**Things machines have made February 2012**

**Autographical Review by Michael Eden, MIRIAD Manchester School of Art, UK**

At the moment, there is much discussion about making. Craft is in the Zeitgeist and for once its relationship with Fine Art seems to have been side-lined. Whether this is a reaction to the financial meltdown or is seen as a remedy to Continuous Partial Attention (Stone 2009), it must be a good thing. A new generation of makers is appearing, taking pleasure in the pursuit of manual skills. This is not a return to the ethos of the Arts and Crafts movement. They still have their Smartphones, but for a growing number craft provides an opportunity to get together, practice a craft, share tools and conversation face to face, rather than via Facebook. It’s connection without Wi-Fi and the distraction of multi-sensory stimuli, all competing for simultaneous attention. Through the Internet, groups such as the Bleeding Thumb Whittling Club (BTWC) are spreading the ‘C’ word, spawning groups from Frankfurt to San Francisco (BTWC 2011).

Though I applaud this movement, personally I do not define what I do as Craft. I prefer to define myself as a maker who is happy to explore the overlapping ‘grey’ area between Art, Design and Craft. The term ‘maker’ is used here in the sense of creator, which seems to be a more accurate description of my practice than simply making something with skill. To clarify my position, I will describe what I actually do.

My aim is to communicate an idea or tell a story in the form of a three-dimensional (3D) object and in order to do that in a lyrical way I choose the appropriate tools. It does not matter to me whether they are the computer, the potter’s wheel, the 3D-printing machine or the kiln. They are all tools and require a degree of craft skill in order to do the job well.

Whilst this seems obvious enough, it is not that simple. The furniture maker, Fred Baier is cautious about the use of computers by makers. He opines ‘Unless artists can… push and pervert their software far beyond its expected parameters, they must accept having their role as author/composer downgraded to performer’ (Baier 2011). Baier’s observation can be witnessed in many of the products that surround us, from the homogenous design of cars to most contemporary domestic objects. As a maker whose life has spanned the digital divide, going from whittling sticks to whittling voxels, there is a temptation to be wowed by the truly fabulous box of tricks that I sat in front of right now as I write this. But, technological enchantment leads down the slippery slope to the ‘media of attractions’ as being ‘Artefacts of digital culture whose appeal is essentially their perceived novelty. They attract less for what they mean than for the fact that they are’ (Lunenfeld 2001: 173).

In an attempt to avoid this pitfall, I have become increasingly skilled in the use of 3D software, but not necessarily in the conventional way. Learning to create meaningful objects in the virtual space of the computer requires an engagement with certainty and risk (Pye 1968: 17–29). The software was designed for engineers, but my interest is not in designing widgets, however technically sublime they may be. The software is essentially a whole suite of tools, allowing an endless number of possible actions. In order for it to be efficient and effective, the program designers have created numerous shortcuts, where for instance, any user can easily produce geometric primitives after some very basic introductory training. The risk has been removed. Having come to the software after years spent giving life to clay, I am trying to apply the same sensibility to objects through the mouse and keyboard. The process normally starts with the creation of simple shapes, but then the challenge begins where I am improvising, using tools in ways that they may or may not be intended for. And that is where the risk comes in.

In order to explain how I arrived at this way of thinking I will reflect on my journey across the digital divide.

Arts and Crafts

Back in the 1980s my wife, Vicky and I lived in a way that William Morris would have recognized and approved of, bringing up a young family, keeping sheep and making slipware, partly inspired by the rich history of European slip decorated earthenware. The work we produced was decorative and functional and the vast majority was thrown on the wheel. Over time I developed an understanding of the 3D form, its curves, volumes and proportions along the craft skills and tacit knowledge required to produce lively pots.

In the 1990s, my work began to challenge notions of function, moving away from the domestic, to pieces that investigated the abstract nature of forms. I used the relationship of form and surface to create ambiguity for the viewer by manipulating the assumed perspective of a vessel. Alongside my love of ceramics I had been developing an interest in digital technology. I had discovered that it involves a different way of thinking, a different way of problem solving to ceramics. It seemed to wake up another part of my brain. As a problem-solving exercise working with clay involves a very open-ended way of working. If I wish to make a cup and saucer, I have a variety of materials and processes to choose from, each combination will produce a different end product. Whereas working with website HTML code is far more rigid, if the syntax is not in the correct order the webpage does not work.

Around the same time I began to hear of something then called Rapid Prototyping and became excited by the prospect of being able to make the impossible. But the challenge was how to bring these two worlds (and the two parts of my brain) together?

In 2006 I was accepted by the Royal College of Art to undertake an M.Phil. research project. This gave me the opportunity to start exploring CAD software, which proved to be a very useful tool for developing numerous iterations of an idea. Although the virtual is no replacement for the actual, there was enough visual information to determine whether geometry and proportion were going to work.

Once I was happy with the design on screen I could translate the virtual into the actual using traditional pottery methods.

During the first year I was bouncing backwards and forwards between traditional processes and CAD software, beginning to come to the conclusion that the relationship was healthy, each having its place and a reason to use them. My final practical work for the M.Phil. was the first fully digital piece that I made using Additive Manufacturing (AM), regarded as the new Industrial Revolution. Additive Manufacturing is the umbrella term for various additive processes used within Rapid Prototyping and Rapid Manufacturing, including, e.g., 3D printing and Selective Laser Sintering.

