

POTTING IN A DIGITAL AGE



DO NOT NEED TO EXPLAIN to the readers of this journal the long and diverse history of pottery. In every corner of the globe where clay exists, pottery is to be found, objects that express the character and stories of the culture and of the people who made them. I identify as a potter, a creative who wants to continue the tradition of making clay vessels that represent the age in which I live—an age in which computer technology is ubiquitous. I am of the opinion, having considered the diverse heritage of pottery, that a pot is no more than a sculptural object, a human construct, not bound by any single function but more of a common visual language and tradition that reflects the culture in which it was produced. Simply put, if pottery is all about domestic, utilitarian function, why don't all pots look the same? If you think you know exactly what a pot is, possibly this is not the article for you.

Like them or loathe them, computers are able to compute information at faster and faster speeds. The social effects of this technology are everywhere to be seen—even in the pottery studio, where computers have been for some time. Who with an electric kiln does not have a digital firing controller or use glaze calculation

BY JONATHAN KEEP

software? The digital revolution is already in the pottery studio. What is particularly exciting to me are the new ways of working with clay that computation offers, such as generating forms for 3-D printing with computer code, how this might come to redefine what a pot is, and the relationship between the maker and the object.

The popular image of pottery is that of the handmade artifact. That image is far from the truth, considering that in the modern world most pottery is mechanically mass-produced with minimal handwork involved. The handmade pot is something of an indulgence, a nice indulgence in an affluent society, but it is helpful to remember that in developing nations *handmade* often represents low pay and, not uncommonly, exploitation. I do not aim to undermine the sensitivity of the human hand and the ability of the hand to offer subtle, readable gestures and marks, but I do question the romanticised binary view that hand is good, mechanised process is bad. Technology is unavoidable in the pottery workshop, so what is important is how it is used.

I am the kind of potter whose work is primarily about form. I have thrown on the pottery wheel since childhood; over time I became increasingly frustrated by the limits this machine imposes on sculptural shapes. Coil building offered me so much more in the way of expressive shapes, but it was a slow process. An opportunity in 1999 to use computer 3-D modeling software opened up a whole new world of form exploration and manipulation for me. On screen, forms could easily be

BIO

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◀ *Jonathan Keep. Seed Bed, 2013. 3x3x4 in. each. Code-generated, 3D-printed porcelain clay and glaze. Photo by artist.*

manipulated, distorted, and edited while offering a full three-dimensional viewing. The problem, then, was how to get this digital information out of the computer and into physical clay objects. I looked into the possibilities of clay 3-D printing, but this was before the explosion of maker communities and the emergence of the now-ubiquitous tabletop, plastic 3-D printer. UNFOLD, the Belgian design duo of Dries Verbruggen and Claire Warnier were the first to hack a 3-D printer kit by attaching a clay-filled syringe rather than the plastic printer head. Then using compressed air to pressurize the syringe, they extruded a thin line of clay—and so we had it, computer-guided coil building. After seeing this development online, I visited UNFOLD in 2010 and copied their system. Although I am constantly developing and refining the process, this is now the way I construct all my work.

Because of a huge misconception of what 3-D printed ceramics entail, people fear the tradition and skill related to ceramics will be lost. The machine has limitations that need to be understood, and new skills in controlling it need to be learned. Clay 3-D printing is only the construction technique. Significant material knowledge is still required as well as knowledge of many of the other traditional clay-working methods. Time is showing that there is no one way of working. Different styles of work are best suited to different machines, different clays, clay consistencies, and so on. And you still need to fire it and do all the standard glazing and finishing processes. There is no

deskilling in the process when done well.

I consider myself a traditionalist in the sense that tradition is a continuum. As far as I am concerned, 3-D printing and digital ways of working are not going to overtake conventional ways of working in clay, but are an add-on and in time will just become part of the ceramic tradition.

