this project has been fortuitous. Development of revolutionary digital technology, such as Rapid Prototyping, is still at an early stage and though other research projects have been carried out, the advances, and their wider accessibility means that I have been able to look at how the independent artist designer can embrace some of the new tools and materials.

The ceramic works that have come directly from this project can exist independently of their theoretical underpinning. They were borne out of this framework and are able to speak for themselves.

It has never been my intention to engage with the semiotic or metaphorical associations of the container. This project is purely and simply designed

to put perception of the container in tension with the conception of it. As such, should there be any need to do more than look at the ceramic works and to gauge the response in terms of the unconscious process of apprehension and the resulting conscious reaction?

> The critic's only valid function is to clear away the extraneous considerations and return us, naked to the experience before us[1]

Yet the writer Susan Sontag says,

> None of us can ever retrieve that innocence before all theory when art knew no need to justify itself, when one did not ask of a work of art what it said because one knew (or thought one knew) what it did.[2]

The ceramic works are related to the thesis and the thoughts, facts and theories it contains. So the practical work can be evaluated in one of three different ways - independently, before reading the thesis, or after reading the thesis.

In the context of this MPhil project the first option will be out of the question. Is there much difference between the second and third options? Evaluating the work before analysing the thesis would probably entail its re-evaluation in the light of the context and methodological approach. Evaluation after reading the thesis would be without the fundamental formative experience where the perceptive process had to

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[1] Irwin, Robert. (1979) Some Notes on the Nature of Abstraction, *Perception and Pictorial Representation,* Calvin F. Nodine and Dennis F. Fisher (eds),. New York: Praeger

[2] Sontag, Susan, (2001) *Against Interpretation and Other Essays*, USA: Picador

apprehend the pieces based only on visual stimulation, previous experience and knowledge.

In practical terms my evaluation of the work is extremely subjective, yet there are certain criteria that I can use to help me.

- Illusion and ambiguity, and how the use of those devices has succeeded in encouraging a questioning of whether what appears to be there actually is.
- The relevance of ceramics as a medium, particularly the use of matt and highly reflective black surfaces.
- The relationship between the 'Hand and the Glove', in other words how the use of digital technology has affected both the making process and the outcome.

There are certain criteria that I am unable to use in the same way as someone seeing the work for the first time.

On first viewing an object, the perceptive process uses logical inference and perceptual induction to create an 'induced structure'[3].

According to psychologist Rudolf Arnheim logical inferences are,

> thought operations that add something to the visual facts by interpreting them[4],

and perceptual inductions are,

> sometimes interpolations based on previously acquired knowledge. More typically they are

[3] Arnheim, Rudolf. (1974) *Art and Visual Perception*, The New Version. University of California Press, 12

[4] ibid

> completions derived spontaneously during perception from the given configuration of the pattern.[5]

Having carefully designed and made this work, from imagined concept to finished object, I 'know' it too well to employ those processes. In fact, I don't have a choice in the way I apprehend my work, as the process is involuntary.

Having said that the illusions and ambiguities created in the work are still effective. As the neurophysiologist Richard Gregory says,

> Conceptual understanding seldom destroys perceptual illusions. Perceptions and conceptions are remarkably separate in the brain[6]

4.4 Art, Applied Art and Craft

This leads on to another consideration. Glenn Adamson, writer and Deputy Head of Research at the Victoria & Albert Museum states that,

> artistic practice has normally been oriented to optical effects, craft is organised around material experience[7]

In this body of work I have attempted to remove all signs of the making process, I have chosen a surface treatment that creates an overwhelming optical effect, distracting the viewer from its materiality. Where

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[5] ibid

[6] Gregory, Richard L. (1987) *Illusions* The Oxford Companion to the Mind. Richard L. Gregory. Oxford University Press. Oxford Reference Online. Oxford University Press. Royal College of Art. (Accessed 31 October 2007) <http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t159.e441-s1>

[7] Adamson, Glenn. (2007) *Thinking through Craft*, Oxford/London: Berg/Victoria and Albert Museum, 4

does this place the work, is it 'Craft' or 'Art' and does it matter?

Adamson goes on to say,

> Craft involves direct engagement with specific material properties. The normative idea of modern art, by contrast, involves the transcendence (which as in the case of autonomy, is also a repression) of just this encounter.[8]

This project investigates the relationship of traditional and non-traditional methods of working with the 'specific material properties' of clay, yet in the outcome, the aim is exactly for the 'transcendence' that Adamson claims to be the objective of Art.

The term Applied art is also problematic. Adamson strongly associates the discipline with craft, yet the gallery owner and writer, Garth Clark offers an almost opposite definition. Referring particularly to the ceramics movement he says,

> Applied art differs from craft in that it has no fealty to the handmade… Even though the objects are often partly handmade, craft is usually disguised or, if present, rarely more than a footnote. Material and process virtuosity, when it occurs, is hidden. The work is about the ideas it provokes, not the connoisseurship of materiality.[9]

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[8] ibid

[9] Clark, Garth (2008) *The Industrial Complex*, American Craft April/May, 58

According to Clark the work that I have made for this project would be classed as Applied art, for Adamson it is Art. Yet John Ruskin defined Art as,

> Fine art is that in which the hand, the head and the heart of man go together.[10]

This illustrates the difficulties in defining the context in which this evaluation takes place. In order for me to evaluate the practical work I need to step aside from this debate.

I have set out to explore certain visual phenomena in relation to the ceramic container. Regardless of the positioning of the work, I can gauge their effectiveness purely in terms of the perceptive experience.

4.5 Methodology

4.5.1 Introduction

My standpoint is as an independent maker, someone with a desire and the ability to creatively explore ideas and bring them to fruition.

It has always been important to me that the appropriate means are chosen to realise and communicate an idea.

From the outset, the aim of this project has been to explore the specific abstract qualities of the ceramic container.

For most of my career I have employed craft skills that have remained fundamentally unchanged for many hundreds of years, certainly since well before the first Industrial Revolution. By some they are regarded as romantic, pastoral, and almost magical, whilst

[10] Ruskin, John. (1859) *The Two Paths…* London: Routledge,

others might say they are irrelevant and regressive. Either way, they are the antithesis of the modern age of anonymous production.

The evolution of my practice from craft-based potter to concept-led ceramic artist, in many ways parallels the development of Modernism from William Morris[11] to present day post-industrial Postmodernism.

The work made for this project has been designed to serve a particular function. In this case the function is not a practical one, but the form has been developed with only that purpose in mind. You could apply Louis Sullivan's mantra,

"Form… follows function"[12].

You could label the work Functionalist, originally taken to mean that efficiency results in beauty, but I would agree with Herbert Read[13] who pointed out that there are many instances where that theory fails. For instance, Modernist or Functionalist architects such as Le Corbusier used a system of mathematical principles based on the Golden Section to give their buildings a harmonious form.

My practical work shares some of the same approach as Le Corbusier and the Bauhaus. I employ the Fibonacci series to determine the proportions of the work; I combine traditional and digital technology to explore and realise a concept. But this is the point where our paths diverge - this project is not design-centred; it does not aim to re-interpret or create new domestic products. It is primarily concerned with the

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[11] Feill, Charlotte and Peter, (2001) *Design of the 20th Century*. Köln: Taschen

[12] Sullivan, Louis H. (1896) *The Tall Office Building Artistically Considered*. Lippincott's Magazine, March.

[13] Read, Herbert. (1984) *Art and Industry, The Principles of Industrial Design*. UK: Horizon Press

deconstruction of the vessel, encouraging questions and not providing specific answers.

In the past, art was generally used to support man's understanding of the world, backing up political and religious doctrines. The writer and broadcaster Matthew Collings[14] maintains that art since the early 20th century reflects Western mans uncertainty in understanding the world around him.

My practical work also shares this approach, summed up by ceramic artist Clare Twomey,

> I hope my work raises more questions than answers; the viewer is in control of the level in which they engage.[15]

4.5.2 The Hand and the Glove

The passion for the handmade that many people possess is not just a harking back to a fictitious, romanticised rural idyll, but one way that the innate creative potential of a human being can be channelled and satisfied.

In this context the use of CAD/CAM technology is seen by many to take away the intrinsic value of creative work.

Originally I worked as a designer-maker, a potter living a life indirectly influenced by the ideals of William Morris, yet I have no qualms about entering the 21st century and taking advantage of technological advances that make possible greater creative freedom and the evolution and development of new work.

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[14] Collings, Matthew (2007) *'This is Civilisation' -Uncertainty*. series 4th programme -Channel 4

[15] Twomey, Clare (2008) *On the Cusp*, Ceramic Review 229 Jan/Feb, 48

Martin Heidegger believed that the use of hand skills was a way to engage with the natural world, to understand its essence. He claimed that a maker, using his or her own energy through the skilled use of hand tools develops a direct understanding of materials. A machine in contrast uses indirect, stored energy that places the maker at a remote distance from his or her relationship with nature.[16]

Heidegger put these thoughts to paper just over fifty years ago, if he were to revisit the subject now I believe that he could not come to the same conclusion. Some types of technology are advancing rapidly, for instance 3D CAD has benefited from the enormous growth in gaming software, resulting in extremely sensitive haptic devices such as the SensAble. An increasing number of virtual reality or 'datagloves' are now available. Using sophisticated feedback mechanisms they are able to capture motion and pressure, hence a direct understanding of material is becoming possible. Further experience indicates that nature can be revealed through concept, and that the creative representation of that idea will provide the most intense experience, regardless of how it is achieved. For example, some new technology such as CAD software that creates algorithmic geometry is particularly capable of revealing the structures of the natural world.

[16] Heidegger, Martin. (1993) The Question Concerning Technology, *Basic Writings* Krell, David (Ed). HarperCollins Publishers, 319

4.5.3 Technological characterisation

Groups such as Autonomatic, the research cluster based at the University of Falmouth employ a different approach to mine,

> Hello. We are Autonomatic. We do research that explores the use of digital manufacturing technologies in the creative process of designing and making three-dimensional objects.
>
> We are design practitioners with skills and experience in designing in ceramics, metals, glass, plaster, plastics, amongst other media. As creative researchers we have a basic urge to invent new ways of making things, to ask "what if?" "so what?" and "what next?".[17]

Their approach is craft-centred, where iterative methods of production are the basis of practice.
In this project, I have a clear idea of the product; any development that is required comes from the evaluation of the object, not the process.
Autonomatic Research Fellow, Dr. Justin Marshall describes three characterisations of technology.[18]

- The *conservative* characterisation creates a division between thought and action, creating a hierarchy. Mental activity dominates the physical action.
- The *critical* characterisation of technology is espoused by followers of Heidegger. This is where technology acts as a barrier to true

[17] http://www.autonomatic.org.uk/ (accessed 01.04.08)
[18] Marshall, Justin. (2002) *Craft and Technology,* 'Craft in the twenty-first Century' conference, Edinburgh School of Art, December

understanding of the natural world, denying the maker an intimate, haptic knowledge of materials.

- *Pragmatic* characterisation is where thought processes and tools are on an equal footing, each responding to each other within the creative process in order to produce an end result. By this method the end product cannot be fully predicted in advance.

Marshall clearly says that his research is craft-based, whereas mine is concept led. None of the three characterizations listed resonate with my experience.

Putting aside the investigative aspect of the use of technology in this project, the application of all tools and processes to produce the practical work is governed by need. I apply the most appropriate tool to achieve the desired result. Some of those tools, particularly CAD software can be part of the conceptual process, as well as the realization.

I propose a fourth characterization of technology, the *incorporated*, where there is an appropriate and harmonious application of concept and tools used to create a planned end result.

4.5.4 Skill Transfer

In terms of the transfer of my craft skills to new technology, I agree with Marshall that

> the experience gained by craftspeople is not all tacit and bound up with physical practice. Knowledge gained through practice can also be made explicit and used to guide the development of future work. Because this knowledge is not tacit it can be transferred from one type of

> technological mediation to another. Therefore some of the experience gained using 'traditional' technologies can be fruitfully employed to guide the use of digital technologies.[19]

The non-tacit experience could be described as a sensibility, something that I have found transfers effortlessly from one technology to another.
Whilst undertaking this project at the RCA I have observed my collaborations with the CNC and RP technicians. I note that their innate and acquired sensibilities are highly tuned to the tools they are using, even though these sensibilities are channelled through a keyboard or SensAble haptic device. They apply the same way of thinking to the modelling of an object as they would to using traditional processes and gain the same satisfaction from a job well done. Their way of thinking has adapted to digital technology, developing a creative approach and sometimes finding new ways to use machines to achieve higher quality results.

4.5.5 CAD software

The visualisation of a piece of work at the design stage is a two-sided experience. CAD programmes such as Rhino 3D enable the designer to inspect a virtual object in virtual space, panning and zooming in on its image. After instruction and a few days practice, the new user is able to create sophisticated designs. It has some advantages over a sketchbook, such as accuracy, but until more intuitive software evolves

[19] Ibid 11

the experienced operator does not have the freedom or immediacy of pencil on paper.

I have used Rhino 3D extensively during this project to explore ideas and it has enabled me to quickly visualise various permutations of an object without the need to make them. It has proved to be a valuable tool in the early stages of the conceptual process.

However, there is an issue with 2D and 3D representations. 2D views of a design in Rhino are no different than an engineering drawing, yet the 3D representation is still a 2D image. Even with the rendering capabilities of Rhino 3D where realistic images are possible, the experience of the actual object is bound to be far more tangible. (see Figures 3.60 and 3.61)

It is important not to be seduced by the virtual, without direct understanding of materials there is unlkely to be a harmonius application of concept and tools.

4.5.6 Design and the Haptic

The work of designer Assa Ashuach clearly demonstrates how new technology can redefine both the form and function of everyday domestic objects.

Fig 4.1 Assa Ashuach. OMI.mgx

(His) surreal OMI.mgx lamp is the product of his experiments with selective laser sintering technology. Made from a single piece of nylon,

> it diffuses light so finely that,from a distance, it seems solid. On closer inspection, the lamp is revealed to be an intricate sequence of nylon ripples cut so precisely that they can be bent and twisted into improbable shapes.
>
> The OMI.mgx could not be made without the use of complex design software and production technologies: "I try to reduce design to its essential points. You can't take from it and you can't add to it. If a few millimetres of surface changed, it would collapse.[20]

Ashuach's practice can be characterised somewhere between *pragmatic* and *incorporated.* The exploration of digital technology is important to him but is employed with a clear end product in mind.

4.5.7 Sculpture and Making

> Fine art is that in which the hand, the head and the heart of man go together.[21]

In an interview with Joan Bakewell, Anish Kapoor does not necessarily agrees with the statement by John Ruskin,

> I think in the context of what's happened in contemporary art in recent years, the hand tends to have taken a secondary role. And I think that's rather interesting. It's as if we can, in the modern world, convey the heart without the hand and I feel that's a tension that's important… The question that's difficult then is whether one can come to the poetic without the

[20] http://www.designmuseum.org/design/assa-ashuach (accessed 05.04.08)
[21] Ruskin, John. (1859) *The Two Paths…* Routledge

> hand. And it seems that we can read as viewers, the made without looking for the sign of the making… I love the sign of the hand and at the same time, it's as if what one's saying is that the art that one is reaching to… doesn't necessarily have to be a recorder of my personality. It's as if one's then talking about the notion that art might come to be beyond biography and come to be something that is reaching to a deeper part of our human presence.[22]

Kapoor operates from a large studio that in its organisation would not be foreign to many artists since the Renaissance. The similarities are the presence of assistants, and a wide range of materials and tools. The obvious difference is that the tools now include computers, which extends his practice to outside assistance from engineers. He appears to regard his practice as an *incorparated* activity where a concept is realised through appropriate use of tools to create a planned end result.

4.5.8 Minimalism

Another consideration to be explored is how my work relates to Minimalism.

Minimalism is a much-abused classification for a style of artwork characterised by simple, geometric forms. Usually abstract and industrial in its choice of material the work in some cases explores materiality and in others perception of space. In the book

[22] *Joan Bakewell talks to Anish Kapoor* (2001) BBC Radio 3 Interview, Jan 5th

"Minimalism', David Batchelor[23] charts the work of Andre, Judd, Flavin, Le Witt and Morris. Though the artists claim that they were never part of a group their work has common factors.

- There is generally an absence of craft or ornamentation.
- The use of industrial materials employed with precise, symmetrical or grid arrangements as part of the subject matter. In many cases the materials are not cut or shaped, therefore the artist does not wholly determine the size and proportion of the work.
- Most artists, such as Andre used industrial materials in their natural state. He said, "you couldn't impose properties on materials, you have to reveal the properties of a material."[24] "Their subject is matter"[25]. Andre wishes the viewer to experience things for what they are.
- All but Andre rejected the term 'sculpture', terms such as 'three-dimensional work' or 'objects' were preferred.

Some apparent similarities can be dispelled. Both Judd and Le Witt employ arrangements of regular repeated modules. Le Witt deliberately set about producing work where the look of the end result was of little importance "it is the process of concept and realisation (with) which the artist is concerned"[26] Whereas in Judd's work the material is carefully controlled. The actual objects have little mass;

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[23] Batchelor, David (1997) *Minimalism* London: Tate Gallery Publishing
[24] ibid 60
[25] ibid 60
[26] ibid 47

spray-painted metal sheets and coloured Perspex are used to explore the effects of colour combinations and to alter the viewer's perception of the contained space.

It may appear that my practical work shares some of the various characteristics of Minimalism. On the one hand it conforms to Judd's view that

> It isn't necessary for a work to have a lot of things to look at, to compare, to analyse one by one, to contemplate. The thing as a whole, its quality as a whole, is what is interesting. The main things are alone and are more intense, clear and powerful.[27]

However, there are a number of differences.

- Unlike Judd and Le Witt, my work has a solid materiality used to create particular objects related to familiar everyday containers.
- Only some of my work is symmetrical, none employs modular arrangements.
- I have chosen to experiment with primary geometric forms, the cylinder, the cone, and the torus, as I perceived these as being the most familiar, easiest to apprehend objects. This instinctive decision is supported by research that demonstrates that the eyes are drawn to forms containing angles and sharp curves as they give the most information.[28]

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[27] Judd, Donald (1975) *Complete Writings 1959-1975* The Press of the Nova Scotia College of Art and Design, 187

[28] Noton, D., & Stark, L. (1971). Eye movements and visual perception. Scientific American offprints, 537. San Francisco, Calif: W.H. Freeman.

- All the practical work made for this project uses dimensions that conform to the Fibonacci series. This is a mathematical series that underpins the Golden Section. Based on laws of natural growth it is widely acknowledged to produce a pleasing, harmonious arrangement of elements when applied to man-made objects.
- Another common factor in all the work is the use of a highly reflective, metallic black glaze, sometimes used in conjunction with a matt black surface treatment. Having set up a blueprint for what should be an easily apprehended body of work the choice of glaze creates the ambiguity and illusion that subverts the perception of these simple forms.

Comparisons between my practical work and the diverse body of work that has been parcelled together as Minimalism is bound to lead to confusion, it is far more incisive to evaluate the work in the knowledge of its genesis, its ambitions and its reality.

4.6 The Practical Work - Reflections

> When we fill the jug, the pouring that fills it flows into the empty jug. The emptiness, the void, is what does the vessel's holding. The empty space, this nothing of the jug, is what the jug is as the holding vessel. ... But if the holding is done by the jug's void, then the potter who forms sides and bottom on his wheel does not, strictly speaking, make the jug. He only shapes the clay. No -- he shapes the void.

