Vasarely Redux: *Electroplastique* and the structure of digital aesthetics

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It is frequently assumed that as the technical capabilities of digital media expand, so too will immersive and mimetically naturalistic qualities in digital graphics. The 'conventions' of digital imagery have transmuted from the highly pixelated, discrete bitmapped graphics emblematized by Super Mario Brothers and Jodi into a smooth, perspectival illusionism that meets or even exceeds the resolution threshold of the human eye.

This trend towards illusionism has resulted in a tendency to obscure the architectonic properties of digital images, which begin life as one of a few basic shapes - circles, squares, and lines. But as the frenzy for digital naturalism licenses the concealment of the undergirdings of digital figures, a competing form of code-based, generative abstraction has emerged to succeed the proto-computational formalisms of artists such as Victor Vasarely and Sol LeWitt. This paper will take an example of this generative abstraction as its primary case study. Marius Watz's 2005 homage to Victor Vasarely entitled *Electroplastique #1* translates Vasarely's algorithmic visual language into computational generative code. Well in advance of bitmapping technology Vasarely infused his works with a distinct computational 'look' by conceptualizing the image as a field of discrete values arranged within and conditioned upon the structure of the grid. Surprisingly, however, little has been done in the disciplines of art history or media studies to evaluate the extent to which Vasarely's method predicts the possibilities and limitations of encoded computational plasticity.

While both Watz and Vasarely mobilize elemental modular structures in their art, what makes them stand apart from other modernist abstractionists is their subjection of these structures to the activating effects of code and algorithm. The dialogue imaginatively enacted between Vasarely and Watz - the former employing analogue tools to explore the still-gestating notion of digital systems, the latter pushing digital visual language further into the domain of self-generating computational abstraction -

lays bare the conceptual and visual qualities of digital materiality and initiates the question of what we might learn by bringing the underlying structural principles of digital images back to a visible surface.

Known as the father of Op Art, Vasarely developed, over the course of his artistic career (beginning in the 1929 and continuing until his death in 1997), an optical aesthetic deeply influenced by scientific and technological innovations of the 20th century. Trained in early adulthood as a scientist, Vasarely dropped out of medical school in Budapest to pursue a career in fine art and graphic design but continued to investigate the natural and physical sciences as well as cybernetics and technology. His artistic aims were driven in part by his aspiration to understand relativity and quantum mechanics, and through his reading of Einstein, Bohr, Heisenberg, and Wiener he determined that it could be possible to make 'scientific models visually comprehensible' by offering these models 'plastic equivalents' (Morgan 2004: 18). It is my contention that Vasarely, who reportedly never touched a computer in his life, produced images that bear a morphological resemblance to computer art because his creative process set into motion an exploration of the possibilities generated and limitations imposed by the application of procedural logic (what might be known now as the logic of programming) to image-making. Despite the fact that they are not themselves produced with the technological aid of a computer, Vasarely's graphics rehearse presciently the graphical indexes of computation that become common in the 1980's. But these graphics also do more than merely metaphorise computation; Vasarely articulates a theory of plasticity distinct from the 'already known' in its imagination of matter, form, and structure in digital terms. 'As I work, I reduce all the data of my creations to invariables, so that I might retrieve identical values at the moment of re-creation' (Vasarely 1979: 11). For Vasarely, expressing the possible relationships between discrete elements or units unlocks the possibility of seeing through new eyes the structural and architectonic principles that configure world, universe, and even social organization. His obsession with a cybernetics-influenced pancomputationalism manifests in his formulation of a series of notational schemata, including a decimal-based scale of colour-form permutations and several instantiations of a 'plastic alphabet.' This alphabet notates discrete, articulate, and interchangeable elements out of which, often through algorithmic processes, an image or a visual field is constructed.

Conceived as an alphabet of basic elements or building blocks, possessing their own structural limitations that in turn govern the array of possible outcomes for the image,

Vasarely's system, initially titled 'planetary folklore' and ultimately named the *alphabet plastique*, was the product of a career-long goal to compose a formal language of pure, irreducible units of shape and colour upon whose principles would develop a universally legible (because based on a systematic program) and infinitely permutable visual program. His description of the grammatical rules for this visual system resonates with early computers in its evocation of punch-card coding, reproducibility, efficiency, discrete, interchangeable units (a necessary property of notational systems), automation, and expandable-compressible scalability.
In 1959, Vasarely linked art and the applied technical sciences, pointing to the fact that as scientists are building electronic chess-playing 'brains,' artists are also engaging in their own assays with the possibility of a new visuality governed by binary code. 'For quite a long time now, one branch of the plastic arts has been working on plastic language that can be encoded as a binary system' (ibid: 15). What is most notable in Vasarely's vision of a stored-memory archive is his nascent conceptualization of what would be the material, phenomenologically experiential 'body' of electronic processing, paradoxically attained through the explosion of human scale in the vastness of the electronic archive. It is to this end that Vasarely's art is valuable to humanism: in its very exposure of the inhuman qualities of a machine-computable informatic universe.

