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In the beginning(s) was the digital image.

WHY DIGITAL PRINTS MATTER

It has been established that "computer art" started approximately in 1950 with Ben Laposky's oscilloscope images, which he generated with analog electronics and then recorded onto high-speed film. This event occurred in the wake of the then-recent developments of the first electronic digital computers: a machine built by John Atanasoff and Clifford Berry in 1941 and then the well known Electronic Numerical Integrator and Computer (ENIAC), the first major general-purpose computer, introduced in 1946. Completed in 1951, the Whirlwind Computer was the very first to be equipped with a (vector scope) video display monitor. A "bouncing ball" animation was actually produced to demo this feature.

Taking Laposky's work as a starting point, this art form is about 53 years old. The phenomenal computer-based art movement has now come to be popularly identified as digital art. The current mainstream incarnation called new media is in fact a subset of digital art.

It is important to recall that a lot of key artwork was produced in the formative stages of this movement. That is to say, works created during a timeframe spanning up to 26 years before the Apple II was introduced, 30 years before the first IBM PC, 32 years before the adoption of the TCP/IP protocol for ARPANET, at least 38 years before the development of HTML, 42 years before the first graphical web browser (Mosaic, 1993), and 44 years before the DVD was announced as an industry standard. This is a very long time in computer years.

In the last decade, I have seen a large emphasis on the fact that new media use digital technologies as a platform for interactive engagement with viewers – viewers become participants, in a sense. Perhaps this is the contemporary embodiment of Marcel Duchamp's notion that the viewer completes a work of art. Fair enough. While this is quite exciting and important (that is the creation of tech-laced phenomenological tableaux or something "post-object" and process-based), I would submit that this is not the only contemporary (digital) art that matters.

It is important to note that digital print work, for the most part, is in fact created in a dynamic time-based interactive software-hardware environment. A profound cybernetic interactive engagement does take place toward the completion of a work, but in this case, the artist "straps it on." It's somewhat analogous to the contrast between browser-side and server-side programming in modern web-site architecture. It's a technological intervention with blood-robot wetware and body kinesthetic processes, at some point along the interface or workflow. It is digital. Digital as we mean it today. One hundred years from now, it may mean the same, but it most likely will connote something quite different.

Even if the software of choice is off-the-shelf, it functions to adapt and articulate the general-purpose hardware component of the art-making tool in use (or perhaps the term should be instrument, as in musical instrument), so that the artist can make art with it. To take the musical metaphor further, an off-the-shelf "tool" like the trumpet did not limit the evolutionary expanse of the jazz idiom as can be heard in its development through the work of Louis Armstrong and forward to Miles Davis. Of course, Miles did bring electronics into the equation after a while, but, hey, some artists love technology.

It may be obvious, but let me clarify what digital print work I'm talking about. I'm not including output sourced from digitized traditional media like painting, drawing, or film-based photography in an attempt to reproduce the original.

I am referring to work that utilizes digital-imaging technologies in a way that is intrinsically bonded with its content. This is most easily seen in work that is comprised totally or partially of purely computer-generated (virtual or synthetic) forms. Certainly, algorithmically generated prints fall into this category. Additionally, I include work born of a digital matrix, such that the final look of it is something that could not or would not (in the practical sense) be produced with existing traditional media tools.

Getting back to the first 43 years of digital art, what form did all those early artifacts take in those years? Along with animation and some screen-based imagery, a fair amount of it was hardcopy (digital prints of various types). These were at first photographed off the CRT and then later plotted on to microfilm and then on to paper.

Who were these early digital print artists? Let's take a moment to highlight some of them in rough chronological order. First, there was the aforementioned Ben Laposky. From 1953 to 1956, Herbert Franke also experimented with oscilloscope imagery, and then later, in the very early 1960s, he created monochrome computer graphics. Georg Nees' plotter piece, called "Cubic Disarray" (1968), remains a poetically elegant computer graphic rendering of order and chaos.