There was a time in history where coil-built pots were the norm, then the pottery wheel was developed, and now for many the wheel-thrown pot is *the* image of pottery. I would suggest the pottery wheel has actually been hugely restrictive in the development of pottery form and surface because of the revolving symmetrical process that is involved. The throwing rings considered a mark of the maker are ultimately just a machine aesthetic, the result of a turning machine. So clay 3-D printing could be considered a return to the even older tradition of coil building. With the aid of computers, ideas can be generated or drawn in an interactive virtual space on screen, then made into physical form through this mechanical coiling process, layer by layer. There is a different workflow from idea to execution, which does not involve the maker's hand to such an extent and thus opens the door to work that explores new visual content rather than manual dexterity. That is why I suggest we will see a redefinition between maker and the pot as an expressive object.

In essence, pottery is about material and process, human expression and imagination. The artist or maker's choice of forming technique and their handling of the material, both clay and glaze, profoundly

► *Jonathan Keep. Ant Hill Series, 2016. 28x13x12 in. each. Code-generated, 3D-printed, variegated stoneware clay. Photo by artist.*





affect the aesthetic of the work. For me, process remains critically important, and its qualities are intrinsic to the expression of the object. Continuing this tradition in my series *Iceberg Field*, I have used the translucency of porcelain clay to echo the translucency of ice, and the layering of the 3-D printing process to reference the layering of the ice. The forms that are generated from computer code make

use of an algorithm that mimics the erosion of the ice—material, process, and artistic intention are one.

Recently I heard the clay 3-D printer being referred to as a robot, making me realise just how emotive the intersection of technology and creativity is. Ceramics is inextricably linked to technology in that it involves taking a natural material (clay) and, through the use

▲ Jonathan Keep. *I Think*, 2018. 10x48x96 in. Code-generated, 3D-printed clay and glaze. Photo by artist.

of human technology, subjecting it to heat to become ceramic. Technology and machines have played an increasing role in the development of world traditions of pottery, often offering an identity to a period of time or culture. The important point to be made here is that the technology—whatever it might be, a kiln, a wheel, a knife—and how the artist uses these tools are significant. What should be judged are the work's sensitivity and appropriateness of expression, and its communication of the desired outcome; it's not about whether robots are taking over the world. Whatever technology is used to make it, the artwork I most respond to is that through which I can read the humanity of the creator.

Too often I see people become interested in the 3-D printer but miss the point that it is only the output device. The 3-D printer is merely the forming technique; the important part is done on computer or using computer-aided devices. You have to be prepared to get involved in computers, and I appreciate that it's not for everybody. What drew me to using computers or computation—the machine's ability to compute information very fast—in clay is the new ways of working it offers. This process of calculation can then be used to make hardware, such as the 3-D printer, or software, such as the 3-D modelling program, run according to an underlying code that the user controls. I have spoken about the ability of 3-D software to manipulate and explore form, but equally interesting is to go below the software interface and to use computer code to generate forms and ideas. Once your ideas are being worked up in digital media, there is so much more opportunity to use this common format to collaborate with other

artistic disciplines or with the sciences. Ideas and information can easily be transferred and exchanged as data between disciplines, offering opportunities for pottery to take on a much more dynamic and relevant portrayal of contemporary life, culture, and thought.

Working with digital tools that make use of the power of computation, such as 3-D printers and 3-D modelling software, 3-D scanners, and augmented-reality equipment, challenges established assumptions of how to work with ceramics and entrenched views of tradition in pottery. It offers the chance to see pottery in a more diverse and creative way. I began by saying I see the pot as a sculptural object with its own visual language and tradition. This was to say that surely, as an important part of material culture, we can make it whatever we want, and the idea of a pot will live on in many forms through the current age, into the post-digital age and beyond. And with this, we can allow clay 3-D printing to become part of the process, and not an end in itself.



◀ Jonathan Keep. Iceberg Field, 2012-2016. 12x6x5 in. each. Code-generated, 3D-printed porcelain clay and glaze. Photo by artist.