> ... The vessel's thingness does not lie at all in the material of which it consists, but in the void that holds.[29]

The practical work to be evaluated consists of three container forms: the cone, the cylinder and the torus. Some pieces incorporate a hidden light source that represents the contents. In addition to these is the Wedgwoodn't Tureen project.

4.6.1 The cylinder

The cylinder forms are the closest to a conventional container that I have made for this project. Each has a different shaped base, from concave to steeply convex and some have light emanating from where the wall meets the base.

The work has been created to disturb preconceived ideas of the container, to confront the viewer with unexpected ambiguity and set up a situation where the cognitive and perceptual processes are challenged.

The pieces have a solid materiality, emphasised by the matt black exterior. However, the black glazed internal surfaces create a distorted reflection of the object's surroundings, making it difficult for the eye to focus and determine the exact form. Where a hidden light source is included the eye is confused by a defined line of light surrounding a surface that appears to be disconnected and floating free. The effect is one where the carefully orchestrated object is a starting point to a greater perceptual experience.

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[29] Heidegger, Martin (1971), *"The Thing," in Poetry, Language, Thought,* New York: Harper & Row, 169

Fig 4.2 Cylinder Ø26cm.

4.6.2 The Cone

Two variations of the cone were produced, a truncated cone section fitted with cone sections at each end (Fig 4.3) and a simpler truncated cone with one inserted cone section (Fig 4.4). The design and positioning of the internal cones creates an uncertainty of depth in the piece.

In contrast to the cylinders that are outward looking, bringing the object's surrounding into the perceptual experience, the cones are inward looking, exploring the idea of containment. Again the external surfaces are matt black, helping to give the objects a solid

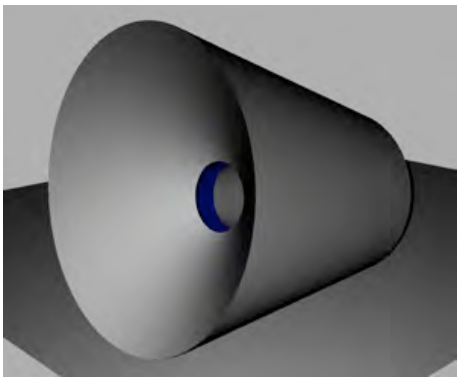


Fig 4.3 Rhino rendering of Cone 02

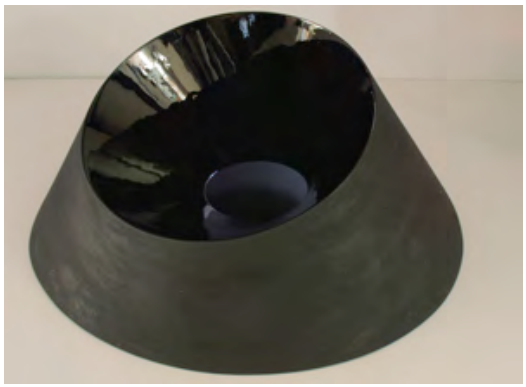


Fig 4.4 Cone, Ø32cm.

materiality. The internal glazed surfaces draw in the reflection of the surrounding space, but it is less extensive than in the cylinder series, more contained.

Where light is used, it appears to be floating separate from its source. The effect is that the depth of the interior appears to be greater than is physically possible, causing a perceptual question.

4.6.3.The Torus

The making of this form was chosen as suitable for a comparison of traditional and digital techniques. Initial 'sketches', thrown on the wheel gave me an actual object, useful for understanding the form, but Rhino software then had to be used to develop a form of the accurate proportions, necessary scale and visual impact. The making process, utilising throwing, Rhino 3D, then CNC milling and slipcasting is documented in the previous chapter.

The outcome clearly demonstrates to me that appropriate methods need to be selected for the end result to fulfil the conceptual objective. This is the result of employing the *incorporated* technological model suggested earlier. Unlike the cylinder and cone series, the torus does not have clearly defined interior and interior spaces and is completely glazed. This time the reflections are not framed by a matt black exterior surface, and though the torus form has one unbroken surface the eye does not rest on the object, it is difficult to assess whether the interior surface is convex or concave as would be expected from a conventional bowl.

Fig 4.5 Final Torus

4.6.4 The Wedgwoodn't Tureen

The project to design the Wedgwoodn't Tureen was used to poetically test some of the software, hardware and materials of the latest Industrial Revolution.

The Tureen is a re-interpretation of an early 19th century Wedgwood tureen, chosen because I wished to reproduce it in a way that would not be possible using conventional ceramic techniques and materials. Wedgwood pots often imitate natural materials such as cabbage leaves and bamboo, I wished for my interpretation to imitate a natural material, but one associated with Rapid manufacture. I chose bone, as artificial bone is under development for use as implant material. The object has not been planned as a vehicle for the exploration of perception but as a technically challenging exercise to see how my skills and sensibilities can be transferred from the actual to the virtual. In addition the project utilised technology and materials that have enormous creative potential.

The design was concept led; I knew in advance what I was attempting to communicate. Rhino 3D was used to create the original design; it was a fairly

straightforward process to realise the concept and bring together the components in an aesthetically pleasing way. My innate understanding of form and proportion was effortlessly transferred to the virtual object. The application of ‘bone’ texture involved technical assistance from RapidformRCA, but in observing the conversion process I could see that once the technical issues were understood it was an intuitive process using the SensAble haptic device.

At the manufacturing stage there were direct similarities to producing test pieces on the wheel- to add strength to the fragile material the wall thickness needed to be adjusted.

After completing the design and testing process, the Tureen was made on a Z Corp 510 It was then infiltrated with Colifix and cured.

To complete the piece I had chosen to imitate black ‘Jasperware’. To achieve the exact shade, sheen and texture of the non-fired eco-ceramic a large number of tests had to be made. The only difference to undertaking glaze tests for conventional ceramics was that no firing was required.

The Wedgwoodn’t Tureen has successfully achieved all that I set out to do. The materials and technology have created an object that would not have been previously possible using traditional technology.

5. Conclusion:

The result of this project is a thesis in two parts that have successfully evolved alongside each other in a symbiotic relationship.

The research undertaken for the written report has been instrumental in the creation of the practical work. Without the development and justification of a context the ceramic work would not have developed with such focus.

The practical work made for this project is a sculptural response to a scientific phenomenon, realised through the application of design and craft skills. The use of traditional and non-traditional materials and technologies has proven to be a creative combination, allowing me to visualise ideas through 3D renderings and prototypes then choose appropriate making techniques.

A significant point was reached when I realised that I had left my previous material based practice behind and am able to explore concepts without being unencumbered by specific technical or material associations. This point came about as a result of exploring the relationship of making and concept. Being able to articulate the *incorporated,* (a methodology of practice where there is an appropriate and harmonious application of concept and tools used to create a planned end result), will have a lasting effect on future work.

The development of this approach has had a number of benefits.

- Firstly, it promotes clear thinking supported by appropriate contextual research and planning, in order to determine an objective.
- Secondly, it has allowed me to realise a concept without the need to physically produce numerous test pieces. Equally, without the use of new technology some of the project would not have been possible.

On opening the kiln:

On opening the kiln and seeing a finished work for the first time, the effects of illusion dominate the experience. The transformation to a highly reflective, glazed surface during the firing brings about a pure sensory experience.

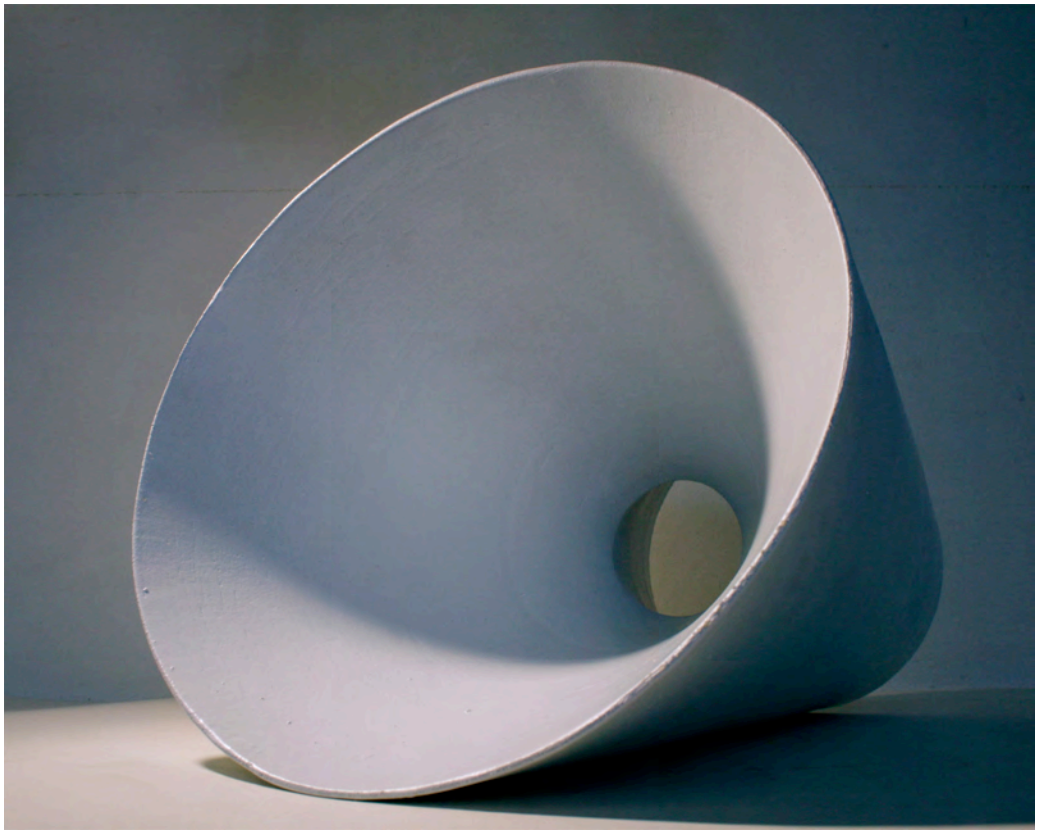
The work succeeds in the way it creates ambiguity. It encourages enquiry, fully engaging our visual sensory apparatus to apprehend it.

The ‘hand’ and the ‘glove’ have come together. I have explored the intangible with the tangible and the actual with the virtual.

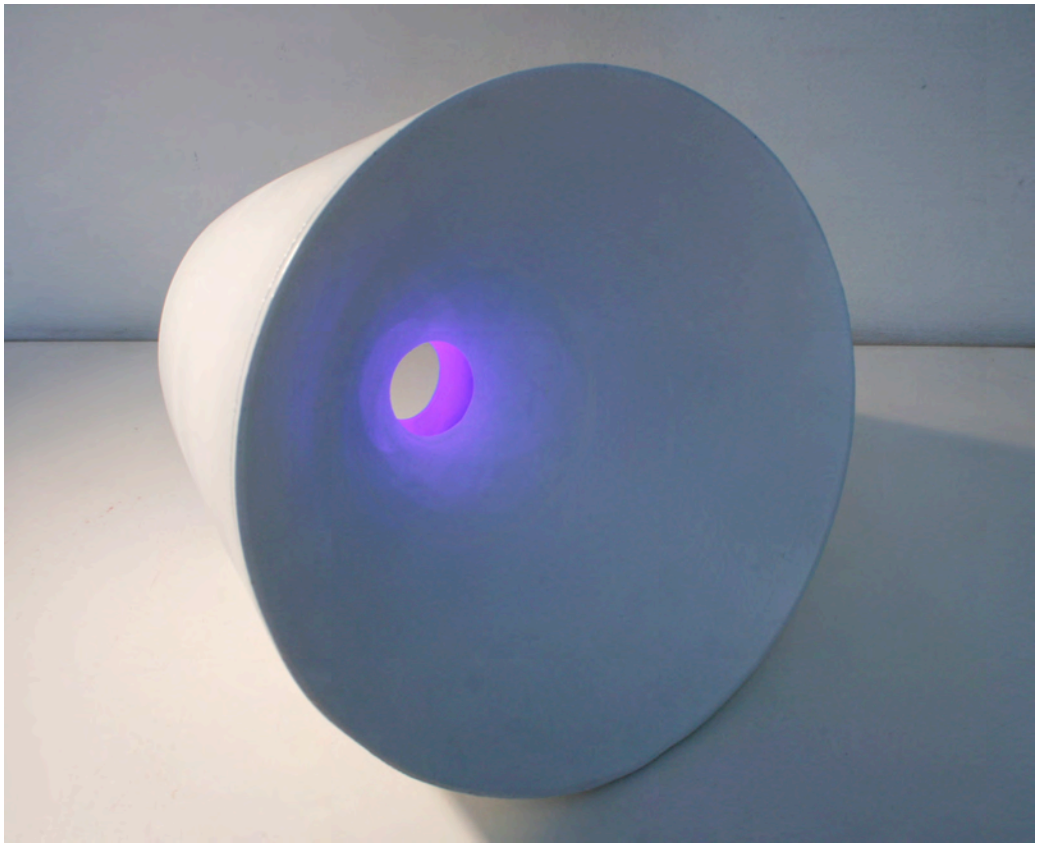
Appendix 1:

Michael Eden, *Red/black vessel* (2005) ceramic, h.23cm.

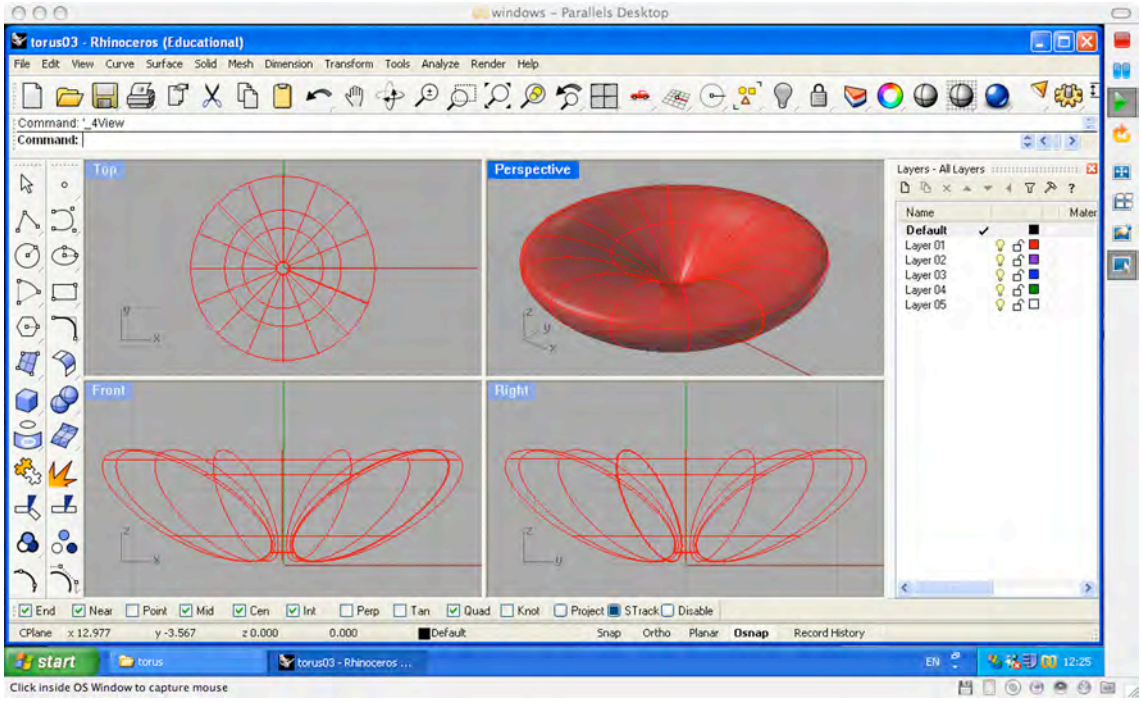
Michael Eden *Cylinder piece* (2007) glazed ceramic h.8cm



Michael Eden *Cone 01* (2007) Ceramic Ø27cm



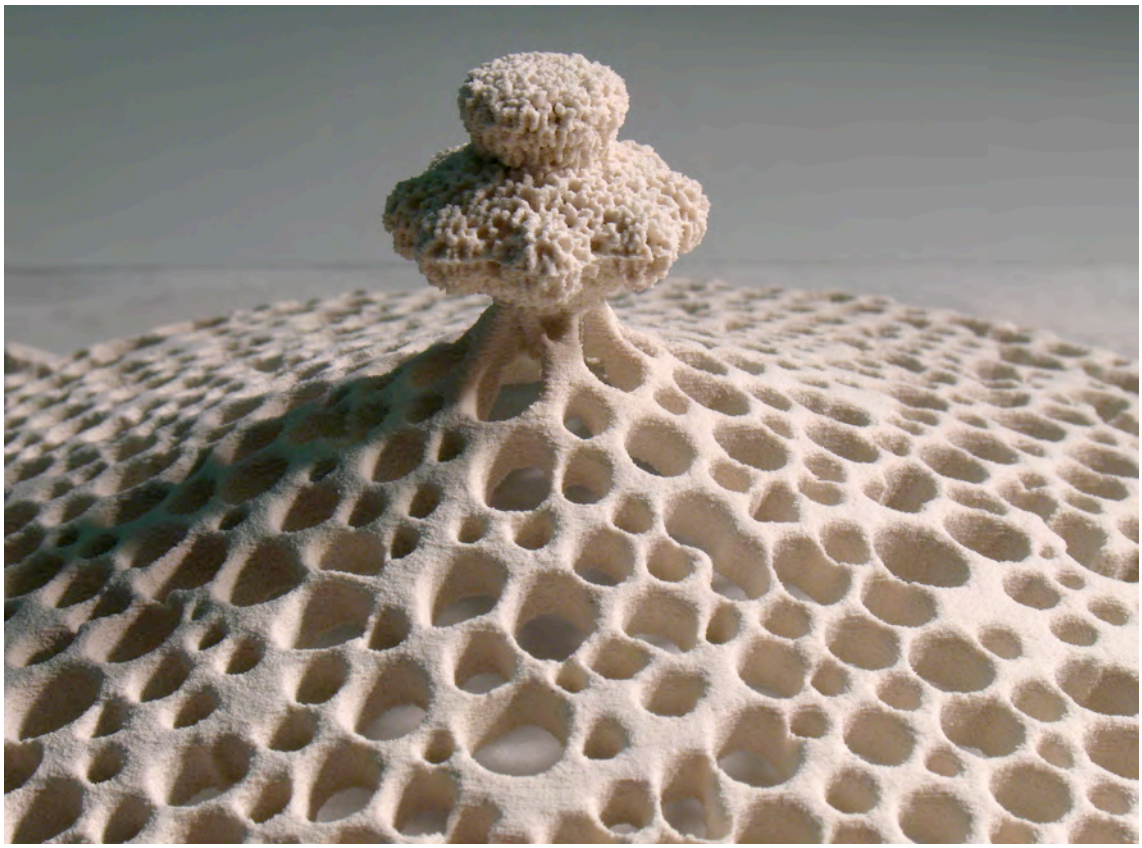
Michael Eden *Cone 02* (2007) Ceramic with LED Ø26cm.



Michael Eden *Torus 03 Rhino rendering* (2007)

Michael Eden *Torus 03* (2008) glazed ceramic Ø47cm.

Michael Eden *The Wedgwoodn't Tureen* (2008) Rapid manufactured, ceramic coating h.23cm.



Michael Eden *The Wedgwoodn't Tureen* (2008) Rapid manufactured, detail

Appendix 2:

The project has been recorded on my website http://www.edenceramics.co.uk and includes a regular blog, generally written on the train each Friday evening travelling home to Cumbria. It is an un-edited record of activities, mostly College related, which have been valuable for reflection and in the writing of the written report.