Michael Noll's algorithmic simulation of Mondrian's painting called "Composition with Lines" was quite brilliant (1965). At Bell Labs in New Jersey, Leon Harmon and Kenneth Knowlton produced their famous "Studies in Perception" series (1966-67). They invented the scan technology to do it and then created these digital images, which were output in a curious array of typo-pictography that corresponded to the originals' levels of gray. Lillian Schwartz also collaborated with Knowlton at Bell Labs around this time. One of the haunting and expressive portraits they plotted was reproduced in Jasia Reichardt's 1971 book called *The Computer in Art*.

Charles Csuri's "Leonardo Da Vinci" inspired linear interpolations, and a piece called "Sine Curve Man" (1966-69) manifested a fluid and subtle intuition. David Em's work in the late 1970s, using software tools built at the Jet Propulsion Laboratory in Pasadena, has held up incredibly well. Some of these images could be classified as late-20th-century masterworks. Manfred Mohr (working with the computer since the 1960s) and later Roman Verostko (in the 1980s) are key exponents of algorithmic art. Their still images are created by graphics programming. Yoshiyuke Abe (in the 1990s) is a contemporary practitioner in this genre, writing his own code and working in a color palette that is almost extraterrestrial in its electronica hyperbole.

Creating imagery with high-level 3D modeling software are artists like Yoichiro Kawaguchi (starting in the 1980s) and William Latham (early 1990s). They have both produced images of enigmatic, otherworldly biomorphics that show a direct correlation to their riveting animation work. Rebecca Allen's famous flat-shaded heads of the band Kraftwerk are classic images from about 1985-86. Tensegrity sculptor Kenneth Snelson's lesser-known Wavefront 3D images (1988-89), output as digital photographs, comprise a body of work that is multi-valent in content as well as strikingly beautiful. Char Davies' (1989-93) pre-Osmose digital print work, output in various ways including as large-scale photographs, are poignant, resonant, and dare I say it, almost immersive. What all these artists have in common is that they can all be credited for generating some of the most significant still images of all time.

Having said all that, where is this art? Where are all these artifacts? I sure would love to go to my local art museum and see a collection of this work on "permanent" display. And I'd like to see these pioneering artists get recognized in the art marketplace as well. (Too few, so far, have gotten enough play, so to speak.)

I am pleased to report that recent steps toward this goal have been made. For instance, a virtual digital art museum (www.dam.org), features excellent coverage of many of the computer art pioneers. A Chelsea, New York gallery called Bitforms (www.bitforms.com) features digital art exclusively and possesses a curatorial scope that includes digital-print artists such as Barbara Nessim and Manfred Mohr as well as the work of many brilliant young new-media artists. Finally, it would be important to acknowledge the New York Digital Salon and the annual SIGGRAPH Art Gallery for their roles in presenting a balanced sampling of digital art over the years.

In addition to purveying the work of the pioneers and the new-media stars, let's hope that the best in contemporary digital print work is recognized and fostered by the art world and presented to today's audiences and collectors. Credit where credit is due, as they say, all the while embracing the notion that it is more important to be timeless than timely.

Victor Acevedo is an artist, best known for his digital work. He attended Art Center College of Design in Pasadena, and he is now teaching in the department of MFA computer art, School of Visual Arts. In 1984, after seven years of working in traditional media, Acevedo adopted computer graphics as his primary medium. His digital image called "The Lacemaker" was featured in the ACM SIGGRAPH documentary "The Story of Computer Graphics" (1999). He has shown his work in over 80 exhibitions worldwide, and it has been reproduced in many publications, including *Computer Graphics World*, *Leonardo*, and *The Los Angeles Times* (Valley Edition.) His work has also been featured in several books, including, *Digital Creativity* by Bruce Wands and *Cyberarts: Exploring Art & Technology* by Linda Jacobs. An illustrated article written by Acevedo for the book called *Escher's Legacy: A Centennial Celebration*, edited by Doris Schattschneider and Michele Emmer, was published by Springer/Verlag in January 2003.