

## **Invention, Error, and Evolution** **Susan Shantz's *creatures in translation***

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*creatures in translation* teems with life, mammalian and amphibious, avian and marine. The works swarm from frame and flatness as from the egg or the primordial soup. Ranging from the endearingly miniature to the dauntingly enlarged, they are at once comical and uncanny, playful and eerie. But nothing actually moves in the room. All is completely static. One observes that Susan Shantz's two- and three-dimensional creatures are dissected and pinned, sliced and sampled, secured with steel knobs and encased behind glass.

In Shantz's elegant and engaging laboratory research is in progress: some works are complete, some partially underway, still others at the notational stage, germs of ideas. The liveliness which permeates the exhibition is new for Shantz, stemming from her expansive exploration of the creative and educational potential of fast-developing digital 2D and 3D imaging and printing technologies. It springs too from her creative entanglement with process, her embrace of the errors, mistakes, and failures inherent in these otherwise mordant processes of replication and iteration.

Shantz's previous work over the last decade--*canopy*, *chamber*, and *technologies of tenderness*--parsed contemporary intersections of science, technology, and art; cultural presentations of nature; and craft practice and domestic work in relation to the labour of mass production. These are dynamics very much of our moment. Yet the polemical framework underlying Shantz's work can be traced more than 300 years back into the past, even as it reaches forward into the quantum future.

In her fascinating and wondrously erudite examination of visual education in the eighteenth-century Western world, *Artful Science*, Barbara Maria Stafford describes the formation of two ways of understanding, offering antimonic approaches to learning and knowledge. One is the path of a visual-oral culture characterized by the sensual and spectacular attributes of the Baroque; the other, the Enlightenment's reasoned and text-based epistemology. Stafford points to "cabinets of curiosities" of the time, collections of natural artifacts amassed by scholars and aristocrats, as epitomizing the distinction and the dilemma.

The optically-based rhetoric of being versus becoming can be situated within the larger debate concerning exhibitionism. Experimentation conspicuously reconfigured both matter and self. These promethean uses of technology also had an impact on systems of ordering. Were natural objects to be arranged ostentatiously according to their flamboyant materials or reticently disciplined by linguistic schemes?<sup>1</sup>

"At present," Stafford proposes, "information is in transit, crossing over from 'hedonistic' oral-visual modes to 'serious' textual methods and back again."<sup>2</sup> Shantz's exhibitionism too is informed by this restless passage between being and becoming.

Shantz began the work in *creatures in translation* by accessing online images of four ceramic artifacts in the collection of the Art Gallery of Greater Victoria. Part of a large collection of nineteenth-century Japanese Banko ware, the four tea pots are characterized by creatures such as badgers, birds, frogs, and sea creatures, which connected loosely with Shantz's ongoing interest in cultural uses of natural imagery. In a process quite opposite to the precision, preservation, and copyright protection inherent in a museum's mission, Shantz and her students used clay modelling software and a haptic tool to replicate the teapots. The replications are necessarily imperfect as Shantz explains:

We were working at a distance from objects archived in a public collection, so the limitations of online visual source material became part of our content. For example, we could not see the inside or back of the teapot and had to imagine them. Invention took over where methodical reproduction encounters limits and this, along with errors and mistakes, became our creative edge.<sup>3</sup>

As part of her thinking process Shantz digitally sliced the images of the pots and drained them of their ebullient colour. The website collage renderings were then printed and used as the bases of Shantz's own relief collages. A pair of digital collage prints was also handed to artist collaborator Joseph Anderson to work with, resulting in a series of delicate watercolours akin to the Victorian animal illustrations which are the subject of Anderson's own research.