Blog

http://www.edenceramics.co.uk/diary.html

16.03.07

As you may have gathered from other parts of the site, I am an MPhil research student in the Ceramics and Glass department of the Royal College of Art in London.
I generally travel weekly from my home & family in Cumbria, usually spending Tuesday to Friday in London and the weekend at home.

Tuesday:
At Metropolitan Works there have been a series of talks in conjunction with the Digital Explorers II show. The talk by Fluidforms was of interest for their use of Open Source software in their microprocessor circuits. Also see www.processing.org. It may be more accessible than the Picaxe microprocessor which I'm trying to link to a proximity sensor and LED lighting.
Bumped into David Watkins, head of GSM&J whilst he was having a cigarette outside the back door

of the RCA. He mentioned a PhD student called Moi Fusachal from 99 who had experimented with interactive light in body adornment. Also saw Martin Watmough from RapidformRCA telling me about some new 'blob' software, I must investigate!
Met up with Martin Smith, Alison Britton & Liz Aylieff to discuss new research student applications, then interviewed June Kingsbury. I find the whole process quite fascinating and it certainly puts my own application into a new light!

Thursday:
A lovely early spring morning got me into college by 8.00a.m.I spent a quiet hour finishing the turnng and assembly of my second ceramic test piece. Though simple in appearance, they are complex to assemble. One is slowly drying; this morning's is wrapped in plastic letting the moisture in the 3 parts slowly even out before being unwrapped in a couple of days time. The rest of the day has been spent going through all my Research Methods course notes and transferring the relevant info onto the computer. I've also got to grips with del.icio.us bookmarking so follow the link in the recommended sites page.

If you can recommend anything relevant to my studies please let me know.

16.04.07

Monday:
Teaching my first session of a new project at CIA.

Tuesday:

Back to London, the focus of this week is to finish my test pieces in preparation for next week's tutorial with Martin Smith. I have four cone pieces to fire, one of which cracked during drying, highlighting the hazardous complexity of traditional making techniques on forms where internal access is impossible. I have discussed attempting to press mould a similar cube form, however I suspect that will not overcome the technical difficulties. Slip casting and the post-firing assembly of parts are some of the other ceramic techniques to consider, before investigating alternative materials and RM.

I sprayed both the biscuit fired and dry pieces with a white Hyplas 71 ball clay terra sigillata slip and a leftover demo piece I made at Ceramic Art London with a black terra sigillata made from our standard black slip recipe.

Wednesday:

Packed the kiln and started the firing.

Thursday:

Unpacked the kiln in the afternoon. Mixed results- the black slip worked very well, but I suspected it would do because of the sheen it developed on application. The white slip is smooth, but very little sheen, it doesn't look any different from before the firing.

The packet of LED's, controllers, and transformer arrived from my brother in Austria. I now have the means to put together a simple circuit to produce either white or coloured lights and with further experimentation [and

assistance] I should be able to incorporate a proximity sensor to control effects.

In the evening there was an excellent presentation on biomimetics by MADE [the Material And Design Exchange]. See www.materialsktn.net. The first part was by Julian George, a material scientist from Imperial College looking into producing synthetic bone structures. He showed examples of biomimetic developments from spider's webs, lotus flowers etc. Geoff Hollington, a product designer and member of MADE talked about how biomimetics may impact on our lives in the future. Materials that will react in the same way as our senses allow us to are in development and will be part of the not too distant future.

Friday:

I started to prepare a mould for casting cube 4 in glass. The form was designed on Rhino; I then produced Illustrator files of all its surfaces. These were printed onto adhesive vinyl by plotter/cutter, stuck onto 5mm foamboard and cut out with a craft knife. The internal corners needed to be mitred before assembly. Once assembled, they were used as a model from which to take a plaster/quartz cast.

At lunchtime the research cluster met at Heike's request to discuss her project. It is always a fruitful experience, the similarities and differences of our projects allowing some fresh perspectives and new information to follow up. For instance, Heike showed a photograph of a piece of glass by Richard Whitely which loos very similar to part of cube 4!

Saturday:
Catching up with things at home- domestic duties, mowing the lawn, checking seedlings etc. All a healthy contrast to London, allowing me some important time to reflect on the week.

Sunday:
The rain has returned after 3 or 4 weeks of gorgeous weather, however I'm packing some of the figures that I made during Easter. My youngest daughter, Grace has an interview at Midddlesex University on Tuesday for a place on the Fashion & Textiles course and Vicky is helping her to complete a Yamamoto top. The pattern was downloaded from the Showstudio website with very few instructions, so assembly has been a challenge. She is really keen to get a place, however students are asked to leave their portfolios, and after inspection some of the applicants are invited to interview. She'll be pretty devastated if she doesn't get an interview, as that is where she will excel.

27.04.07:
Monday:
2nd session at CIA, in the afternoon had a demo of SolidWorks 3D modelling software. Pretty refined in comparison to Rhino, but costs a lot more.

Tuesday:
Back to the RCA and started to prepare the fired cone pieces for Thursday's tutorial. The firing cracks were filled with Plastic Padding, sanded smooth then taken upstairs to be sprayed with cellulose paint. The finish is not bad, 2 are a satin white and one is black.

Wednesday:

I had forgotten that I had signed up for a FuelRCA presentation skills day focusing on 'meeting the client'. The day was of limited use as we were guinea pigs; generally I think my day could have been better spent. The mind map exercise was the most valuable as my partner thought that 'research' is the core of my practice, not 'ceramics' as it seemed to initially suggest. This has a bearing on how I prepare for my post-RCA life.

After this I continued to finish my cone pieces then assembled the LED's & installed them successfully in one of the cones. They illuminate the piece with a blue glowing light, no colour or intensity changes as yet.

Thursday:

The tutorial with Martin was very productive. I showed him the cone pieces; they are less successful than the cone 05 test piece in terms of the illusion created. However, they have served their purpose in demonstrating that LED lighting is worth pursuing, but mostly that throwing and assembly is definitely not a suitable technique for these pieces. The chance of cracking is high, grogged clay is difficult to smooth and though my throwing skills are pretty good it's still difficult to produce a cone with a perfectly straight profile. Martin brought up the choice of making technique and exploration of alternative materials. It was decided that a model should be made that could be used to produce a mould for press moulding and for vacuum forming. This is exactly what I was hoping to hear as I have questioned the need for this work to be made of clay. I wish

to remove all traces of the hand and any connotations with studio ceramics.

I also showed Martin the new website, which he thinks will make a valuable contribution to the interim examination coming up in May.

After the tutorial Martin, Alison and I discussed the last two research applications, one was rejected, one accepted, which should be interesting as his project is almost a glass version of mine. It looks like the 'research cluster' is going to increase to 7.

Friday:

Bit of a frustrating day as I hoped to start on making the rest of the moulds for the cube glass cast first thing in the morning, but couldn't find any clay! It brings it home that I must prepare in advance, it's not like the workshop at home where everything is under my control. I did complete one more, but had hoped to make the remaining three.

I popped upstairs to the Darwin workshops to learn about vacuum forming where the French technician Fred was pretty negative. I need to find others to ask, maybe visit a specialist company.

Stephan came to give me some advice about producing a model for press moulding; it should be straightforward but will need to be planned carefully. I continued to produce a Rhino model that can be used then went to see Martin Watmough in RapidForm to talk about Rapid prototyping a model. He thinks it will be possible on the ZCorp machine, but is likely to cost over £200. I'm meeting Nick Grace up there on Wednesday to discuss the details. The advantage is that the model would be absolutely accurate and could be used to produce a model

for vacuum forming. Martin also told me about a powerful new laser cutter that's been installed recently. Apparently it's capable of cutting much heavier duty material, so I will need to check it out to find whether I can use it to produce a strong accurate model.

04.05.07

Monday:
Teaching at CIA- started with tutorials, focusing on the development of ideas. In the afternoon gave a 2-hour Rhino introductory demonstration. It was a hands on session, which I think went quite well.

Tuesday:
Back at the RCA to a busy week making the moulds for press-moulding and looking into rapid prototyping a model to produce a vacuum forming mould from. First of all I had to explore whether the cone pieces use true cones. Martin suspected they aren't so I spent a few hours on the train & in the afternoon testing whether it's possible to bring 2 truncated cones together with an even 2cm gap separating their 'sharp' ends. In the end I came to the conclusion that it's not possible, the centre must be started from 2 circles, each lofted to the outer ends of the cones, then those lofted to each other.

Wednesday:
Started the day with a meeting with Nick Grace up in Rapidform. They are under pressure installing new machines and helping 2nd years prepare work for their final shows. Still, he gave me time to discuss preparing a Rhino model

for production on the ZCorp machine. The cost is huge – 25p/cc doesn't sound much but when my model is 1.34 litres we're looking at £300! However, my models need scaling down to fit within the 250X200X200 bed size. So that will bring about a reduction in cost. Meanwhile, I returned to the analogue!

I had some plywood discs cut, based on Cone 6 dimensions. Angled lengths of 2X2 connected them. The space between the discs was then filled with clay This is the outer cone made on Friday, with an extra disc on top. This one is to have the plaster applied directly onto the surface, building it out in line with the discs. When the former is removed & the plaster is dry, it can be used as a press mould for the outer cone.

Thursday:
Woke early so was in college by 8.00am. Continued with the moulds These are the inner cone moulds over which I'll form the clay.

This is the outer cone made on Friday, with an extra disc on top. This one is to have the plaster applied directly onto the surface, building it out in line with the discs. When the former is removed & the plaster is dry, it can be used as a press mould for the outer cone.At lunchtime we had another of our research cluster get togethers. They are an opportunity for one of us to discuss an aspect of their project. I set up the first meeting to help me define the core of my project. The perspective of my fellow students is extremely helpful, though our projects are quite different to each others, we have enough overlaps and shared interests to make our group very supportive.

Today, I had invited Alison Britton to discuss her new work on show at Barrett Marsden Gallery.

At the opening night Alison used phrases like "taking risks", "loosening up" and "relaxing", and it was these aspects of moving towards a new body that I thought were relevant to some of us. One of the most interesting parts was her description of how a piece of work can initially be inspired by a theme, such as a place, a piece of writing, personal views and that it may loose it's link to it's original starting point as the piece progresses. The title always comes last and generally doesn't have a relationship with the original theme.

The question I would like to ask Alison is "How does a viewer then interpret the piece? What are the criteria and how much are we expected to understand of the context in which the the work is made?" These may seem like naive questions, but for me that are worth pursuing.

Friday:
I was in two minds about staying in London this coming weekend to complete my moulds and visit some galleries. However, my eldest daughter, Rowan will be home from Manchester, the garden and the surrounding countryside are so beautiful at this particular time of year and the fact that I can have some time to relax has made it an easy decision to go for the 18.45 train north. I'll also be able to prepare the written parts for the interim examination scheduled for the 24th.

11.05.07

Monday:
It was the May Day Bank Holiday here in the UK, so no teaching at Carlisle. Instead, continued with written work for College and spent some enjoyable time with my family.

Tuesday:
Busy train journey back to College, then straight into the plaster shop for the afternoon to complete the outer cone mould

Friday:

Started the day by rolling out a slab to wrap around the small inner cone as the clay applied to it yesterday stuck very firmly to the surface.

I had to break off to have a tutorial with Jonathan Miles in the Humanities Department. He had been recommended as someone to discuss perception with, and after describing the aims of my project he gave me a brief history of philosophy of perception since Descartes!

The most relevant thing we discussed was the 'autonomous object'. Jonathan Miles defined it as an object that can speculate on its own condition, rather than being a comment or statement. I find this relevant to my questioning of the centrality of ceramics in the project. But how does an object become autonomous? Surely any contrived object is

autobiographical whether it is functional or sculpture? I can imagine a series of objects collectively being 'autonomous', each being part of an act of speculation.
I must ask Jonathan Miles for specific texts that discuss this notion.
His general suggestions were:
ANDREW BOWIE:. Aesthetics and Subjectivity: from Kant to Nietzche.
HIEDEGGER: 'Being and Time' and the essays 'The Question of Technology' & 'The Thing'.
ROSALIND KRAUSS: 'Sculpture and the Extended Field'
MERLAU—PONTY: suggested first reading a commentary or Aesthetic reader. 'Eye of the Mind' and 'Cezanne's Doubt'.

I came away from the tutorial aware that I have 20+ years of ingrained thinking habits which must be questioned for me to truly engage with this project.

My feeling is that my past practice as a functional potter led me to this point and the ceramic container should remain the core of the project. If I abandon the ceramic element I am then moving into territory that I have little knowledge or experience of. However, my investigation of the digital has brought me into contact with making techniques and materials that could well be part of the future of ceramics. This is one of the reasons for undertaking this project and could be part of my post-RCA life.

The rest of the day was spent wrestling with the moulds. I tried to fit the smaller end cone into the outer cone and though I had carefully

worked out the dimensions the thickness of the clay walls was a problem that made assembly impossible. So my plans to have assembled a piece by this evening went completely out of the window. I will have to make scaled down versions of the inner cones by taking and firing clay 'casts' from which new moulds can be made. In theory this should work, but I won't have a fired piece in time for my interim examination on the 24th.

18.05.07

Monday:
Teaching at CIA in Carlisle.

Tuesday:
Back to the RCA and upstairs for a chat with Tomek Rygalik, an ex-RCA product designer, who seems to be based in college, partly engaged in his own practice partly as a researcher. We discussed vacuum forming specifically & materials generally. He has offered to take me through vacuum forming next Friday, when he returns from his trip to New York. Meanwhile I set about producing the mould of the outside cone.

Wednesday:
Finished the cone mould.
Our Taiwanese friend sent me some titles from his bibliography that he thought might be relevant to my project. One particular recommendation – The Art of Light + Space was in stock in the library and looks very interesting.

Thursday:
Took the small cone mould down to the large vacuum forming machine in the basement. The third attempt was successful, but doesn't bear close inspection as the styrene is of uneven thickness. My first impression is that it will appear insubstantial, though with the inclusion of a light source this could be an advantage.

Friday:
Made another attempt to put together the ceramic cone, but the thickness of the clay walls is preventing the pieces from fitting. I then took a 'cast' of the inner cones, which after firing will be about 10% smaller and from which I can make new moulds.
The process is slow & frustrating, however it's partly due to learning new techniques and partly that practical works takes longer in the college than in the workshop at home.

25.05.07

Monday:
The morning was spent in a meeting at CIA to discuss the setting up of a Craft Research Centre. Vicky and I had been invited along with Paul Scott [of Ceramics and Print etc.] and the Cox's Potfest organisers].
Jude Stoll has recently completed a survey of craft in Cumbria and along with Ian Farren, the head of the School of Art & Design wished to hear our views.
I started off by raising the thorny question of the 'craft', a word full of connotations and 'baggage'. Both Paul and I thought the term 'applied art' is a title that covers the range of current practice. I agreed with Paul that

there should be an academic tier to the centre to give it stature, and for something for undergraduates to make use of & aspire to.
To support current practitioners and emerging new makers I suggested the setting up of a Hidden Artfranchise based at the centre. Jude mentioned that there is interest from a group of makers around Kendal, but she has asked them to hold on until the CIA has looked into it. My feeling is that a Hidden Art franchise is too big an operation to set up amongst a group of practitioners unless they have enough funding to employ an organiser.
The Cox's seemed mostly concerned about their kiln site at the Newton Rigg College site at Penrith and made very little positive contributions to the wider discussions. My other suggestions were for the inclusion of a digital manufacturing centre or bureau along the lines of Metropolitan Works. This all seems very ambitious for a centre in Carlisle, but later this year it will become part of the newly formed University of Cumbria and an ideal opportunity to aim high whilst there is investment going in.
The next step for me is to attend a meeting to discuss the Hidden Art franchise.

Tuesday:
Back to the RCA and set about producing a model and mould of flat cone 01. I am looking to produce a one sided piece that would work equally well on a flat surface or wall. Additionally there is the advantage that the piece is far simpler to produce than the two ended cones and allows me to test variations fairly quickly. By the end of the afternoon I had the mould drying in the cabinet and it was

off to The Gate restaurant in Hammersmith to help Jeannette celebrate her birthday. Ray and Jeannette are the couple who kindly have allowed me to use their spare room 3 nights a week whist I'm at College. They are keen collectors of ceramics and have a large eclectic collection.

Wednesday:
Nervous preparations for tomorrow's Interim Examination; I had thought that I was ready, but looking at Steve's Summary of work to date thought I had better revise mine. Had hoped to produce a cast from the new flat cone mould but it is still too wet.

Thursday:
The morning was spent printing off copies of my written work, selecting and cleaning practical work and a bit of last minute panic! As Martin Smith is both my supervisor and Head of Department Hans Stofer, head of GSM&J was brought in to act as chair. Heike Brachlow, one of my fellow students came out of her examination saying that he had asked some difficult questions, so my nervous anticipation went up a notch or two. Alongside Hans Stofer and Martin, Alison Britton and Liz Aylieff interviewed me. Luckily, I felt comfortable with the questions and afterwards was told by Martin that I had passed. Next week there will be a feedback session that I am quite looking forward to in the hope that constructive advice will be given.
I have asked to see Liz next week as she raised an interesting observation that the internal space in my pieces appears to her as a passage.

It's not something that had occurred to me as I see them as containers of light.
Finished early so that I could cook Jeannette and Ray a Surprise Tatin. Jeannette's partial to root vegetables [which Ray puts down to her Irish ancestry!] and the surprise in this recipe is the potatoes!

Friday:
Spent some time thinking about and discussing Martin's advice on the alteration of the press moulds with Stephan. Having tried to marry the inner and outer cones decided that it would be more efficient to start again with a really precise model. Having rescued 2 large vinyl display boards from the clear up of the fashion show I thought I could laser cut them or use the plotter to print out the surfaces of my new cone 07 form. So went down to the laser cuter/vacuum forming workshop and had some very good advice from Ian, the technician. He suggested making the model on the CNC milling machine in the Darwin workshops, so it was back upstairs to see Neil the technician. No problem with the design, just have to see Gordon in Vehicle Design about a block of material out of which I can have the model milled. That's the job for first thing Tuesday afternoon.

Sunday:
Went up to Blackwell, the Arts and Craft house near Bowness-on-Windermere with Vicky as Emmanuel Cooper has asked me to write a review of the Gareth Mason exhibition for Ceramic Review. On the few occasions that I have seen his work I have always found it difficult to understand what he's aiming at, but this time was really enlightening.

01.06.07

Monday:
Bank Holiday so didn't teach at Cumbria Institute of the Arts.

Tuesday:
An extremely busy train took me back to London, and more or les immediately into an interim exam feedback session with Martin Smith. All appears well, so now I have to concentrate on putting together the Contents page of my thesis. Martin gave me a couple of recent ones to look at. We also discussed the prospects of upgrading to Ph.D. Does the project have "wheels", as they say, which means will it make "a unique contribution to knowledge"? There is also the major question of funding, etc. etc.

Wednesday, Thursday, Friday:
The rest of a tiring week was spent re-making my flat cone 01 mould, as my first attempt wasn't accurate enough. I had rushed the preparation & making in the hope that I would have had a piece ready for my interim examination. That will teach me a lesson.