The piece was The Wedgwoodn’t Tureen (Figure 1), which aimed to thoroughly test the software and hardware and also to tell a story. It was created to fully exploit this new technology and was the first to use non-fired ceramic materials. Redesigning an iconic object from the first Industrial Revolution, I produced it in a way that would have been impossible using conventional industrial ceramic techniques. The piece is loosely based on early Wedgwood Tureens, chosen for their classic beauty and in homage to Josiah Wedgwood’s role as a father of the first Industrial Revolution. The delicate pierced surface is inspired by bone, referring to the natural objects used by Wedgwood and his contemporaries as the inspiration for many of their designs. My choice also refers to the artificial bone produced by AM.

The technology removes the constraints of ‘design for manufacture’ where the processing of materials has an impact on the final outcome. In other words, there are only certain forms that one can throw on a wheel; gravity, centrifugal force and the material qualities of clay limit the possibilities. The Wedgwoodn’t Tureen demonstrates the removal of these constraints and the potential to create previously impossible forms that can creatively communicate new ideas.

The tureen was designed on Rhino 3D and FreeForm software. The files were then sent to a ZCorp 3D-printing machine that ‘printed’ the piece. It was then coated in a non-fired ceramic material (developed by the French company Axiatec) that I adapted to closely resemble Wedgwood Black Basalt. An advantage of using this technology is that there are no moulds; therefore no two objects have to be the same. Designs can easily be customized using CAD software, allowing the end user to commission objects that fit their specific requirements. Online bureaus, such as Shapeways (2011) demonstrate how access to design tools is not limited to specialists, but becoming available to everyone with a broadband connection. This has raised the question whether we are seeing a democratization of design, a development which Evans and Larson, however, are sceptical of:

To author a work, to turn data into knowledge, requires intuition and a comprehension that involves a sense of practical experience and vision. Without that, we just have amateurish pastiche…. (2011: 4)

Material and language

Experiments with the materials used in AM have attempted to blur the boundaries between traditional and new technologies. For example, the pieces Maelstrom and Vortex have attempted to digitally emulate the technique of coiled pottery construction where coils of clay are used to build the wall of vessels (Figure 2).

In another project, heat-treated ZCorp plaster pieces have been successfully glazed and fired. Further, a collaboration with the Soldner Laboratory at the University of Washington in Seattle has produced a number of 3D-printed ceramic pieces, which I received in a biscuit-fired state and which I glazed and fired in my own studio to complete them. A previous collaboration with the Digital Manufacturing Centre at the Bartlett School of Architecture, UCL, London, has produced successful tests of printed ceramics. There are an increasing number of academic institutions and individual practitioners experimenting with non-proprietary materials, including cement, wood powder and peanut butter. The open-source philosophy of the majority means that reliable materials should be available to a rising number of creative makers in the near future.

Engendered by these digital developments, a new ceramic language is being forged where the pre-industrial craft meets post-industrial manufacturing. The encoding of information has led me to explore ways of combining actual and virtual experiences in an attempt to ‘liberate’ the physical object. The Babel Vessel achieves this by enabling it to connect to the Internet through mobile technology. Quick Response (QR) barcodes are similar to the barcodes we find on most products. They function as a link to factual information, which led me to exploring their potential for storytelling (Figure 3).

To begin with, I generated a QR code that links to a page on my website when scanned by a barcode reader, available as an App for some Smartphones. I then extruded the 2D image into a 3D form using CAD software. This was then given the shape of a Chinese hu, a Chinese ceremonial wine vessel. On a visit to the British Museum, I noticed the surface decoration of a hu from the sixth century bc, which reminded me of the QR barcodes. When translated, the Chinese symbols tell of battles won or of heroic deeds by emperors. Like the QR code, I wasn’t able to read them without a translator (or an App). The idea is that the viewer can scan the Babel Vessel with a barcode reader Smartphone App, which then connects to a page on my website telling the story, providing additional information thereby creating simultaneously an actual and virtual experience.

In the catalogue to the ‘Power of Making’ exhibition, Martina Margetts states:

The role of making is a sequence of actions that set in motion a curiosity to go beyond what is already known, in a non-verbal language that extends our abilities to communicate with each other across cultures, time and space. (2011: 43)

And that:

Making is not only a fulfilment of needs, but of desires – a process whereby the mind, body and imagination are integrated in the practice of thought through action. (Margetts 2011: 43)

As a maker, I would say that defines my practice. I am fortunate to be working at a time when there is a new creative momentum, brought about through a technology that was supposed to relieve mankind from dull and repetitive labour. However, making is innate, it is hard wired in our DNA, so it is no wonder that a growing community of makers are getting their hands dirty, hacking the software, tinkering with the hardware and in doing so creating poetic and meaningful objects. All this might seem a long way from making slipware in the old workshop in Cumbria, but for me the journey is really only just beginning.

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Contributor details

After twenty years as a studio potter, Michael Eden (M.Phil. (RCA) FRSA) undertook an M.Phil. research project at the Royal College of Art to see how his interest in Digital Design and Additive Manufacturing (AM) could be developed and combined with the craft skills he had acquired during his previous experience. Since then he has continued to create a body of work, inspired by historical objects and contemporary themes. His work sits at the intersection of art, design and craft, a rich territory that allows him to interact with experimental manufacturing and other types of digital technology.

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Figure 1: Michael Eden (2008), The Wedgwoodn’t Tureen, made by Additive Manufacturing (AM). Courtesy: Adrian Sassoon.

Figure 2: Michael Eden (2011), Vortex, made by Additive Manufacturing (AM). Courtesy: Adrian Sassoon.

Figure 3: Michael Eden (2010), Babel Vessel, made by Additive Manufacturing (AM). Courtesy: Adrian Sassoon.