The eighteenth-century creator of modern collage, Mary Delaney (1700 - 1777), also chose natural subjects for her more than 1000 renderings during a prodigious, late-life production of floral specimens. Floating on a dense black watercolour and constructed of coloured tissue with such fine attention to minute detail that they were said to be fit for scholarly botanical study, Delaney's collages were facilitated by her free access to the Duchess of Portland's extensive natural and horticultural collections. Like Shantz's works, they relied on fecund display: Delaney "was an early admirer of Carl Linnaeus's so-called 'sexual system,' a method of classification based on the numbers of reproductive organs of plants--the stamens and pistils. As dainty as her art might look at first sight, it was based on the nimble cutting and counting of the sexual organs of flowers."<sup>4</sup>

Three hundred and fifty years later and a continent away, Shantz split her creatures into their component segments, as an earthy globe is splayed into cartographic flatness (*3D Rendering: Sea Creature Teapot, Fragments*), and re-constituted her 3D digital frogs into a 2D relief collage that romps and swirls (*3D Rendering: Frog Teapot*). Shantz then hand-rubbed pastel along the vestiges of clay lines in the pale halftone prints to sculpt their papery surfaces, and subtly imbued the collages with a sense of human touch as delicate, transitory and intimate as the tiny snips of Mary Delaney's scissors.

Subsequent Shantz experimentations, the *AGGV Website 3D Fragment renderings*, share the Delaney specimens' rich black backgrounds. Shantz's digital creatures hover in an inky void, their isolated electronic forms now third generation variants of the original Banko ceramic artisans' hand-glazed mammals, birds, amphibians, and sea creatures. Shantz had observed the surface neutralization common to 3D prints in thermoplastic, so her selection of the "third stage" Banko ware was based not on their decorative glazing but rather on the pots' imagery of a domesticated nature in appropriately sculptural modes. In the Banko teapots, relief creatures are laid atop a vessel structure, as in the *Teapot with Raised Frog Design* and *Teapot with Sea Creature Motifs*, or comprise the form itself, as in the *Teapot in the Shape of a Badger*, and *Teapot in the Shape of a Sparrow*. Beyond these pragmatic considerations however, Shantz's selection of these particular artifacts has proven peculiarly apropos.

As curator Barry Till describes in *Fanciful Images: Japanese Banko Ceramics*, Banko ware has a multivalent history beginning in the eighteenth century when Nunami Rozan, a wealthy eighteenth-century Japanese merchant with an interest in horticultural design and ceramics, imprinted *banko* and *fueki* stamps, meaning "everlasting," "enduring," and "changeless," on his own vessels. The four stages of Banko ware production since then have each been characterized by imitation, amalgamation, and innovation in form, technique, molding, decoration, and glazing. By the beginning of the twentieth century, domestic popularity spurred production of Banko ware for export to Europe and the United States, with an explosion of fanciful forms and finishes. Appropriately, in relation to their iterative issue at Shantz's hands, the third stage Banko ware of the Art Gallery of Greater Victoria's collection has been described as "imaginative, bizarre, whimsical, fantastical and charming, but sometimes grotesque."<sup>5</sup> Banko ware has proven everlasting and enduring--but changeless only in its capacity for endless variety.

All of Shantz's 3D thermoplastic prints poetically gesture back to their Banko ceramic origins through her rubbing of light-toned clay slips onto their surfaces, her intention being to bring out surface textures, emphasize forms, and return to these glowing plastic progeny a sense of earthiness and the human hand.<sup>6</sup> The multiple hues of the clay slips serve as well to individualize the iterations. So does the variety of print sizes, which in the case of Shantz's sparrow and sea creature pieces, ranges from full scale to 1/3 to 1/2 to 3/4 of the estimated real dimensions of the original Banko teapots. Shantz simply wanted to see how these scale shifts, which were selected as logical for the technician, would look. In contrast to the rationale behind their dimensions she arranges the *3D Prints (Sparrows)* in life-like little groupings. One can almost hear the pecking, chirping and cooing - except of course that they are mutant "replicants," luminous, silent, and still.

**Mutagenesis** is a process by which the genetic information of an organism is changed in a stable manner, resulting in a mutation. It may occur spontaneously in nature, or as a result of exposure to mutagens. It can also be achieved experimentally using laboratory procedures. In nature mutagenesis can lead to cancer and various heritable diseases, but it is also the driving force of evolution.<sup>7</sup>