This time the discs for the model were made from acrylic, cut out on a router then the edge

sanded smooth. When it came to mating the two sections of the mould together, Stephan, our patient plaster workshop technician pointed out that they weren't perfectly round and should have been turned on the lathe! However, this mould is a great improvement on the previous one, I have learnt some valuable lessons so next time things should be easier. Meanwhile, preparations for the Great Exhibition of 2007 are well underway; the second years are putting in the hours and it's good to see some exciting finished work being moved around. The show should be spectacular, so if anyone reads this and can get to London it will be well worth it. See the RCA website for details.

There will probably not be an entry next week as I'm going with my youngest daughter Grace to my brother's wedding in Austria.

22.06.07

Since my brother's wedding, I have continued to work with the flat cone 01 mould that had dried out well whilst I was away. Martin worked with me, demonstrating how to smear the surface of

the mould with soft clay then build up another couple of layers until it is the correct thickness. We added a coil around the inside of the base to strengthen and stop it from distorting. When the piece was taken from the mould it needed relatively little fettling and appears crisp. However, I was a bit disappointed that the lower, internal rim is higher than I had anticipated, so I threw an insert with a smaller diameter to form a false base.

Later I had a meeting with Martin to discuss the preparation for starting the thesis. I had prepared a draft Contents page that Martin has now asked me to flesh out to abstract length. Since then I have spent some time working on the Introduction and the beginning of the first section dealing with the perception of the ceramic container. I have tried to make it engaging and straightforward, but writing doesn't come easy to me, so it's not the easiest part of this project. Having said that it does focus the mind on what the practical work is designed to articulate. I'll include some of the first draft below, if anyone actually reads it with interest please let me know!

Sensing the Container:

I have made thousands of mugs, cups and saucers, bowls of different sizes- ceramic containers of all sorts of shapes and sizes. Function and aesthetics were the main concerns in their gestation. The mug for instance, is a humble, everyday pot but one of the most difficult for a potter to successfully make. Being practiced and attuned to subtle differences will determine its success. Fingers should fit the handle comfortably, there should be a sense of balance when lifting it, it should hold the preferred amount of liquid and the mug is almost unique as it is often in intimate contact with one of our most sensitive organs- the lips.

So we use sight and touch to perceive the mug, sight, touch and smell to perceive the contents. Hearing plays a part in the experience when the tea is poured [and my youngest daughter hates anyone to slurp his or her tea].

We analyse and respond to all that sensory information just to have a cup of tea and we are barely conscious of the complex processes involved. If we stop awhile to look again, what do we see? Firstly, the fabric- decorated red earthenware if I made it, yours may be stoneware or porcelain. Each of these materials has a particular quality that will affect your experience. Then there is the form- it could look like a small bucket, a barrel or a can. It has an interior and an exterior surface, is that one surface or two? A barrel shaped mug will make you think of two surfaces, an open form will be more ambiguous. The rim is the dividing line, but pour a cappuccino and the rim doesn't restrain the contents, it foams

outwards to the 'exterior'. So where is the dividing line between the inside and outside space?

I like to drink Darjeeling tea, it is a golden translucent liquid and if the interior surface of my mug is pale I can still see its form. If I was to fill the cup with water, I can have the best of both worlds, something to drink and I can still apprehend the interior.

The empty mug is actually full; air is made of matter and energy in the same way as tea, but our perception of it is liminal. However, looking at my empty mug isn't a lot different than my experience of looking at it when filled with water.

The container actively frames and shapes the matter around it.

That's as far as I've got for the time being, I'm hoping to add to it over the weekend before my next meeting with Martin on Tuesday.

Going back to the mould- it is made of 2 sections, the outer cone and the inner, which is removable. This allows me to make variations of the inner cone, enabling me to produce a series of related forms. I made a second inner cone, deeper than the first and dried it overnight. Since then I have made 2 variations from it, in the first the cones are joined, whereas the second has a gap between the inner and outer cone. I plan to raise it of the surface so that when it is filled with light all three rims will be defined.

We have 2 Swedish post-graduate students on an exchange from Kontsfach in the department. They haven't been around much, but I spoke to them

for the first time last week and they described how they collaborate on installation projects that deal with material, space and object. I asked them if they would make a presentation to the research students so at lunchtime with cakes provided by Heike they showed some photographs of their recent graduation installation in Sweden. It was comprised of a series of 'rooms', some bright, white and airy, others very dark with scorched wooden walls and polished concrete floors. The objects ranged from a group of white porcelain teabowls to glazed earthenware 'mirrors' and free blown glass container suspended from the ceiling slowly leaking water onto the floor. They describe their work as a desire to connect the viewer with a calm contemplative environment, something that is in short supply for most people in the busy modern world.

29.06.07

This is the official last week of term, though I am returning on Tuesday for one more week of tidying up & making use of the library.

My overwhelming feeling is how fast the year has gone, it has been a tremendous experience, I have met many wonderful and talented people and feel lucky to be part of a very special College. Regarding my project, I feel somewhat daunted by the amount of work required to complete it by this time next year. The past 9 months have been spent finding out how to conduct research, developing a context for the project and attempting to produce work in response. The practical part of the project hasn't moved as fast as I would have liked, partly for technical reasons – learning new techniques takes time, and for the

practicalities of working in a studio with very little space which is often cluttered up.

Tuesday:
Arrived to find that the kiln I had booked for tomorrow was empty and very hot, so let it cool for a while then loaded the first of 2 pieces. They are difficult to handle and I broke a small section off the internal rim, more or less ruining it. The second piece had its internal & external cones separated at the rim, with bridging pieces inside. I managed to load it, then left the kiln to cool further, allowing the pots a pretty hot drying period.
At 5.00 I had a tutorial with Martin to discus the writing of the thesis. I had prepared a draft contents page that Martin had asked me to develop into abstract length sections. It had been an interesting exercise, making me realise the importance of writing it in the correct order. For instance I started to write the introduction, then went onto the first section 'Sensing the Container', soon beginning to realise that I was duplicating myself and that the ideas were far better expressed in that part than the intro. Martin had a lot to say, plenty of sound advice and didn't actually say that my efforts were dismal. I felt pretty daunted by the task, though I have found that the writing, when I work at it has improved and is an enjoyable experience. I think that Martin's main advice is to justify every statement and to write clearly in my own voice.

Wednesday, Thursday and Friday:
Attended the Atoms to Art 2 conference held at University College. Though there was an impressive range of speakers from science,

ceramics and glass the attendance wasn't what it deserved. I must admit to cherry picking a little as some of the subjects were either incredibly specialist or potentially interesting, but not relevant to my work at the moment. Besides, on Wednesday I had to cycle back to College to unpack the kiln and discover that rushing things definitely does not pay off. Both pieces had cracked, they should both have been lifted off the kiln shelf, loaded into the kiln when it was cooler and allowed to warm through for much longer. One of them can possibly be used as a mould for vacuum forming so perhaps all is not lost.

Meanwhile, back at Atoms to Art 2 I was very impressed with Marek Cecula and his approach to ceramics. He showed images of work he has selected for a forthcoming exhibition in Toronto. The makers/artists/designers chosen don't often have a ceramics background and their approach to ceramics is very fresh. Of the work shown many were utilising ready-mades, over-layering or creating contemporary and sometimes political imagery. I think he would make a valuable contribution at the RCA and I plan to put his name forward as a visiting lecturer.

I am writing this, as usual on the train home, hoping that this journey isn't a repeat of last week's diversions and delays due to flooding. I finally got home at 12.15 a.m., three & a half hours late. But I was dry & warm and the house wasn't flooded.

05.07.07

I returned to College after a weekend of feeling unsure of the next step in my research. I have plenty of writing to do, but found it difficult to settle because the previous writing [see 22.07.07- Sensing the Container], where I have tried to focus on the core of the experience of perceiving the container has left me doubting that the practical work is coming close to provoking the sensation that I'm looking for. So Monday, a nice quiet day in the house was mostly wasted.

I had a good chat with Steve Brown, one of my fellow researchers about my recent doubts. He expressed having experienced similar feelings and talked about using case studies as material if I couldn't provide the material myself. This was a new thought for me, I know I need to use examples of other artists work in the thesis, but I had thought that would be solely for contextual purposes. Steve is a very supportive and has a strong insight, our conversations are always stimulating and productive from my point of view, and I hope that I give something in return.

I had planned that this week would be spent getting together the reference material I would need for the thesis writing over the summer but realised that I would also have time to do some practical work. I made a replacement for one of the flat cone pieces that I lost through firing too impatiently. It came out well and didn't require much fettling, so either my skill is improving or the mould is drier and releases the clay more easily.

I find that taking a pen, sketchbook and cup of tea across into Kensington Gardens can be a fruitful experience. For the last couple of weeks the weather has been so wet and cool that there haven't been many opportunities, but Thursday was a bit kinder so off I went. I made some notes about the container, about its deconstruction, separating the parts- rim, interior and exterior surfaces or making a container without those distinct parts. In relation to deconstruction I think of Malevich and the Cubists periods of Picasso and Braque; in relation to a continuous surface I think of the torus and then the Möbius strip. Which is what I was thinking about before starting at the RCA. I had shelved it as too complicated a structure, but find it maybe the way forward. I must return to the Rhino models and see if they can be used to produce a CNC milled model. It

felt like I'd found a way forward so got some clay and threw three torus pieces, one in white earthenware and two in porcelain.

I was pleased to move away from the feelings I was experiencing at the weekend and this seemed like a step in the right direction. I don't know where these pieces will lead but they also help to alleviate my concerns that the work shares too many similarities to Martin Smith's.

A couple of weeks ago I put in an application to take part in a mentoring scheme that the RCA and the Royal Designers for Industry are pioneering. I have chosen Martin Hunt of Queensbury Hunt as the person most appropriate for me and on Wednesday received a call from the chap [Barry…?] co-ordinating the scheme at Innovation RCA to say that it looks like I'll get the placement.

I emphasised that at this stage of my career a review in light of my RCA experience will be invaluable. I need to change direction, as the studio pottery model is increasingly difficult to sustain. Basically, that is where my experience lies, with some teaching experience, my knowledge of other models is limited.

I'm now writing this sat on the 18.45 Virgin Pendelino train heading north for the last time this academic year. I may have to pop down to use the library at College during the summer but would rather make use of time at home to balance production work and practical and written College work. Plus I have to do some DIY on the house and we definitely need a bit of time off. We'll see.

20.07.07 – Reflections:

Since arriving back for the summer I have been concentrating on commercial work, producing more figures for the interior designer we have worked with for the past few years. The work is physically demanding but does allow me some thinking time. One of the things that has come up is linked to how quickly the first year has gone and how soon the end of the second year will come around. I will need to prepare for that moment so that I "hit the ground running",

I think I'll find it difficult to return to production throwing, supplying galleries and doing the round of potters markets, but I may have to if I don't follow up other possibilities and take advantage of the opportunities that come up.

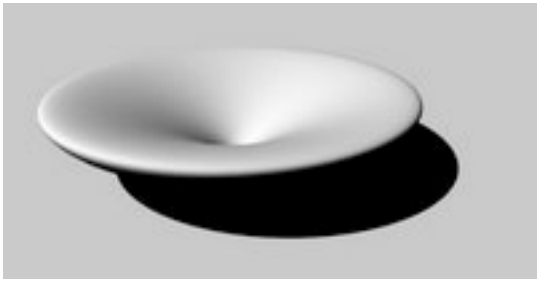
I have also been thinking about the thesis and the need to write. One pretty obvious thing that has occurred to me is that the title of the project 'The Hand and the Glove- Actual and Virtual Explorations of the Ceramic Container' requires that I make comparisons between hand and digital processes. This raises the issue that, apart from my use of Rhino 3D modelling software I haven't used any digital manufacturing as anticipated. Over the summer I must prepare models for CNC milling and rapid prototyping. They need to be the right ones, forms that explore the container, but the essential thing will be to experience the process. Another area of exploration is to analyse the practice of other makers who use digital tools, such as those involved with Autonomatic at Falmouth and some of the exhibitors at last year's exhibition at The Guild of Devon Craftsmen's gallery in Bovey Tracey. These can be used as case studies and depending on what I find will be used as supporting material in the construction of a 'position' or 'argument' to be explored in the thesis.

17.08.07

Last week was spent writing about the making process and throwing some torus forms based on the model I had designed on Rhino. Like all attempts to develop new work there is a need to adapt skills and improve techniques. I was keen

to reproduce the Rhino design as accurately as possible, the first attempts [torus 01-08] were thrown the 'right way up', but I found it was very difficult to create a shallow, open bowl form. Throwing the form 'upside down' meant that I had gravity assisting me, particularly useful in forming the outside wall. Much more control was possible and the resulting toruses [09 and 10] are quite pleasing. However, the cross section is not an accurate reproduction of the Rhino design. I am looking forward to producing the Rhino model by CNC milling, to be used as a mould for slipcasting or pressmoulding the piece. It will be interesting to compare the results of the two methods. Which will prove to be the most successful, what are the criteria I will use to make a comparison?

The torus has been chosen because it is a one-



sided surface; it doesn't have a separate interior and exterior, but can be produced to challenge the habitual understanding of the container. Does it matter that my thrown toruses are not a true reproduction of the one designed to carefully proportioned dimensions

on Rhino? With nothing to compare my thrown pieces to, I cannot answer that question. I will have to wait until I return to College to find the answers.

Along with my last clay order I bought a gallon of bone china casting slip. To test it I used an old tealight mould, which is basically a torus with a base on which the tealight sits. They were fired to 1000, sanded smooth, then fired to 1260 after which they were sanded with wet & dry paper. They have come out successfully with very little distortion, a beautiful sheen and are translucent when held up to the light. I thing there would be the potential to evolve the design to one where the tealight is positioned to shine through the bone china.

Between house renovations, visiting Kielder Forest and having visitors I have continued my attempts to throw a Ø45cm torus in white earthenware. I am now up to my sixth try with only one saved for turning. As I said above, learning to make a new form takes time, and eventually I will succeed to produce one of the right size, but I'm sure the cross-section won't be as accurate as I would like, and for me that is essential.

11.09.07

The past few weeks has been filled with making more figures for the interior designer, and making a few more toruses [should that be tori?]. I have tested various clays- glacier white porcelain, grogged porcelain, T material & Valentines GT material. All those tests are

at the biscuit stage though I expect to high fire the porcelain ones tonight.

I have continued to attempt to throw a large torus and though attuning myself to the subtleties of the form it is still a deceptively difficult one to throw. Part of the problem is at the turning stage where excess clay from the bottom of the piece is trimmed. Being an enclosed form it is impossible to gauge the thickness of the clay wall, so there is a risk of removing too much and creating a weakness or even cutting right through. I try to guess the thickness from the weight of the piece, but that can be deceptive as the wall thickness may not be even!

The surface treatment has also been an area of experimentation. I have to make a careful choice as I wish to enhance the qualities of the form, not work against or diminish them. I used a black 'chrome' glaze on a couple of tests and am pleased with the results which make the piece appear less solid. The reflections are interesting, in the centre there is a reflection of a smaller version of itself, surrounded by a fisheye view of the backdrop, it's quite captivating but makes photographing it very difficult.

I'm interested to know whether a translucent version could be produced in bone china or porcelain, possibly incorporating light. They would need to be cast, but when I return to

college it shouldn't be too difficult to use the CNC milling machine to produce a mould.

I plan to return to London about a week or so before College starts so that I can attend a number of London Design Festival events. The first of which for me is the 'Craft, Creativity & the Computer Controlled Age' on the 17th September at the Royal Festival Hall. It will address questions such:

- *What role does new technology already play in the crafts world?*
- *What do these new processes mean for the crafts and the individual craftsperson?*
- *Can craft maintain its individuality if it embraces this technology? Are digital processes actually facilitating the survival of the 'handmade' in a world of mass production?*

On my list of events I plan to visit are:
-Designersblock – Tenth London Anniversary Show

-Form Foundation presents Mode of Production
-Hue, Line & Form
-100% Design London
-iconoclasm.jp/07
-Illumination- Making a Difference with Advanced Materials
-Launch of Materials Resource Centre
-Manufacturing Reinvented: additive manufacture and second industrial revolution
-Organicks
-Trans Forms
-Zaha Hadid

These are just a few of the events on offer, full details can be found on the London Design Festival website.

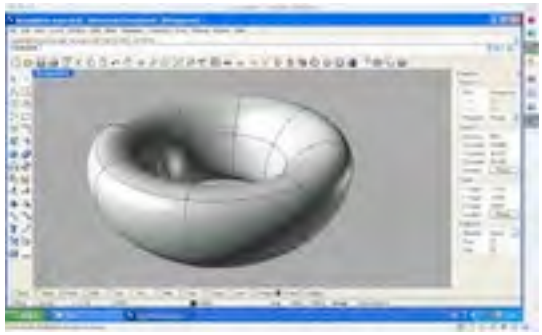
Obviously these are design-focused events, where I will be looking out for materials, responsive technology, lighting etc. However, I need to keep the core idea of the project at the forefront of my mind. The exploration of the ceramic container is the focus, the materials & tools are only the means by which I investigate & realise the work. The process must be underpinned by justification of all the decisions & choices I make, and I have to avoid using new materials or technology where they don't have a place.

14.09.07

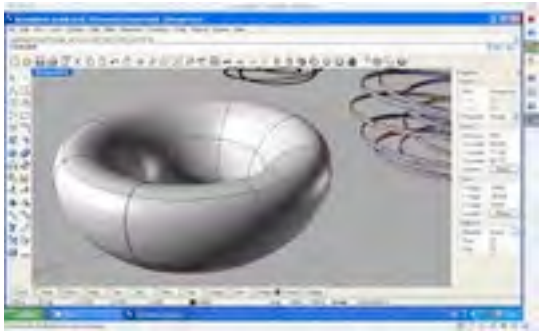
The Torus & the Möbius Strip

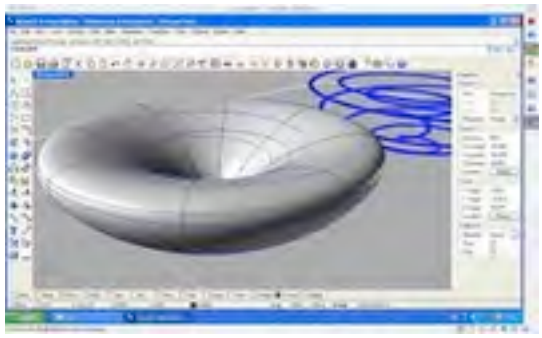
Some weeks ago I gave my friend Ivan Payne one of my thrown torus forms to experiment with. He's an interesting person to discuss my project with as he completed his MA at the RCA last year. One of the brightest lateral thinkers that I've ever come across, something new always arises when we toss the ball back and forth. The end result of his unusually quiet investigation was a cut that spiralled up the inside of the torus and back down the outside connecting seamlessly to its starting point. In theory the torus had been bisected, but was very much still one complete form. Both the Torus and the Möbius strip are one-sided surfaces; if a Möbius strip is bisected lengthways it just doubles it's circumference, which makes me think that the same thing was happening here. [What would have happened to the torus if it was made of flexible rubber?]

I went on to widen the cut & remove a 1cm wide strip of clay from the torus, producing an unsupported gap between the two 'halves'. At that stage I found it impossible to work out whether the strip of clay was a Möbius strip. From the workshop it was back to Rhino 3D on the computer in the hope that I could analyse and develop this phenomenon. At this stage I had the feeling that the link between the exploration of the torus was taking me back to the Möbius strip that played an important part in the genesis of this project. After some additional instruction from the very helpful technicians at Simply Rhino



I described the spiral line onto the surface of the torus. In the ceramic test piece I was trying to visualise what the strip of clay would look like if it could be removed in one piece from the torus. In Rhino it is possible to take and develop the line into a 'solid' ribbon form. A single spiral strip doesn't have a strong visual link to the torus it evolved from, so I went on to produce a double spiral, then a quadruple spiral, the latter appearing like a skeleton of the torus. In exploring and





developing the torus form, the use of 3D modelling software has been invaluable. It has enabled me to visualize the evolution of the form, literally adding another dimension to the creative process. My attempts to throw the toruses has demonstrated that a great deal of skill is required to realise the different stages of development, There is absolutely nothing wrong in that, it is the age old process helping to produce high quality craft and art work. However, I have chosen to produce forms that conform to a particular set of proportions and so far my throwing skills don't allow for a very precise reproduction. It's partly due to the torus being an enclosed form, preventing me from gauging the thickness of the clay wall.

28.09.07

Rapid Manufacture & Craft, walking hand in hand?

Last week was a busy one, on Monday I went down to London for the Craft Council's 'Craft, Creativity and the Computer Controlled Age' event.
It was one of the many London Design Festival attractions held between 15 – 25 September. Chaired by Sir Christopher Frayling, it brought together makers involve or interested in the application of digital technology in their practices. The presentations were followed by a

debate that ranged from the negative through scepticism to the enthusiastically positive.

This event linked in nicely with 'Manufacturing Reinvented- additive manufacture and the second industrial revolution' held at the RCA on the 25th September.

The speakers came from a spectrum of backgrounds- engineering, design, biomimetics, cultural and 'outside the box' in the case of Max Comfort.

As the conference chair, designer Geoff Hollington put it when talking about Rapid manufacture- 'if this is the next industrial revolution then we are at about the year 1800 in its development'.

In many respects the technology is sophisticated, though it is still at an early stage in its evolution and has a long way to go. Technical problems will be ironed out, 3D CAD software will improve and I foresee a place for digital craft where knowledge of materials and processes can be part of the creative digital process.

There are many C21st Luddites out there who fear the death of skill, but they are wrong. CAD/CAM, rapid manufacture and the other new technologies are additions to the creative industry's toolbox. Letterpress isn't extinct even though it's a far more laborious process than typography on the computer. My eldest daughter Rowan, brought letterpress and digital typography together in work for her degree and the results were stunning.

For me, the creative process is about the communication of an idea and I will choose whichever tool in the toolbox is the most appropriate for its realisation.

Last Wednesday evening we drove to London to deliver my youngest daughter Grace to Middlesex University for the start of her first term as a fashion student. Once she was unloaded and settling in I caught the tube from Oakwood to South Kensington to drop some stuff off at College then checked back in with Ray & Jeannette in Chiswick.

On Friday it was off to 100% Design at Earls Court, a busy show, the most interesting parts for me being the Lighting and Futures sections. I came across Earlsmann, producers of Light-Tape electroluminescent film, which I think looks to be the perfect light source for my cone pieces. There was also a sample of film from Elumina8 whom I must also speak to. Earlsmann produce a wide range of colours and the wiring and fitting looks really simple.

I found the most stimulating shows over in East London; Designersblock in the beautifully decrepit Nicholls & Clarke building was a treasure house of boundary-crossing creativity. I took my daughter Grace there and she also loved it Tent was a younger, livelier show than 100% Design, with a good number of last years RCA Ceramics & Glass graduates showing.

Back in College I've been sorting out my new space, following up some of the leads I made at the various shows and generally preparing myself for a busy term.

05.10.07

I was determined to 'hit the ground running' this week and am pleased to say that I managed to achieve virtually all that I set out to do.

I have spent time thinking about what I can realistically complete in the time available knowing that practical work takes longer than

it would in the studio at home, partly because I am exploring new ways of working & I often need advice, sometimes from outside the ceramics & glass department.

I decided to concentrate on the cone and the torus, both of which are one-sided surfaces and are essentially the same form, the cone an angular version of the torus.

So the week started with a throwing session, attempting to create a larger torus than previously. By the end of the week 4 toruses were thrown and turned and two glaze tests had come out, one of which- the metallic black glaze that I've used at home, was particularly successful.

One of my aims for this week was to arrange for a torus spiral piece to be rapid prototyped and for a torus model to be CNC milled. Unfortunately, the RP piece partly failed at the top edge, however it was still very exciting to see the piece with its supports still attached in the SLA machine.

I had hoped to CNC a 560mm diameter model from which to take a mould, but the material it will be made from is incredibly expensive- a 500X100X2000mm. sheet costs £250! I managed to get hold of an offcut that brought the cost down. It's a dense material that should produce a fine surface without much extra sanding. Due to the sheet size I have had to scale down the model to 480mm. 560mm may have been too ambitious as the mould may have been unmanageable for slipcasting.

Martin Watmough from RapidformRCA gave me details of a French company who are producing a ceramic coating for models produced on the Z-Corp machine and a fast way of producing glass moulds for blowing or casting pieces. I

contacted the Managing director who invited me to visit their laboratory in Paris. Martin Watmough is really keen for me to go with 'Big Al', one of the RapidformRCA technicians and will part fund a trip. I have to find additional funding so spoke to Tom in the Research office who was encouraging. I'm waiting for confirmation, but hope to go in November.

During the week I had an informal meeting with Martin Smith to discuss what I had done over the summer and my plans for the forthcoming term. He appeared positive and made some practical suggestions. We have arranged a time for a formal tutorial at which all my practical work and writing will be discussed.

12.10.07

The Craft of Rapid Manufacture

The week started with a return to teaching on the Foundation Ceramics degree course in Carlisle. The CIA [Cumbria Institute of Art} has become part of the new University of Cumbria, which I don't think will affect me very much. I'm teaching throwing to the first years and overseeing the second years. Both groups are small so that seems manageable and interesting.

Back in College on Tuesday I headed straight upstairs to RapidformRCA to check on my SLA torus piece. The second

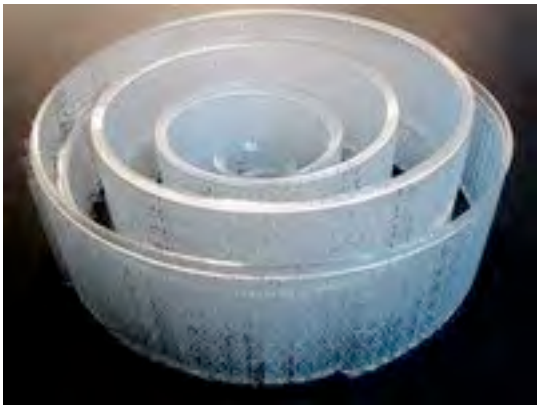
attempt had again failed at the same place on the rim, so the technician Greg, had a more detailed look and suggested that he strengthen the support matrix at that point.

Like the new hand building techniques I have been using, there is a craft element to Rapid Manufacture. The practitioner needs to know the characteristics and properties of the material and understand the methods by which it can be processed. The main difference between my two recent experiences is that the hand is absent in the making part of an RP piece. That doesn't alter the need to develop a tacit knowledge as in other skills.

From there it was back to the Ceramics workshops and the familiar, traditional skills of glazing, drying and firing. More time was spent in the workshops watching plaster-sledging demonstrations by the highly skilled technician Stephan, and tutor Tavs Jorgensen. There are some interesting techniques that may have possible applications in my project. The other workshop demonstration I attended was press moulding by Martin Smith. He chose to use one of the moulds for his forthcoming Barrett Marsden exhibition, so it was interesting to see what his current work is dealing with. His demonstration clearly emphasised that to realise an idea, appropriate techniques need to be used; as he said he doesn't have a favourite technique or one he feels most comfortable with. The process is a complex problem solving exercise where a high quality end result is the goal.

In between the workshops I was also preparing for the torus 03 form to be CNC milled. The

material was measured and cut to size, leaving me with enough excess to produce another form.



Back up in RapidformRCA the third attempt had successfully been produced. Once the material had been cured I took one of the failed ones and the successful down to my workspace to remove the supporting matrix. It was fairly easily removed, but care had to taken not to snap the brittle form.

As can be seen in the photographs, the material does not possess the tensile strength to completely support the form. Would another RM material have the properties required or will I have to redesign the form? It won't be the finished object I have imagined as it's only 25 cm diameter and the surface isn't smooth.

I wish to produce an actual three-dimensional version of a form that I can visualise in the virtual world of Rhino 3D software. On the computer screen it can be turned, scaled and I can even pass through the form. With the precision that the software allows me I can explore and develop my particular ideas far more accurately than with paper and pencil. The forms are based on simple geometric models,

which with my level of skill can be drawn up on the screen fairly easily. This particular software may not be suitable for more complex intuitive forms. However, haptic modelling software is being introduced into the department, so it will be interesting to see how other students make use of it. I have found that my sketching has become far more simplified, mostly being a rough outline of simple forms. I use them to quickly run through a series of ideas, from which I can select a number to develop in Rhino.

By Friday I was feeling pretty exhausted, having had an intense return to College. However, I have achieved what I had planned. Just before I left I saw that start of the CNC milling process, watching the machine roughing out the beginning of the torus.

I spent the afternoon at the Frieze Art Fair in Regent's Park before walking over to Euston for the train home.

It was my first visit to Frieze and an enlightening experience to see so much current contemporary art from many parts of the world under one canvas roof. It was possible to detect some trends, for instance the use of graphic design to convey messages and statements. Oppression, sex and the city are reoccurring themes, though one gallery countered them with a makeshift cinema showing Woody Allen's film 'Bananas'!

I missed visiting Origin at Somerset House, but felt that Frieze was more important for me to see.

The train home was extremely busy, but a useful time for reflection, planning and sketching, preferring, on this occasion the less intense experience of sketchbook and drawing pen.

18.10.07

The Actual and the Virtual

On arriving at College I went straight upstairs to the Darwin workshops to see how Neil had got on with the CNC milling of my torus 03 form. I felt like Christmas had arrived! It was finished and looked superb.

The difference between visualising the virtual form on Rhino 3D and having the real thing in front of me is profound and also shows up the difference between what I have carefully designed and the thrown test forms. 3D modelling software has many advantages, which include the ability to visualise a design, to create an extremely realistic render of it and to save that information to fabricate the design by various methods such as CNC milling and rapid manufacture.

On close inspection of the model various slight imperfections could be seen, there was 'stepping' on the curve at the centre of the form, and a slight ridge where the two halves met. Neil was as interested as any craftsman in how the tool had performed under skilled guidance regardless of the fact that he controlled the tool through the computer keyboard. The making of the form was not an automatic process; there were choices to be made in planning it as there are with traditional methods.

From there it was back down to unpack some tests from the kiln. The metallic black glaze

from a recipe that Liz had given me, which I had ball milled, had come out quite differently; this time it looks very much like steel. Not the same high 'chrome' gloss of my first glaze recipe, but still an interesting surface.

The matt black underglaze fests looked at first less successful, unpleasant to the touch and marked easily. After speaking to Martin on Wednesday I tried using wet and dry on the surface, but revealed some of the white clay body.

On Wednesday I spent the morning in a tutorial with Martin discussing the writing of the thesis. We allocated each section a number of words and started to work out an order for the writing of it. In looking at my practical work Martin suggested that I research using sanitary ware slip as it is designed for large items and would be preferable to press moulding the piece. I emailed Martin Hunt for advice, who suggested I speak to Robin Levien. On Friday I gave him a call and arranged a meeting for next Friday. I mentioned the mentoring scheme, which he told me he had helped to set up.

I had another glaze firing this week, having painted another coat of underglaze on the two test pieces. They came out just before leaving College on Friday and were a definite improvement. They were sanded with 1000 grade wet & dry, giving the jet black one a silky very matt black basalt-like surface. It may be exactly what I'm looking for to contrast the mirror like black glaze.

I have designed a series of pieces to explore that contrast, each a pair, one with the matt inside, its partner matt outside.

The value of our research cluster was again made evident this week at the first of our Seminar room meetings and from a couple of conversations with Steve. The first was a comment that my glazed test torus looked like an event horizon. Looking up its meaning I thought how poetic a reading it was. It is a term used to describe the boundary of a black hole beyond which nothing is ever seen again or ever comes out of. It is also used to describe the edge of the visible universe, as the universe isn't old enough for light to travel to us from beyond that point. Steve also raised the point that the white of my biscuit fired pieces isn't much different to the black of the underglaze tests. My wish is to create a light-absorbing surface and white doesn't have that quality. But it's an observation worth thinking about.

26.10.07

Monday was spent reading about perception and starting to put down some words towards that section of the thesis.

I remember coming across the writings of Richard L Gregory, the Emeritus Professor in the department of psychology at Bristol University last year and was interested in his work on illusion, which he uses to further his investigations into how sensations are interpreted as perceptions. In looking for online definitions of perception I came across his website. It's a valuable resource that allows readers to download all his research papers. What is particularly useful about Richard Gregory is that he is at the forefront of current research.

Since René Descartes, the commonly held view, known as 'passive perception' hasn't changed much. However, the theory of 'active perception', is gaining momentum. Richard Gregory states that perceptions are 90% or more stored knowledge governed by rules generated through experience as we grow up.

In other words, when I look at a container, my brain doesn't have to rely on very much visual information, as it knows what to expect from the countless times it has previously encountered a container. It will contain something or have the ability to. As a potter who has made many thousands of ceramic containers my brain is taken up with the aesthetics and function of the object, rather than identifying it. But I suppose that is what most of us do to a greater or lesser extent.

On Friday some tests came through that are part of my attempt to disrupt this process. I have thrown a series of cylinders; one without a base, one with a cone instead of a flat base etc. each was decorated with one matt black surface and one black metallic shiny glazed surface. I am interested to see if the glazed surface appears to float or loose definition due to the reflections.

The other big project this week was the making of the mould of the torus 03 CNC milled model. When I arrived on Tuesday Stephan was already at

work, so I helped him by mixing plaster. Later on he left me to make the top half, which seemed to go smoothly. The following day we separated the two halves but it wasn't until the evening that I finally removed the model. The mould is a success, but now we have to work out how to slip cast from it. Before catching the train home on Friday I went to speak to Robin Levien who is involved with Ideal Standard, makers of sanitary ware. He was very welcoming, showing me around the workshop below the studio where the team makes highly skilled models from blue Styrofoam. Robin will contact the manager of the Whitchurch factory to arrange for me to visit and discuss the casting of the piece. Ideally I need to make the visit before my French trip.

02.11.07

When Tuesday morning arrived this week, I decided that my chesty cough was best dealt with at home. I wouldn't be coughing and spluttering over the population of London and I could get on with some quiet making and writing.

My attempt to write the section on perception finally got underway, one of the interesting things being that each time I searched for relevant information, Richard Gregory's name came up. He has written a book with E H Gombrich, which I must now revisit, and I believe Gombrich has written one on Art and perception.

In the workshop I made 4 pairs of the disc pieces during the course of the week, managing to apply the black underglaze and leaving them to dry slowly over the next week or so. I hope to be able to biscuit fire them next weekend, but as the heating will be off in the workshop that may not be possible for all of them. I hope to get them through in time for the College interim show at the end of November, but they will crack if I rush them.

On Thursday I made a very interesting visit to the Ideal Standard factory in Middlewich in Cheshire. Steve Hill-Cousins, one of the technical managers who was very generous with his time, showed me around the factory. The mixture of automation and craftsmanship was interesting. The sleek designs are produced from very complex moulds made by highly skilled workers. Ideas, like the use of magnets to hold the internal sections together may be new, but they are employing the same traditional techniques that have been used since the Industrial Revolution.

They use two kinds of slip- vitreous china and fine fireclay. Both are once fired to the same temperature, 1210°C. For me the fireclay has advantages over the china, it only has 5% shrinkage so glaze compatibility may be a problem, so it will need testing. I brought a small bucketful back with me and cast up one of my tealight holders in the afternoon. It was biscuit fired on Saturday and glazed with the metallic black glaze. The result looks successful, but as the glaze cooled it was 'pinging' a little, suggesting that it was crazing. Nothing is visible to the naked eye, but I'll talk it through with Keith, the chief technician at College and maybe ask to discuss it with Nigel Woods, the glaze expert.

So considering I started the week feeling pretty grotty, it turned out to be highly productive. I missed the camaraderie of the other students, but it made me think that staying home is an option if I want a concentrated period without disturbance. It is probably more useful for making than writing, as I would need to ensure that I had all the reference material to hand for writing, but the library at Lancaster University may be accessible to me.

09.11.07

This week has passed in a flash, partly organising things for next week's Paris trip to visit Axiatec, partly making some more test pieces and finishing off things from a fortnight ago.

To prepare for next week I spoke to Anthony, one of the College glass technicians about the principles of casting. Axiatec offer a service where glass moulds for casting and blowing into

can be rapid prototyped. Anthony is intrigued about the material and whether cork or graphite surfaces are applied as in the conventional moulds. I hope to not only find out but also hope to be able to produce a mould to use at College.

Alastair from RapidformRCA talked me through the Z Corp machine, it's relatively simple technology, certainly compared to the laser sintering machines. He is coming along on the trip to talk to Axiatec about licensing their technology for us at College. I'm sure he'll be able to help with adapting designs for use with the Z Corp technology.

A light wire evaluation kit was waiting for me at College on Tuesday. I had ordered 6 different samples of light wire, different colours and grades to test in my pieces. As the name suggests it is a wire that glows along its full length, emitting a neon type glow. Until I see it in place I'm not sure if it will look a little gimmicky, so I designed a piece where the wire will be hidden at the edge of the internal base, hopefully emitting a coloured glow across the black metallic glaze.

I also made a couple of pieces that I could insert Perspex secret sign into to form an illuminated base. It's a satin black material that turns clear when light is shone through. White light looks white, coloured light coloured. Again, I must justify its use in terms of the project but think it could have a place and later have a commercial application.

The Ceramics and Glass department had an outing to see the First Emperor exhibition at the British Museum. First there was a lecture describing his life and the way he unified

China. We also heard details of how the exhibition had been arranged and designed to make use of the Reading Room in the Great Court without affecting its listed interior. My youngest daughter, Grace took advantage of a spare ticket, arriving just in time to see the exhibition. I think she enjoyed it but was slightly distracted by the thought of a trip to Claridges to see Elle McPherson launch her new lingerie collection! Quite a contrast, but that's Grace.

Our research cluster seminar room meetings haven't been very successful so far. This year the new students aren't in as regularly as we were last year, Heike is in the US and Emmanuel has gone part time. Maybe we need a guest from outside the cluster to talk about their research. Or maybe we have to wait until one of the group has something specific to discuss.

16.11.07

On arrival at Euston this week I went straight to Waterloo, met Alastair from RapidformRCA and caught the Eurostar to Paris.

We had arranged to visit a French company specialising in postproduction techniques for rapid prototyped products.

Alastair had arranged to spend just one day in Paris, learning as much as possible about their services and finding out about licensed use of their products. I had arranged to stay for the rest of the week in order to do some practical work. The company is based in a technical college and we spent Wednesday in the classroom learning about the treatment of Z Corp pieces that allows them to be used as durable finished products. This includes ceramic and glass coatings, infiltration and curing that allow

their use as moulds for glass blowing and casting, low temperature metal casting, thermoforming and rotation moulding. The ceramic coating also comes in another version that can be cast. It is incredibly versatile, can be coloured, is food safe, acid and alkali resistant, provides a gas barrier etc.

There seems that to be a vast number of potential applications, and the company are still only at an early stage in its development.