Shantz's other sparrow forms, *Slip-cast Teapots (Sparrow)*, are twelve small slip-cast pieces displayed inside a glass case. Poured a dozen times into seven part plaster molds of 3D prints whose surface lines remain evident, these little clay birds and their clustered arrangement are charming--disarmingly so. Although they initially appear identical, a closer look reveals dysfunctional aberrations amongst the little flock: tops unfinished; heads and handles incomplete, gaping open or fused; and lids missing. Mistakes and failures of process produce unanticipated results, cartoonish mutations which Shantz employs to poetically comment on the underlying risks and opportunities of 3D printing. In a further creative entanglement, *3D Fragment Rendering (Frog Crown)*, pearlescent amphibians crawl over each other, emerging from their dark 3D print's support matrix, a crystalline vestige of the 3D printing process retained by Shantz for its beauty and strangeness. She places this crown on glass above a thinner section of the same 3D print, an unredeemable error given to her by the production technician. Its segments replicated, iterations completed and incomplete, a hybrid mass of striving kitsch grotesquerie and jewel-like splendour, *Frog Crown* is fascinating, amusing and awful, a complex metaphor inextricably linked to, embodied by, its medium.

Perhaps less amusing are the enormous *Frog-alone A* sculptures. Made of styrofoam CAD router cut from Shantz's 3D files, the two *AGGV Website 3D print fragments* are machined carvings which Shantz imperfectly covered with a drywall plaster material and sanded. Unfinished and blankly monolithic as they rise from the vestiges of their matrix supports, the frog forms, like the protagonist of *The Fly*, are clearly in the process of becoming monstrously akin to the imaging and machining processes by which they were created. So too is *3D Fragment Rendering (Badger Teapot)*, printed on paper and then hand-coloured in soft, grainy pastel at a scale which dauntingly dwarfs human viewers. The somewhat comical expression of the original Banko teapot badger is preserved through the multiple processes to which Shantz has subjected it, yet now its gaze is a little vacant, its spout/snout perhaps more of a gaping maw than one finds comfortable--and is its coloration, though a warm pale hue, rather... skin-like for an electronically-generated badger? Throughout *creatures in translation* the viewer's uneasiness is gradually awakened, and our sense of the uncanny--the familiar made strange--permeates subtly yet palpably.

Cultural evocations of hybrids, mutants, clones, and replicants abound in modernity's artistic, cinematic, and literary explorations: from Mary Shelley's *Frankenstein* to Margaret Atwood's *The Year of the Flood*; from twentieth-century Surrealist exquisite corpse drawings to Marcel Dzama's, and Kiki Smith and David Altmejd's sculptures and installations; from *The Fly* to *Blade Runner* and *X-Men*. Beyond such potent evocations and beyond out-sourcing the fabrication of their art, many artists now work alongside scientists and researchers to investigate, to critique and pursue the research and application of contemporary scientific technologies. MIT Media Lab's Neri Oxman is an architect and materials designer, who, along with her collaborators, produces nature-based, self-modifying materials with medical, architectural, and engineering applications. These designs, such as *Ba'al Zbûb (the Lord of the Flies)* or *Medusa 1*, are so potent in their technological and artistic rigour that her works have been acquired by MOMA and were exhibited at Centre Pompidou in 2012 in *Imaginary Beings: Mythologies of the Not*

*Yet.* Oxman describes how some of her 3D printed molds are themselves altered by iterations of a cast: "The work is inspired by the Cartesian Wax thesis as elucidated by Descartes in the 1640's... According to Descartes, the essence of the wax is whatever survives the various changes in the wax's physical form. Not unlike the Cartesian Wax, "materials that think" embody processes of formation that have generated their physical form.<sup>8</sup>

Oxman exhibits the results and signifiers of her research's success, in keeping with her inspiration Descartes, for whom the "self-consciously systematic, ethical and linguistic Enlightenment intensified (the) conviction that error was the greatest evil."<sup>9</sup>

Other exhibitions of 3D printing such as *Industrial Revolution 2.0* for example, curated at the Victoria and Albert Museum by New York design maven Murray Moss in 2011 or the *3D Print Show* in London in 2012 also demonstrate that the technology and the artists and designers using it are already capable of creating impeccable works of the most remarkable intricacy and complexity. And in bio-printing researchers are building layers of living cells in a matrix into 3D structures such as functioning vascular systems. As marvellous as these achievements are however, their production is more akin to morphogenesis, in which the developing form of one organism is changed at a cellular level. This is vastly different from alteration at the level of DNA, which means the change is passed on to progeny. It is mutagenesis alone, change created through mutational error and iterative failure, which drives evolution.