Thursday was spent in their lab, casting and spraying ceramic materials. It's a straightforward procedure. I would like to have had some of my own designs to work with, but it was not possible this time. I used children's plastic moulds of cherubs and numbers instead! Even so, I learnt the basic technique, which I can pass on to students at College.

During our trip the French train drivers were on strike, with the Metro drivers joining them on Wednesday. It made for a difficult taxi journey to Gard du Nord for Alastair in the evening, arriving just 10 minutes before his train left. Monsieur Sarcozy is in for a fight but I think there is no way a country can afford to pay workers to retire at 50. Though I hope he isn't a French Mrs. Thatcher.

Friday morning was spent checking my notes and wrapping up my samples, followed by a slow drive with Gilles to the railway station. The Eurostar was smooth and quick, arriving back at the newly refurbished St.Pancras station in two and a quarter hours.

23.11.07

A busy week, spent moving between different projects.

After discussion with Martin Smith I have decided to enter the RSA design directions international competition, in the Ceramic Futures section.

I would like to utilise what I learnt in Paris last week so set about designing a piece to be rapid prototyped. The piece will have a traditional appearance at first glance but on closer inspection it should be clear that it could not have been made by traditional techniques.

Next week is likely to be as busy, there's the Work in Progress show starting on Thursday, which needs everyone's help, a meeting with the French company upstairs in Rapidform on Wednesday and I had hoped to get another piece finished for the show!

This weekend I am giving a demonstration at York City Art Gallery. I'm taking part in one of their showcase features, where Paul Young and I have selected historical work from the collection to show alongside our work.

30.11.07

It was another busy week of juggling my main project and the RSA Ceramic Futures entry.

In addition the Ceramics and Glass department is holding the Work in Progress show. Tensions mounted at one point, but the show looks great, the bonus this year being the inclusion of the First Years.

They have completed one 7-week project and the results are very accomplished.

I was disappointed with the last couple of kiln firings; the black glaze is too thin, uneven or blistered. At home things haven't been any better as most of the work has cracked!

The RSA entry has taken quite a few hours work, partly refining the design to help Alastair in RapidformRCA to be able to apply the texture. I had been thinking about how to submit the design work to the RSA, the guidelines suggest sketchbook, mounting work on A3 board etc. but that doesn't appeal. The project is all about the application of new technology and innovative materials, so I wanted to reflect this approach in the supporting material. I have decided to present it as a blog- http://www.wedgwoodnt.blogspot.com that I can print off sections from as necessary. It can also be put onto CD that I hope will be interactive.

My torus mould has been sat gathering dust since it was made. I was away in France, and then my contact at Ideal Standard has been on holiday. In addition I had some trouble finding plastic containers for the fireclay slip. They should now have been delivered so I plan to go to the factory next Monday.

I have also managed to continue writing my essay on perception, just over 2000 words so far and not finished. I must canvas the opinions of some of my fellow researchers.

I have missed a few potentially interesting lectures at College and there are one or two exhibitions that I must see. However well organised I try to be, there never seem to be enough hours in the week.

07.12.07

The RSA project has been the focus this week, though on Monday I drove through very heavy rain to the Ideal Standard factory at Middlewich. The containers had arrived so will filled 6 of them. I hadn't realised that they would be so heavy, but the slip is 1.9 kilos per litre so one container weighs about 40 kilos.

On Tuesday I arrived at College to Tavs Jorgensen enthusing about the lid of my Wedgwoodnt tureen. I rushed upstairs to Rapidform feeling like Christmas had arrived early! The lid, had turned out really well, far more beautiful than I expected. Alastair was finishing the preparation of the base section on Freeform software though his time is spent juggling other projects as well.

On Tuesday afternoon I had a meeting with Jeremy Myerson in Innovation for advice on the questions that should be asked at Wednesday's meeting with the French company. He gave me a list of very practical points to clarify. I also asked about how Research Associate positions operate within the College. He mentioned Innovation Fellowships where sponsorship comes from various sources for the project. In this case there would be the French, possibly someone from within the industry here, made {DTI] and possibly the London Design Festival. I need the backing of the Ceramics & Glass department as the project would be based there and there may be some cost implications. Martin is interested in the materials, but needs to know more before committing himself.

Wednesday's meeting with the French company to arrange collaboration went very well. Both

parties are enthusiastic about working together. There will have to be a non-disclosure agreement between College and the company as some of the materials are still in development and haven't been patented yet. This may need to be mutual in case the RCA develop new applications or products.

Martin Watmough from Rapidform kindly invited me to a meeting with Robin Levien and his team on Friday. They were over at College to discuss Rapid Manufacture, Martin giving them a tour and talking them through the various systems. It was a great opportunity for me to talk about the French ceramic materials and their potential. There was a bit of a disagreement about just how revolutionary they are and whether they are truly ceramic, according to the definition of ceramic [made of clay and irreversibly hardened by heat]. That seemed to pass and when I mentioned my interest in an Innovation Fellowship he offered to be the Industrial partner. For me, that is a very important part of the jigsaw.

In the afternoon, Grace came down from Middlesex University and after having a look round the C & G Work in Progress show we went over to the Serpentine Gallery where there is a stunning show of light installations by Anthony McCall. They are computer programmed moving images of lines and wave patterns projected through smoke. The effect is mesmerising, the light appears as gossamer thin material that you can walk through and engage with. Each viewpoint gives a different perspective, looking from within a shape is quite different from observing from outside. We were both stunned by the magic and beauty of the art. I need to go again, now that I know what to

expect and be more analytical. Maybe the exhibition would make a good topic for a research seminar meeting.

14.12.07

Last weekend was spent finishing off the design presentation for my RSA Design Directions, Ceramic Futures competition entry, the deadline for which is today.

I decided to document the project as a blog, reflecting the fact that the project use digital technology [rapid prototyping] and unconventional ceramic materials.

After returning to College on Tuesday, I went up to RapidformRCA to check on the progress of the build. A test piece had come through but was extremely fragile; one handle had broken, but the piece looked amazing. The next stage was for Alastair, the technician who has been assisting me on this project to strengthen the weak points in the FreeForm software and then have another go at building the piece on the Z Corp RP machine.

Meanwhile, I was also busy chasing the Ideal Standard slip that I'm planning to use to cast my torus form.

On Wednesday I had a tutorial with Martin Smith, primarily to discuss the section of the thesis on Perception that I recently wrote. Comments were positive, with some suggestions about topics that I need to develop or add.

He also said that I should work out what practical work is to be produced for the examination. I mistakenly thought that I had longer to produce those. So the pressure is on. Over the Christmas period I need to start writing the Context section of the thesis, looking at artists who are exploring similar

themes. Most of the work that resonates with me is non-ceramic, which Martin thinks is a problem as the project is rooted in the ceramic medium. I'm not sure how to deal with his own work and need to look more closely at whether should be a candidate for inclusion.

The rest of the week was spent organising my trip to Paris next Wednesday, and liaising with Michel, who is coming over from Paris on Tuesday to bring the equipment that RapidformRCA have ordered and to work on my piece. I have been anxious that the Wedgwoddn't piece might not be ready in time and couldn't keep hassling Alastair, as he has plenty of other tasks to be getting on with in the College.

Thursday evening was the department Christmas party, which apparently lived up to its long held reputation; so much that College insisted that we have a security guard!

I thought things would be quiet when I arrived in College on Friday morning but the place was awash with water, plumbers and cleaners. The radiator in the technicians room had burst at 4.00am flooding the glass workshops, clay store, corridor and research area with steaming black water. I helped to get the place straight and 90 minutes later it didn't look so bad. However, the real damage had been done down below in the research offices.

The rest of Friday was spent trying not to check on Alastair and start thinking about the work I need to produce.

21.12.07

Still juggling!

I returned to college on Monday this week as Michel from the French company was arriving at 8.00am on Tuesday morning. He came over to bring some equipment and materials and to demonstrate the infiltration process.

Alastair had completed a second tureen base, so I now had one set, plus a tureen with thin handles. The equipment was set up in the cold glass workshop, first experimenting on some test pieces of tureen. By the end of the day all was infiltrated, cured with the UV lamp and dried in the oven, or so I thought.

I carefully packed the two pieces and took them to Paris by Eurostar the following day. When Michel inspected the pieces he thought that they should have been cured and dried in the oven for longer. There were tell-tale blotchy patches which show the uneven curing. Michel had made a second lid for me, so in theory I have two tureens.

The day in Paris was spent making some tests for the black ceramic topcoat. Michel also proposed to make another tureen on their Z Corp machine using 131 powder as it is stronger than the 130 that College uses. It was decided to produce it in black to make the application of the topcoat far easier.

The following day I brought the test samples into College and compared them to a Wedgwood artists proof of an Eduardo Paolozzi Newton sculpture that is in the office. Surprisingly the colour that I thought would be the closest was far too dark, an iron oxide stain being far closer. I photographed the samples against the sculpture and emailed them to Gilles who planned to make up the colour in the lab and send me the results over Christmas.

The next stage will be to return to Paris to

collect the pieces some time in January.
Meanwhile, I also had to think about the main project – the M.Phil. Whilst I was in Paris the slip from Ideal Standard arrived, so on Thursday I set up a frame on which to place the mould for casting. The mould is large and heavy, heavier still when full of slip, so I need to be able to turn it over for emptying without the need to lift. The system works well, but the first cast imploded as part of the cast stuck to the mould when I was separating the two halves. The first cast is normally scrapped as it cleans the surface of the mould, for the second cast on Friday I decide to cast the piece slightly thinner, leave it in the mould to dry for longer and to lift off the other side of the mould which may be less likely to stick. As I write this the cast is still in the mould.
It's now 3.00 pm and the cast has been successfully removed from the mould. It looks OK and I'm optimistic about taking further casts as they should come out more easily.

Happy Christmas.

04.01.08
Christmas Vacation

I was home for 2 weeks over Christmas and New Year and it was lovely to have the time to settle back into life in Cumbria with family and friends. Walking the dog across the fields, gathering firewood, cutting back brambles and that sort of thing mean a lot to me.
Some weekends during term it's difficult to switch off from College, so the longer break allowed me to change gear a little and see the

project in perspective. I think it's essential to be able to step away from time to time.

Having said all that I spent a substantial part of the break writing up the Context section of the thesis. I feel quite happy with it so far, knowing that it is a useful starting point. I'm sure some revision will be necessary, but it's one of the more demanding parts of the thesis so I'm pleased to have got it to this stage.

11.01.08

Decision time

I came down to College on Monday this week, planning to make an effective start to the term.

Everything was in place for the casting of the torus mould and I managed to cast one each day. I shouldn't be surprised that there is so much to learn each time a new form is attempted. With the torus I had to develop a sequence whereby I could handle the heavy mould allowing for careful filling, emptying and the removal of the cast. Correct timing is crucial, the cast has to be of the correct thickness, it has to be left in the mould until it's firm enough to be removed without it distorting etc. etc.

By Friday I had 2 perfect casts and two slightly less than perfect. Thursday's had imploded, probably when the slip was drained from the mould. I had applied talc to the surface of the mould that may have contributed to the problem.

I had a quick chat with my supervisor, Martin Smith, about the writing that I had done over Christmas. He agreed that there should be a stronger narrative throughout the section, so

that's something I need to attend to before long.

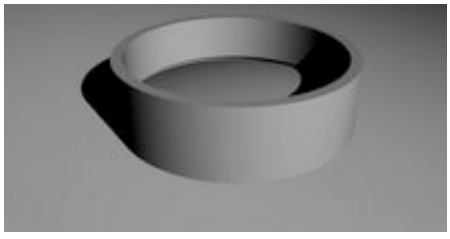
I spent some time thinking about the rest of the practical work that I need to produce over the next couple of months. The torus form relates well to the thesis, the cylinder pieces explore perception but they don't relate well to each other and the cylinder strongly remind me of some of Martin's work. The mirror black glaze links the two forms but the resemblance to Martin's work is something I need to discuss with him.

Meanwhile, I need to carefully think and design forms that relate well as a group, and can illustrate the thesis.

So the plan for this weekend is to work on the designs and reread the writing. Plus I would quite like a bit of home life!

Rhino rendering of disc 11.

I plan to incorporate 'lightwire' in the groove just below the rim.



Rhino rendering of disc 12.

In this one the 'lightwire' is planned to fit in the groove where the wall meets the base.

18.01.08

Thinking about Making

The decision of what pieces to produce for my examination is not an easy one to come to. The

torus form is satisfactory, but the big question hangs over the cylinder/disc pieces. I am concerned about how they relate to the torus form and their similarity to Martin Smith's work. This is a risk when similar themes are being explored through simple geometric forms. The inclusion of light [and possibly liquid] in my pieces will distinguish them to a certain extent, but links are bound to be made. It is a subject that I must raise with Martin at my postponed tutorial.

I took 3 more successful casts of the torus, biscuit fired the first three, two of which are seconds but were used as glaze tests later in the week. The metallic glaze that I made from Liz Aylieff's recipe is causing me problems that I cannot afford the time to deal with at present. It is still blistering so I bought a small amount of similar glaze from Potclays. I managed to get a test into another student's firing on Wednesday, the results are OK, black and shiny but it doesn't have the metallic quality of the one Liz gave me. I may be able to add more manganese to it but that may risk a return to the blistering.

In preparation for making the cylinder series I threw a large wall section from which I took a plaster cast.

In contrast to the practical work, at this stage of the project the writing seems to be more manageable, or at least predictable. The thesis has a structure, I know what the contents are, the subjects to be explored, and I have just to get on with it.

On Thursday I had a rare evening out with other folk from College. We went to see Paso Doble at the Barbican, a performance by two artists

using 10 tons of clay as their medium to tell the story of evolution and man's impact on the environment. It was an extremely energetic performance, spectacularly creative. Clay and pots were pivotal to this theatrical event, so it will be interesting to see how [or whether] the ceramics media respond.

26.01.08

This week has been a rollercoaster- with some good progress made at College in both areas of writing and making.

My Tuesday morning train journey was spent designing some glass pieces that could be produced using rapid prototyped moulds. The moulds need to infiltrated and cured and then will withstand considerable heat. They can also be used for low temperature metal casting. When I was previously at the company in Paris, I saw a mould that had been used to cast aluminium. The surface didn't appear to have been affected at all by the hot metal.

On Wednesday I went over to Paris to collect the Wedgwoodnt Tureen that had been made in black for me. It is to have a black ceramic coating made to look like Wedgwood black jasper. Unfortunately when I arrived Gilles was rushing between labs trying to prepare the right mixture for the coating. As the afternoon continued it was clear that he was struggling and I came home empty handed in the evening. The black tureen looked excellent, it appears more 'see through' than the white version.

On Thursday I heard that the Wedgwoodn't Project has been shortlisted for the RSA Ceramic Futures competition. The interview is on March 11th and there's some preparation work to do beforehand.

I then had a tutorial with Martin, primarily to discuss the 'Context' section of the thesis. He raised a few points that I need to address, but fundamentally he was happy with it. I now have to start tackling the 'Making' section, once I've gone through the whole 'Sensing' section to see how its three parts read as a whole.

Through the week I had been casting and firing the kiln, on Thursday I added some manganese dioxide to the Potclays glaze in an attempt to make it more metallic. The results came out on Friday and they are the most successful yet. The cone form looked very interesting with red or white light inside it, creating a volume of floating light in the central space.

Friday afternoon was spent at the V&A having a look around Collect. I felt overwhelmed by so many beautiful objects, but underwhelmed by a lack of content in quite a lot of the work. As Chris Lefteri says in his introduction to 'Ingredients'[1] "…the importance of an object and its physical manifestation has diminished… new technologies have provided consumers with a new level of engagement with the object." I was looking for story telling in the objects, something that I could emotionally engage with, and something beyond the well crafted.

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[1] Ingredients, a Materials project by Chris Lefteri. No. 2 Sept 2007 www.moreingredients.com

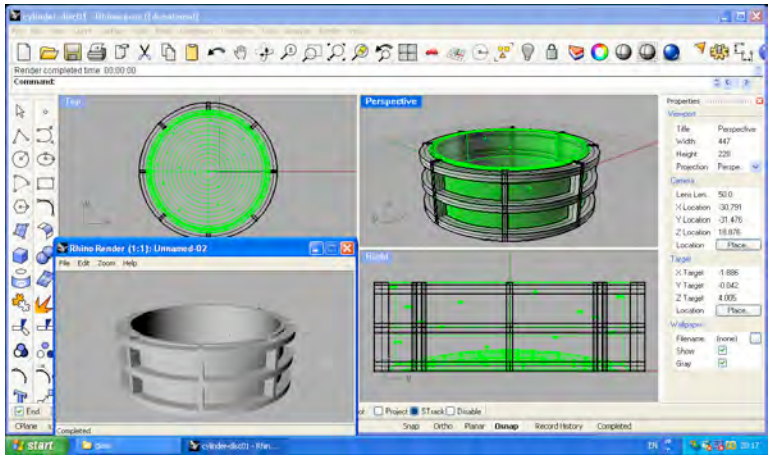
I returned to the V&A later for their Friday Late, an evening of themed 'craft' related activities, some of which were participatory. There was Ballroom dancing on a beautifully stencilled, icing sugar dance floor, casting your finger or toe in chocolate, a graphic design 'playgroup' and some interesting time-lapse films. I managed to be roped into a Charlie Chaplin impersonators Victoria sponge production line, having to dress in bowler hat, false moustache, walking cane, apron and latex gloves! It was a bit of fun and I was given a piece cake as a thank-you.

Saturday morning was spent in College, continuing to develop the glass mould design, and then it was an afternoon spent on the slow train home to Cumbria, writing up this entry.

01.02.08

This week has been spent working on a mixture of tasks.

I finished designing the glass moulds on Rhino 3D. They are intended for production on the Z Corp machine in RapidformRCA, then infiltrated and cured. They should then be able to comfortably withstand the heat of rotation blowing. I first designed a piece to test both the materials and how the glass would fit the form, but decided that it was more productive to design a piece that related directly to my project.



Last weekends unfinished writing on 'Sensing the Container' gave me plenty to think about during the week. I revisited the Anthony McCall exhibition at the Serpentine Gallery and saw a number of connections to my thoughts on form and formlessness. The light, projected through smoke across a darkened room takes on a material quality that is not dissimilar to water or a translucent liquid like the Darjeeling tea that I drink. Being able to enter the beam of light, and engage with it, dramatically changes the experience of the space. The boundaries of the gallery completely dissolve; there is virtually no sense of anything apart from the slowly shifting form of the projected light and the image it creates on the wall.

I managed to resurrect our research seminar group a.k.a. the Cake club for a meeting at the V&A on Thursday. We met to discuss the 'Out of the Ordinary' exhibition, then were treated to tea and cakes by Heike in the wonderful Morris room of the cafe. There were mixed feelings about the exhibition, it was not greeted with complete enthusiasm. The glasswork of Susan Collis for instance, was generally regarded as literal, leaving little for the imagination,

whereas the intricately carved plants and flowers by Yoshihiro Suda were appreciated both for the dedication of achieving such a high level of craftsmanship and their poetic quality. For me the positive aspect of the exhibition is that it is labelled as 'craft'. From my perspective of 20 plus years making functional pots and now having the luxury of time away from the studio to redefine my future practice, I am excited by the attempts to redefine and reposition 'craft'.

15.02.08

The past two weeks have passed very quickly, partly because I didn't have my usual weekend at home but spent it in Frankfurt.

The week leading up to the trip is now a bit of a blur- what comes to mind are casting, glaze tests, writing and trying to organise the rapid prototyping of the glass blowing mould.

Friday morning soon came around and I made my way to Heathrow to meet Kathryn Hearn and her students from Central St. Martins. They organise a trip to Ambiente, the ceramics, glass and product design show each year. I thought I would join them to gain an idea of what is happening in Industrial ceramic design and to make contact with potential partners for the research fellowship.

The show is held at the enormous Messe, there are 9 or 10 halls, many of which have 5 floors! There are buses to take the thousands of visitors from one end to the other.

Over the 4 days of the show, I made contact with a number of firms, both glass and ceramic and have since followed up with emails giving some more information about the materials and technology I hope to work with next year.

Frankfurt is a pleasant enough place, the river running through the centre adds a bit of character to what I perceive may be a fairly boring financial centre, with an ever changing population of Messe visitors.

By Tuesday I was certainly ready to return to College and rest my aching feet.

The rest of the week went well, all practical stuff, including some hopeful glaze tests. The mirror black glaze is proving to be unreliable, with blisters appearing randomly. I had biscuit fired some fireclay casting slip, test pieces to 1080 and 1200 that were then glazed with the 2 black glazes and fired to 1140. The results are surprisingly good, considering the glaze has been taken 60 degrees higher than it is designed to go. I then re-fired 2 pieces that had been badly blistered, one of which needed some extra glaze and they came out better, but not perfect. I'll try taking the temperature up a bit more. One of the glazes has an attractive speckle, which I need to remove if possible, so that was balled milled for a few hours today, whilst I went on a semi-useful photography course.

During the week I was invited to Limoges for a demonstration of treating and preparing the RP glass blowing mould for use. I would like to attend, but am worried about the amount of writing and making that still needs to be done.

22.02.08

Deadlines are starting to loom, not just the completion of my thesis and practical work, but more imminent ones such as the Research Forum next Tuesday, where we have to give a short presentation on the current state of our research. We only have 15 to 20 minutes each,

but it's seems to take me a disproportionate amount of time to prepare for it. The audience is likely to be small, but will probably include staff from both the School of Applied Art and the Research Office.

The other deadline is the RSA Ceramic Futures competition interview to be held on the 11th March for which I am relying on the French company to complete the black tureen on time. Ideally, I should have it now so that it can be photographed and included in my presentation, and Martin Watmough from RapidformRCA has asked if it will be available next week for a visit he is having from the Vice-President of Z Corp. I have emailed and telephoned the company but feel a little in the dark, as I have no idea when it will be ready for collection. They have promised to complete it on time but I feel that last minute is almost the same as too late.

On a more positive note, a very successful glaze test came out of the kiln this week. The piece had been biscuit fired to 1140˚C then glazed with a metallic black glaze to the same temperature. Once the 'bloom' was polished off, the surface was just what I'm looking for, highly reflective and smooth, with no visible crazing.

The other enjoyable incident happened, surprisingly on the tube on Thursday. I spotted one of the Poems on the Underground, one by Elizabeth Cook called 'Bowl' that perfectly compliments my project.

'Give me a bowl, wide
and shallow. Patient
to light as a landscape open to the weight
of a deepening sky.'[2]

Trying to memorise it on the tube literally and metaphorically transported me to another place [Liverpool St and home in Cumbria].
Earlier in the week I had seen another of the Poems on the Underground, this time called Maple Bridge. The first part is a translation by the poet Gary Snyder of a Tang dynasty poem, an almost haiku like description of night-time on the river, hearing the distant bell of a monastery. The accompanying poem is by the translator, set at the same location describing the scene in 2005.
Again, the effect is to transport the reader out of the uncomfortable physical confines of the tube to a place in the imagination. For me the discovery of a poem is always unexpected, as my mind is usually busy with 'London' thoughts, making the experience the more enjoyable for it.

29.02.08

Arrived at College, dropped off my things and went straight down to the Lecture theatre for the research presentations. I arrived partway through the session, but still managed to see three of them before it was my turn. It seemed to go OK, but sitting there waiting I was a little alarmed that Emmanuel was discussing the relationship of poetry to his project. As usual, he has strong views and can appear

[2] From 'Bowl' by Elizabeth Cook, published by Worple Press 2006

uncompromising. I used the first verse of the Elizabeth Cook poem 'Bowl' in my presentation, and explained to Emmanuel that it had been chosen, not because of poetic merit but because it demonstrated someone verbalising the act of looking at a ceramic container and going beyond its material associations.

Quite a chunk of emotional energy was burned up during the week trying to pin down the date when I could collect my tureen from the company in France. Having been told I could go on Wednesday I was about to book the tickets when I received a call to say that it would not be ready. As I was working for Ceramic Art London from Thursday through until Sunday, I was disappointed as one of the designers from Denby Pottery planned to see me on Friday and Martin Watmough had the Vice President of Z Corp visiting. It would have been really useful to have a Wedgwoodn't Tureen to show them. But I'm in other people's hands so to a certain extent I have to go with it.

The meeting on Friday with Gary Hawley and his colleague Thomas was very interesting as they have a Z Corp machine that is use every day. I am very keen to take the conversation further and hope to be able to visit them before too long.

Ceramic Art London went very well, setting up was smooth and exhibitors seemed happy with the help on hand. I looked after the 'Discovery Programme', the series of lectures and demonstrations that included the film of my wife Vicky's ceramic installation to commemorate the Morecambe Bay Chinese Cocklers tragedy. I saw the final version for the first time that includes the final section of the 'stones' being covered by the tide. It adds a

very poignant ending to the film that is appropriately slow paced.

07.03.08

The Complete Tureen

After a late Sunday night tidying up after Ceramic Art London, I had a very early start so that I could catch the 6.30 Eurostar to Paris. I enjoy the journey by train, it's certainly the best way to travel long distances.

Michel greeted me at the lab, taking me immediately to see the completed Wedgwoodn't Tureen. My first impression was relief and excitement that the project had actually been achieved. On closer inspection, the surface finish was not quite as smooth as I expected, but Michel said that Gilles would be bringing in a second piece that he was still working on. Whilst waiting for Gilles to arrive, Michel and I discussed some of the technical aspects of the material and process in order for me to put forward strong applications for awards to fund my proposed research associate post.

About half an hour before I was due to leave Gilles turned up with a superb Tureen. It has the correct shade and sheen to match black 'Basalt' or 'Jasper' and the surface texture is much smoother. They have spent many hours working on this project and I am very grateful for their assistance and the support of Rapidform back at the RCA.

I packed the pieces very carefully and headed back to London, arriving just in time for my meeting at Wedgwood on Regent Street. I met the Design manager, Matthew Harrison, who listened to my explanation of the technology involved in producing the piece. He then brought in Frances Mossman, Wedgwood's Global Design Manager who is really enthusiastic and would like me produce a range of similar work for the 250th anniversary next year. Though exciting, the implications will need careful thought. I have less than 2 months to complete my M.Phil and that mustn't be put at risk.

The rest of the week passed in a blur, juggling throwing, slipcasting and making arrangements for next weeks visit to Wedgwood at Barlaston. By chance Martin Smith and Tavs had planned to meet the Design team to discuss re-establishing a connection between Wedgwood and the department and it seemed a convenient opportunity to join them. Martin Watmough from Rapidform is also coming to discuss the technical side of the project and to offer Wedgwood a service.

This week also saw interviews taking place and again I was asked to sit it on the Research student applications. There are some strong candidates this year, all of them would add something to the department and to the Research cluster.

Just before I left on Friday we got together to make the final choices. So there will be excited and relieved applicants, as well as some disappointed ones.

The coming weekend is likely to be a busy one, balancing the demands of College with a home life that needs some catching up on.

19.03.08

The Wedgwoodn't [continued]

After teaching in Carlisle on Monday I caught the evening train down to London. I had to be at the RSA for the Design Directions Ceramic Futures competition at 10 am the following morning so couldn't catch my usual train.

The interview at the smart RSA building, just off the Strand went well, the panel of judges, which included Martin Hunt were genuinely enthusiastic about the project, but at this stage I don't know the results. We were told that we would receive notification before Easter, so I have up to a week or so to wait. I really don't know how I have faired; I think the Wedgwoodn't project fits into the RSA criteria very well, it's about innovation after all, I'll just have to wait and see.

After returning to College I continued with the practical work, throwing, casting, turning and firing the kiln a couple of times.

On Thursday I went up to Wedgwood with Martin Smith and Tavs Jorgensen. They were going up to discuss the re-establishment of links between the company and the RCA. We had a good look around the factory where Wedgwood is committed to continuing the production of their prestige ranges. Apparently the Japanese, who are a major market won't buy the work unless it's made in England.

After lunch, we returned to the Design Studio to discuss my project. I met Angela Hull, the prestige manager, who along with the rest of the team seems like someone that will be enjoyable to work with. I have some work to do before designing gets underway; they need a

costing for the Wedgwoodn't piece to enable them to work out feasibility and numbers.
I have spent some time thinking about the pieces that I would like to re-interpret, there's the First Day Vase and an Acorn Vase that I would like to have a go at.

Co-incidentally I was looking at the MoMA on-line exhibition of the Design and the Elastic Mind show and found the work of Neri Oxman, an MIT researcher with a background in architecture and interests in ecology and computer modelling. She has used algorithmic generative modelling software to produce some architectural models. I spent some time trying to find out more about the technology, and have emailed her. I expect there are students at College who know something about it or students across at Imperial College. One way or another I'll find out more.

04.04.08
Easter

The first part of the Easter break was spent at my brother's in Austria. Vicky and I went out for a few days to meet our new nephew Luke, who is my brother & sister-in-law's first child. Chris is like a dog with two tails!

After what we thought was going to be a brief trip back to winter in Austria, our landing at Stanstead was delayed by snow. The rest of Easter was cold, but I did manage to get out for some good walks with Vicky and Blue.

Apart from settling back in Cumbrian life, I spent many long days writing up the Evaluation section of the thesis. It's a demanding section, pulling together themes explored during the project and relating them to other peoples work. A lot of time was spent thinking and writing about how I allow for subjectivity in the evaluation of this project. I had originally planned to have an evaluation and a conclusion but they seem to have morphed into one. I emailed my efforts to Martin and Alison, so I'll see what they say.

In addition to all this, I'm looking for generative software to use on the Wedgwood project (if it goes ahead). Sometimes called algorithmic geometry software it can be used to generate 'natural' forms such as bone structure or plant growth. If anyone out there can point me in the direction of Rhino compatible software I'd be very grateful.

Next week is going to be a busy one, with World of Interiors interview as soon as I get in on Tuesday, tutorial on Wednesday afternoon, Grace's fashion show at Brick Lane in the evening. Thursday morning I have a meeting to discuss applying for a SMART award towards next year's research fellowship.

11.04.08

Evaluation – continued

Sitting here on the Friday evening train the week feels like it caught up with me. It's been a busy one, as I expected it would be, balancing the thesis with events following the Wedgwoodn't Tureen project.

Arriving at College on Tuesday I quickly got ready for the World of Interiors journalist and photographer who spent most of the afternoon with me. I learned a lot from the photographer, the use of natural light and the way that I was positioned to create an image that would fill a double spread or a single page. He used film, as Rupert the editor prefers the quality to digital. I'm looking forward to seeing the article, which will be in the June issue.

Wednesday afternoon was scheduled for a tutorial with Martin to discuss the Evaluation section of the thesis. Interestingly, he looked up the word 'thesis' and found that the definition includes the practical work as it is also used to advance the argument. So what I've been calling the thesis is actually the written report. I have a number of points to amend and some additions to make. There isn't much time left to fit everything in place so I don't fancy the idea of starting a whole new lot of reading.

In the evening I went over to Brick Lane to see the fashion show that Grace had arranged for the Middlesex first year students. Understandably she was very nervous, but everything ran smoothly. I enjoyed meeting her friend Coco, she's a lovely girl and they are obviously good friends.

On Thursday morning I took the Wedgwoodn't piece over to MaDE, the `Material and Design Exchange to talk to the mentors about applying for a SPARK award. It was a very worthwhile

meeting, with lots of enthusiasm for the project and plenty of good advice. I need to keep that project moving along, but must give the MPhil priority at the moment.
The rest of Thursday and Friday were spent making alterations to the Evaluation section and writing the Conclusion section of the written report.
The weekend is likely to be filled with writing, but hopefully there'll be time to get out into the fields and woods with Vicky and Blue.

18.04.08
Shuffling the thesis

This week's focus has been the thesis. I had a tutorial with Martin on Tuesday afternoon where we started to look at the Evaluation section. I returned to my desk with a list of jobs to do in time for Thursday's session at Martin's studio.
When Thursday came around I cycled in to College, picked up my thesis and carried on to the far reaches of Clapham. I was greeted at the studio by Martin, with Tallis's Spem in Allium playing. We laid out the thesis on the office working surface and made our way through each section, looking to see how the parts related to each other. The difference between organising the thesis on screen and shuffling the sheets is similar to handling actual and virtual objects.
The morning ended with the layout of the thesis quite dramatically changed. I had thought that the order was logical but we managed to improve it. Again I came away with a long list of jobs to do!

The other news was that I was selected to make the trophy for the Royal Overseas League music award. It's to be presented to the winner, Sarah-Jane Brandon a Royal College of Music soprano from New Zealand, at a concert at the South Bank Centre in May. The organisers liked the look of the Wedgwoodn't Tureen, so I used some of the design data as a starting point. Instead of the piece looking like bone, I made an image of random musical notes. The data was given to Alastair in RapidformRCA, who will put it together over the weekend. I'm relying on Gilles in France to be able to make the piece in time. Having completed the Wedgwoodn't by the skin of his teeth I'm a little worried that this job will keep me on tenterhooks. It's bad timing to have this job to do at the same as the thesis but it's all part of re-positioning myself. It will be useful on the CV and I may make a few contacts.

25.04.08

Editing the thesis (or written report, as it should be called)

Again, the week started with a focus on the report. After making further amendments I printed off the whole thing and passed it to Martin to read. That actually gave me a whole day to carry on with the practical work, so I did some throwing and made up a glaze test. It's a variation of the black reflective glaze with less manganese dioxide. I managed to get a test in Richard's firing and the results looked much the same s the original. There was a texture in the surface; more of a mottling that I realise is due to not having ball-milled the

glaze. So I gave it 4 or 5 hours in the ball mill and dipped another test piece which was put into another glaze firing of Richards, this time to 1140°. Not a straight comparison, I realise, but I'll get a test into a 1080° firing next week.

I think I'll try another glaze variant with even less manganese as I hope to get a perfect finish on my pieces.

I threw a number of porcelain mugs, each of a different proportion, some my normal mug shape, but others wider & shallower. I have chosen a lovely satin white glaze, one of Emmanuel Boos tests that will provide a neutral effect, as I'm interested in how the contents will be perceived in use. Applying handles was an interesting exercise. I pulled some handles, but when they were applied they were far to heavy, fine for my earthenware, but totally out of balance for the porcelain. It's interesting how the material made such a difference, or is it a result of our material associations?

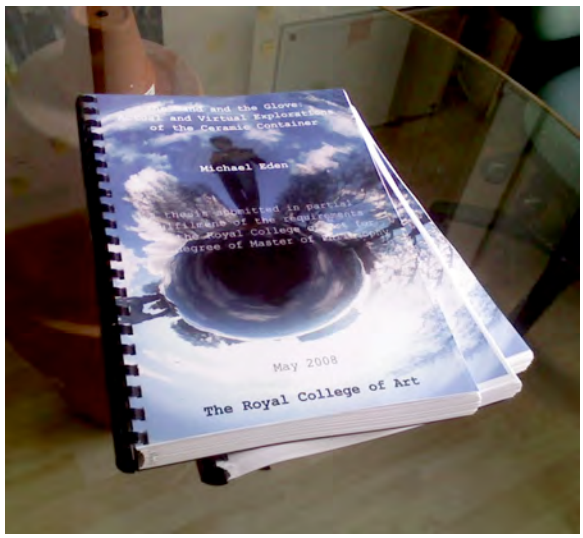
On Thursday morning I greeted Martin with coffee and croissants as I thought we would need sustenance for going through the report that he had spend over 5 hours reading. It was festooned with post-it notes, quite a terrifying sight but Martin reassured me that it wasn't as bad as it looked. The majority were punctuation or formatting, very few required any serious re-writing, thank goodness. I'm not sure I could face that.

I hope to finish the suggested amendments to the thesis this weekend and perhaps get out to see a film, or go for a decent walk. Spring is finally warming up, Kensington Gardens was looking beautiful this week and I would very

much like to get a taste of the Cumbrian spring.

02.05.08 – Handing in the thesis!

Today is the day I handed in my thesis (or written report); three cone bound copies placed on Martin's desk ready to go down to the Research office.



So far there's no great overwhelming sense of relief as I've still a lot of practical work to complete in time for the examination. The writing is just part of the project, a fundamental part that has stretched me in many ways, but which could not have been completed without the practical work.

In addition, I need to plan ahead for my post-MPhil life. Will it be at the RCA? I certainly hope so, whatever happens I need to be involved with the French company and their revolutionary ceramic materials.

Other activities this week included booking the Eurostar to Paris so that I can collect the ROSL Trophy. I managed to get a little throwing done and make up some glaze tests, which are firing as I write this. On Thursday evening I went to a bio-nanotechnology evening organised by Design London, held at Imperial College. There was nothing of direct use, probably more

of value for the Design Interaction students, but an interesting insight into the future. One of the short talks was by a chap who works for the National Physical Laboratory, a government agency that measures stuff. Sounds boring, doesn't it. Well this chap spends his time in Second Life, encouraging bright people to get together to discuss ideas around technology. I had no idea that Second Life was being used in this way, but as he explained, it's all created by the members, so why not?
It was a productive, but tiring week, waking very early on a couple of mornings with my head churning through the various parts of the project.

09.05.08

Now that the thesis has been handed in, it's down to finishing the practical work in time for the exam and the Final Show. Preparations are going ahead at quite a pace, joiners busy cutting and nailing, trucks delivering materials. The Hockney Gallery is even having a temporary extension! The dates for the first part of the show are 30th May through to the 8th of June. After our show there's the Fashion show on the 11th, then the second half starts on the 24th. Check the RCA website for full details.
I've been trying to sort out the glaze problems, trying different levels of Manganese. The results were not very encouraging- all the tests had some pinholing, maybe I should try a lower temperature, as the oxides will flux the glaze. Phillip Wood, one of the visiting glaze experts came in, so I discussed the results

with him. He suggested that the recipe is checked on glaze calculation software to see if it's correctly formulated. He gave me a base recipe for a 1080° glaze that I made up with a 2/2/2/2 addition of copper, manganese, cobalt and iron oxides. He also gave me a matt black glaze recipe. I made up them both and they are in tonight's firing.

On my way to Euston this afternoon I made time to visit the Welcome Collection on Euston Road. What an excellent gallery. There was a very moving exhibition of photography called 'Life before Death'. Large photographs, in pairs of the same person. The first taken a few days before their death, the second taken immediately afterwards. They included people of all ages from infants to the aged. It is a powerful and emotional exhibition.

I went along to see the 'From Atoms to Patterns', textile designs for the 1951 Festival of Britain that were based on crystallography images of molecular structures. The meeting of Art and Science is currently being promoted, with some fascinating projects coming to fruition, but it's interesting to see that it's nothing new. RCA students have a track record of working with Imperial College students, resulting in some successful collaborations, Sarah van Gameren, for instance, coming up with a slow burning material that creates ornate carbonised patterns over surfaces and objects. Rachel Wingfield of Loop.ph is presently one of a number of designers collaborating with Nobel scientists in a project based at Central St.Martins.