The viewer's experience of Oxman's work and that of other 3D printing artists, designers, and researchers differs substantially from the experience of Shantz's *creatures in translation*. The restless energy stimulated by the antimony inherent in the disposition of her works and their embodiment of fragments, iterations, errors, and aberrations provokes a participatory excitement in its viewers. We are engaged in a rich and self-directed educational experience fired by a frisson of cognitive dissonance. Shantz further extends this generous instance of Socratic education through her ongoing collaborations with her own students and upcoming onsite lab opportunities at the various galleries exhibiting *creatures in translation*. In these, Shantz proposes to make a basic tabletop 3D printer such as the MakerBot Replicator available to post-secondary students and the general public to produce works from their own digital files. This emancipatory "DIY" approach distinguishes Shantz's practice from that of most other 3D printing artist-explorers, just as its uncanny resonance distinguishes it incontrovertibly from the experience of increasingly available, commercialized 3D printing services.

Neil Turok, director of the Perimeter Institute for Theoretical Physics in Waterloo, Ontario and a passionate educator, proposes in *The Universe Within* that we are analog beings living in a finite digital information age, moving rapidly towards a quantum future. Quantum information exists in superimposition *and* in parallel *and* in multiple entanglements, with a subtlety, depth, and delicacy far exceeding that of analog or digital information. Turok explains though that "the laws of quantum physics imply it cannot be copied, a result known as the 'no cloning' theorem. Unlike classical computers, quantum computers will not be able to replicate themselves. Without us, or at least some classical

partner, they will not be able to evolve. So it seems that a relationship between ourselves, as analog beings, and quantum computers may be of great mutual benefit and it may represent the next leap forward for evolution and for life."<sup>10</sup>

Susan Shantz's meditations on digital iteration, error and evolution in *creatures in translation* prove prescient. Her interest in the immaterial limitations of digital information and the creative potential of failure in its material manifestation in 3D printing grapple with the most fundamental, complex, and advanced ideas about mutation and evolution. Turok quotes Einstein's reference to quantum entanglement as "spooky action at a distance,"<sup>11</sup> perhaps also an appropriate description of Shantz's mutant musings given her gentle humour, democratic disposition and the subtle waft of the uncanny pervading her experiments, back at the lab.

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<sup>1</sup> Barbara Maria Stafford, *Artful Science: Enlightenment Entertainment and the Eclipse of Visual Education* (Cambridge, Massachusetts: The MIT Press, 1994), p. xxvi.

<sup>2</sup> Ibid. p. xxvii.

<sup>3</sup> Susan Shantz, unpublished manuscript, 2012.

<sup>4</sup> Andrea Wulfe, *An Artist of the Botanical World*, New York Times Sunday Book Review of Molly Peacock's *The Paper Garden*. Accessed March 2, 2013, <http://www.nytimes.com/2011/05/15/books/review/book-review-the-paper-garden-by-molly-peacock.html>.

<sup>5</sup> Barry Till, *Fanciful Images: Japanese Banko Ceramics* (Victoria, Canada: Art Gallery of greater Victoria, 2013), p. 20. A fourth stage of Banko ware has been underway since the mid-twentieth century, with 133 factories currently employing 1,300 artisans, some of whom are acknowledged Japanese master craftsmen.

<sup>6</sup> Susan Shantz, in conversation with the writer, Feb. 22, 2013

<sup>7</sup> <http://en.wikipedia.org/wiki/Mutagenesis> accessed Feb. 22, 2013. See also [http://trshare.triumf.ca/~safety/EHS/rpt/rpt\\_4/node14.html](http://trshare.triumf.ca/~safety/EHS/rpt/rpt_4/node14.html), accessed March 1, 2013.

<sup>8</sup> <http://web.media.mit.edu/~neri/site/projects/cartesianwax/cartesianwax.html>

<sup>9</sup> Barbara Maria Stafford, p. 281

<sup>10</sup> Neil Turok, *The Universe Within: From Quantum to Cosmos* (Toronto, Ontario: House of Anansi Press Inc. 2012), p. 238

<sup>11</sup> Ibid. p. 234