My specific interest is with the Wedgwood project. I am keen to include references to

scientific discoveries made either by the Wedgwood dynasty (which included Charles Darwin) or commemorated by Wedgwood. The Wellcome Collection have a huge image library that I may use to access relevant images that could be a starting point for the designs.

16.05.08 – Digital interference

This week I returned to London on Monday, leaving behind the stunning Lake District Spring sunshine. Our eldest daughter, Rowan had come up for the weekend so we went up to Coniston where I had expected to find congestion and parking problems. It was surprisingly quiet and e enjoyed a wonderful walk around Holme Fell, followed by tea and cakes at the farm with the spinning gallery that was used as Hill Top in last years 'Miss Potter' film.

In London, I went straight to College and picked up the Wedgwoodn't Tureen and took it round to show Robin Levien at Studio Levien. He has shown interest in the project and is rigorous in his questioning of what the eco-ceramic actually is. Can it be called 'ceramic' if an irreversible heating process hasn't chemically transformed it? I suggested that it's time to redefine the word if the eco-ceramic shares all the properties of conventional ceramic. Thorough product testing is required before we get to that stage, but it looks as though it could be necessary.

Tuesday was spent catching up with writing to people and having a look at the latest (June) issue of World of Interiors magazine which has the article about the Wedgwoodn't Tureen. It

has come out well, the facts are all there, and the photography is very good.

I had a meeting with my mentor, Martin Hunt in the afternoon, which was useful for discussing my proposals for next year's research fellowship. I also had a chance to get some advice about the kind of contract I want to enter into with Wedgwood, if the project goes ahead.

On Wednesday it was up and away in time for the 6.55 Eurostar to Paris where I went to collect the Royal Overseas League Music Award Trophy that I have designed. As usual, it was a last minute affair, Gilles rushing in at the last moment, me with my box poised ready to pack the piece and dash off to the Metro. It was only the following day, discussing the piece with Steve Brown that I had a chance to really look at it. I must admit that my first impressions of the piece were that it looked OK, but Steve was very interested in the fact that it looks like wood, and it has small areas of 'digital interference' where it looks like the Zcorp machine has had to improvise. Steve and I discussed how the RM process could be disrupted by letting 'digital woodworm' loose in the process. Maybe a 'virus' could be written into the design programme, something that creates its own spontaneous growth? Almost like a

predatory process found in Nature. It reminds me of the walk on Sunday, pristine Spring growth, and perfect for such a short time before the caterpillars arrive.

Friday brought another early start as I went up to Stoke-on-Trent for a meeting at Wedgwood to discuss the project and access the archive. It was a fruitful visit, they are keen to go ahead, but will get feedback next week after their International Marketing meeting. If there is enthusiasm then I'm in business, if not, then I'm looking for a job at least for the summer.

Appendix 3: The Wedgwoodn't Tureen Blog

http://wedgwoodnt.blogspot.com

The project explored CAD, rapid manufacture and the application of new ceramic materials. It was used as an entry to the RSA Ceramic Futures competition and because the focus of the competition was on innovation I decided to use a blog to record the design and making processes.

http://wedgwoodnt.blogspot.com – The Wedgwoodn't Project: 01 – Josiah Wedgwoodn't

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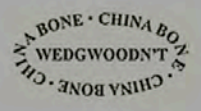
The Wedgwoodn't Project



Friday, 30 November 2007

01 – Josiah Wedgwoodn't

Josiah Wedgwoodn't have been able to undertake this project, but as one of the fathers of the first Industrial Revolution he would certainly be at the forefront of the second Industrial Revolution if he were here today.

The Second Industrial Revolution:

Rapid manufacture [RM] and rapid prototyping [RP] are methods of 3D printing using digital data. A range of materials, from plaster, starch and plastics through to some metals can now be fabricated with increased precision and speed. As yet there are few ceramic materials for use in RM.
The technology has advanced dramatically over the past twenty years and is talked about as the Second Industrial Revolution, yet the present stage of its development is the first Industrial Revolution equivalent to the year 1800.

My entry:

My entry for the **RSA Design Directions** Ceramic Futures competition uses RP and highly innovative ceramic materials to reproduce an iconic ceramic object from the first Industrial Revolution in a way that was impossible in the early 1800's.

So read on.....

at 10:28

Labels: **Industrial Revolution**, **Rapid Prototyping**, **RSA Ceramic Futures**, **Wedgwood**

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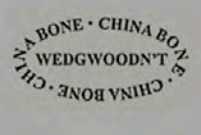
http://wedgwoodnt.blogspot.com - The Wedgwoodn't Project: 02 - The Project

The Wedgwoodn't Project



Friday, 30 November 2007

02 - The Project

Introduction:

Technology:
The technology used in this project is beginning to shape the way that objects are designed and made.
For instance a generic hearing aid has been designed which can be customised for each individual patient and produced with no extra tooling costs. The company **Freedom of Creation** can design an object literally in the back of a taxi, email the design to the manufacturer nearest to the client, who then collects it. The potential to reduce the amount of international and domestic freight is one of the potential benefits of RM.

Materials:
The materials used in this project have been developed by a company in France to convert prototypes made on the Z Corp RP machine into fully functional products. They are ceramic and glass materials that require no firing, yet possess the same properties as traditional materials. They can be applied to virtually any substrate and are non-toxic, food safe, acid and alkali resistant, form a gas barrier are frost proof etc.

Icons:
To demonstrate the use of these materials I decided to take an iconic object from the first Industrial Revolution and produce it using second Industrial Revolution techniques in a way that would have been impossible 200 years ago.
I chose to design a ceramic piece based on early C18th Wedgwood, chosen because Josiah Wedgwood was at the forefront of the first Industrial Revolution, introducing division of labour, helping to develop the canal system etc.

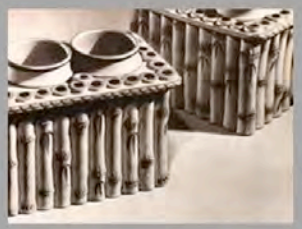
The Design:
My starting point was the 1817 Wedgwood Creamware catalogue. I chose to base my design on the lidded tureens, combining common elements. All my design work was done using Rhino 3D software.

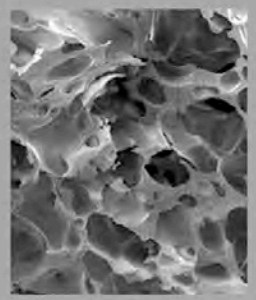
Done

http://wedgwoodnt.blogspot.com - The Wedgwoodn't Project: 02 - The Project

The Design:
My starting point was the 1817 Wedgwood Creamware catalogue. I chose to base my design on the lidded tureens, combining common elements. All my design work was done using Rhino 3D software.

Imitation:
Many manufacturers including Wedgwood produced ceramics that imitated other materials. I chose to imitate a material that couldn't be produced using conventional ceramic techniques. Artificial bone was chosen for it's interesting texture and because it is produced using RP.





at 13:06

Labels: Industrial Revolution, Rapid Prototyping, RSA Ceramic Futures

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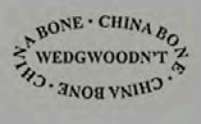
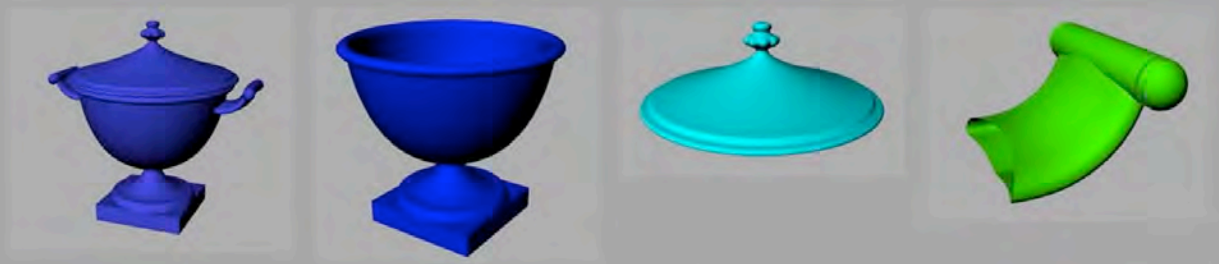
The Wedgwoodn't Project: 03 - The Design/01

The Wedgwoodn't Project



Friday, 30 November 2007

03 - The Design/01



The tureen has been designed on Rhino 3D software. The files were then exported as .stl files that could be used in Magics software for transformation into the artificial bone structure.

at 15:36

Labels: Rhino3D software

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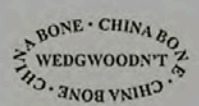
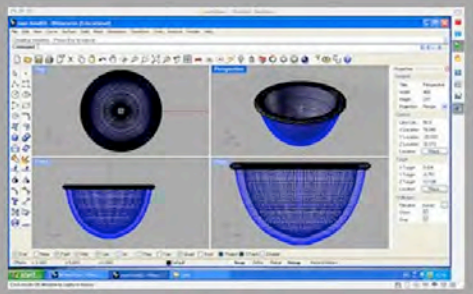
The Wedgwoodn't Project

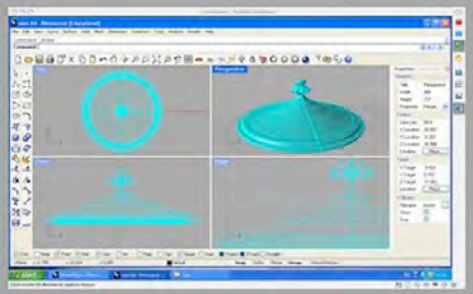


Friday, 30 November 2007

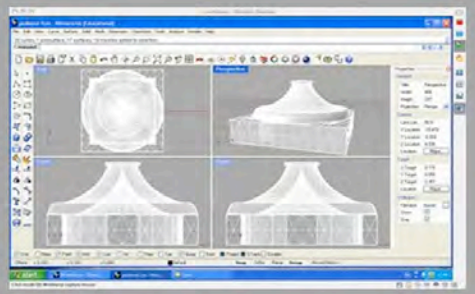
04 – The Design/02



Bowl section in Rhino 3D



Lid section in Rhino 3D



Pedestal section in Rhino 3D

at 15:53

Labels: Rhino3D software, RSA Ceramic Futures

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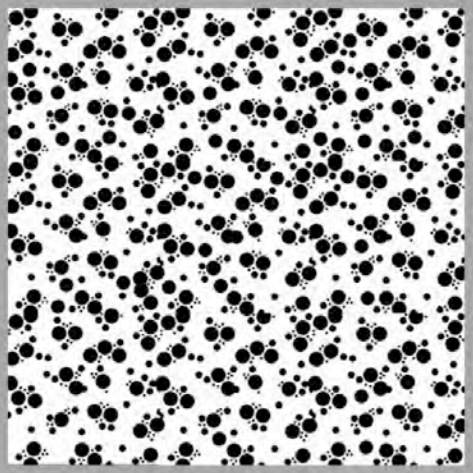
The Wedgwoodn't Project

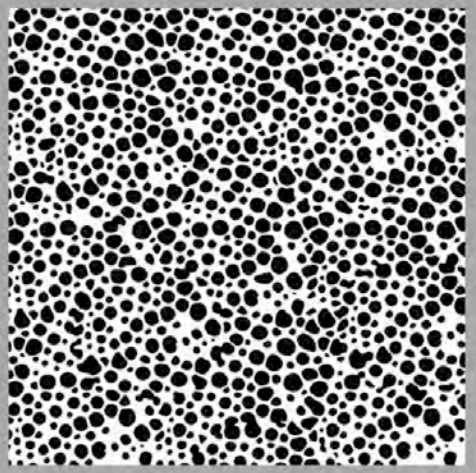
Friday, 30 November 2007

05 - The Design/03



First attempt to create dot design on Photoshop, representing artificial bone. This design is too regular.

Using black and white slips [liquid clay] I created this design.



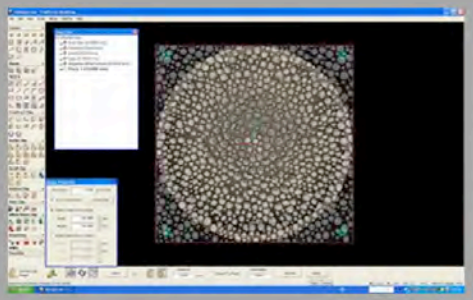
The slip pattern was tiled and merged using Photoshop.

at 16:49

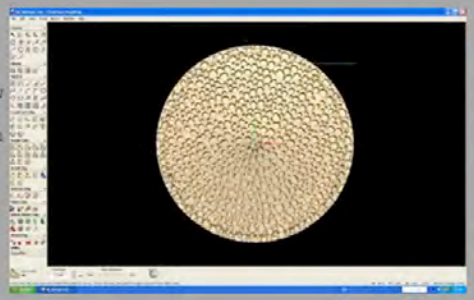
Labels: artificial bone, photoshop

Done

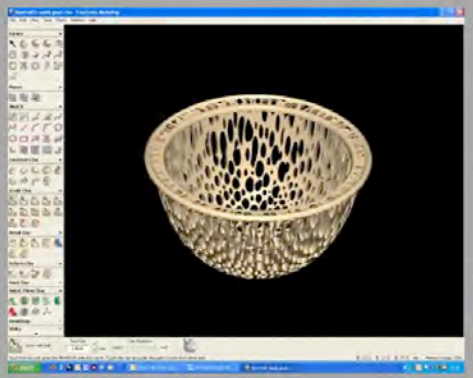
06 - The Design/04



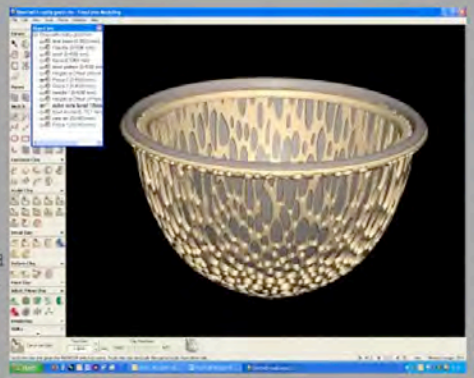
Top view of the lid with 'bone' image draped over.



Top view of the lid with 'bone' image draped over and trimmed.



View of bowl section with 'bone' image draped over and trimmed.



View of bowl section with 'bone' image draped over and trimmed. Note stronger rim section.

at 13:28

Done

http://wedgwoodnt.blogspot.com - The Wedgwoodn't Project: 07 - Production testing

The Wedgwoodn't Project

Thursday, 6 December 2007

07 - Production testing

Before producing the final version there was a need to test the design. The tureen lid was used as the first section to be tested in production on a Z Corp 510 machine.
The result, though very delicate, was spectacular. There is a huge difference between exploring the virtual form on screen to engaging with the real thing.

at 10:50

Labels: Rapid Prototyping, RSA Ceramic Futures

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http://wedgwoodnt.blogspot.com - The Wedgwoodn't Project: 08 - The Tureen - first attempt

The Wedgwoodn't Project

Tuesday, 11 December 2007

08 - The Tureen - first attempt

When I came in to College this morning Alastair showed me the first attempt to make the tureen. It is very fragile, one of the handles had broken off and the design will need amending to provide additional strength to the weak areas, but it looked amazing. Once the design is made strong enough to infiltrate, it should become durable and I'll be able to take it to Paris next Wednesday for it's surface treatment.

at 17:35

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http://wedgwoodnt.blogspot.com - The Wedgwoodn't Project: 09 - The [almost] Complete Tureen

The Wedgwoodn't Project

Friday, 21 December 2007

09 - The [almost] Complete Tureen

21.12.07
I returned to college on Monday this week as Michel from the French company was arriving at 8.00am on Tuesday morning. He came over to bring some equipment and materials and to demonstrate the infiltration process.
Alastair had completed a second tureen base, so I now had one set, plus a tureen with thin handles. The equipment was set up in the cold glass workshop, first experimenting on some test pieces of tureen. By the end of the day all was infiltrated, cured with the UV lamp and dried in the oven, or so I thought.
I carefully packed the two pieces and took them to Paris by Eurostar the following day. When Michel inspected the pieces he thought that they should have been cured and dried in the oven for longer. There were tell-tale blotchy patches which show the uneven curing. Michel had made a second lid for me, so in theory I have two tureens.
The day in Paris was spent making some tests for the black ceramic topcoat. Michel also proposed to make another tureen on their Z Corp machine using 131 powder as it is stronger than the 130 that College uses. It was decided to produce it in black to make the application of the topcoat far easier.
The following day I brought the test samples into College and compared them to a Wedgwood artists proof of an Eduardo Paolozzi Newton sculpture that is in the office. Surprisingly the colour that I thought would be the closest was far too dark, an iron oxide stain being far closer. I photographed the samples against the sculpture and emailed them to Gilles who planned to make up the colour in the lab and send me the results over Christmas.
The next stage will be to return to Paris to collect the pieces some time in January

at 09:45

Labels: Rapid Prototyping, RSA Ceramic Futures

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The Wedgwoodn't Project

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The Wedgwoodn't Project

A BONE · CHINA BONE · WEDGWOODN'T · CHINA BONE · CHINA BONE

Tuesday, 4 March 2008

10 - The Wedgwoodn't Project is my shortlisted entry for the RSA Design Directions Ceramic Futures competition.

The process of designing and making the piece was documented on this blog. To follow the project chronologically you need click on the November archive link and work backwards from there up to this entry. That's because last week's entry is superseded by this week's.
Any thoughts or reactions to the project would be of interest to me.

10 - The Complete Tureen

Yesterday I collected the completed Wedgwoodn't Tureeen with it's black 'Jasper' look-a-like ceramic coating. It has turned out just as I had hoped, but perhaps not expected.
The project has been a technical challenge at all stages, but that was partly the idea as it was designed to test the materials and technology at each step.
I feel deeply relieved to have got it to this stage!
As soon as I got off the Eurostar I went straight to my meeting at the Wedgwood offices in Regent Street. Considering that I have taken liberties with Wedgwood history and heritage It was very well received.

So watch this space.

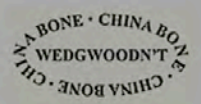
at 13:31 0 comments

Labels: Rapid Prototyping, RSA Ceramic Futures

Done

The Wedgwoodn't Project

The Wedgwoodn't Project



Thursday, 27 March 2008

11 - The Wedgwoodn't Project is my prize-winning entry for the RSA Design Directions Ceramic Futures competition.

The process of designing and making the piece was documented on this blog. To follow the project chronologically you need click on the November archive link and work backwards from there up to this entry. That's because last week's entry is superseded by this week's.
Any thoughts or reactions to the project would be of interest to me.

22.03.08 RSA Award Winner
I received a letter from the RSA on Saturday, telling me that my project is one of the winners of the Design Directions, Ceramic Futures competition. I have won a cash award and become a Fellow of the RSA (Royal Society for the encouragement of Arts, Manufacture and Commerce).
The award will allow me to continue working with the innovative eco-ceramic materials and technology.
My work will go on display, along with other winners, in an RSA Design Directions Awards Online Exhibition from mid May 2008 at www.rsadesigndirections.org

Wedgwoodn't & Wedgwood
Just before Easter I had a meeting with the Wedgwood Design team at Barlaston to discuss the design and production of a number of pieces for Wedgwood's 250th anniversary next year. There are still a few hurdles to cross, but it's an exciting and challenging opportunity that I'm very keen to take on (once I get my M.Phil finished).

at 09:34 0 comments

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▼ 2007 (9)
▼ November (5)
01 - Josiah Wedgwoodn't
02 - The Project
03 - The Design/01
04 - The Design/02

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