If the value of artwork has traditionally resided in the excellence of materials, their technical perfection, and artist's mastery of the hand, today it lies in an awareness of the possibility of '*re-creation, multiplication*, and *expansion*' (ibid: 14). A mode of artwork that emerges from these principles already begins to align with the evolutionary algorithms set into motion by the computational generative art I will explore later in this discussion. Vasarely in using these terms is not merely championing mechanical reproduction, but the inauguration of a replicatory, multiple, ever-expanding model of art. 'Only works endowed with great informative strength shall victoriously withstand depreciation caused by mechanical transposition' (ibid: 14). He envisions not a machine that transposes the art of yesterday into a cheap, easily circulated form of today, but rather the machine that at the outset produces multiples, expanding algorithms, and notational systems whose coded machine-language can be exchanged, appropriated, read and rewritten. Originality and uniqueness are no longer to be sealed and safeguarded but made available to diffusion, translation, and mutation. *To cause to make* is to build a machine that will carry out the act of making; to cause to make is to start a process that will continue to change and to build on itself even with the removal from the picture of the artist's

hand. The mark is no longer a conductor of genius but one switch in a living, dynamically changing circuit.

Although it is not strictly computational, Vasarely's experimentation with the basic units of form facilitates understanding of why digital images look the way they do. By exposing the architectonic construction of modular forms, his work reveals the steps of digital construction, and shows how digital graphic output - the characteristics of the image made visible on a screen, on a continuum from mimetic lifelikeness to geometric abstraction - will vary dramatically as the image moves through various levels of processing. Vasarely envisioned his art as a program that, due to its notational characteristics, could be 'computed' by both viewers and future artists who would produce their own works using his alphabet. These new instances of existing works would not be merely reproductions in the sense that they would allow for sometimes minute, sometimes more macroscopic changes to the originary framework or motivating concept behind the piece. In this sense, then, Vasarely builds into his practice at the outset the possibility of appropriation and refiguration that we see realized in *Electroplastique.*

Thus far, my thread of analysis has been about a model of image-production that looks computational without using computers. Now, I want to extend that thread into an examination of a particular branch of contemporary digital picture-making. I want to see how Watz's 2005 appropriation or 'remix' of Vasarely's aesthetic expands upon Vasarely's ideas through the introduction of computational processing and generative code. With Watz' work we are no longer simply seeing computational and programmatic metaphors, but rather the execution of commands via generative code, which leads us to ask: what new information or phenomenal experience is yielded by the appropriation of Vasarely's aesthetic into a computationally coded medium? *ElectroPlastique* #1, a 'temporal composition' built with the programming languages Processing and Java, was created for the electronic arts festival *Territoires électroniques*, held at the *Fondation Vasarely* in Aix-en-Provence in 2005. Over a duration of five minutes, an uncannily organic landscape of abstract moving images blooms and decays across four screens, accompanied by an electronic soundtrack composed by James Welburn. Taking as his inspiration the work of Op-Art progenitor Vasarely, Watz's *Electroplastique* pays tribute to Vasarely's intricate, transformational abstract landscapes whose contours are dictated by a grammatical alphabet of geometrical, modular forms. According to Watz's description of the work, 'in *Electroplastique #1* a regular grid is deformed and then used as the basis of

a series of organic abstract systems that evolve over time (5 minutes). Due to the panoramic format of the 4-screen projection, the impression is much like a landscape. In the end the grid is exploded and disappears, hinting at a non-Cartesian vector space' (Watz 2005).

Electroplastique is not a programmatic application of Vasarely's plastic alphabet, but rather an exploration of the fundamental principles of his visual universe. Just as Vasarely's Op-Art canvases might be said to create a kind of virtual space by destabilizing the viewer's normative spatial orientation, or his/her smooth integration into her surrounding environment, Watz sought to build a fictional digital space with its own physical properties and parameters. But this fictional space would be, for Watz, kinetic instead of static, in order to test how the system would develop within its parameters if given the added dimensions of time and movement. Beginning with the grid, the original form of computational graphic space, Watz's composition progressively distorts that perfect originary order, not destroying it but subjecting it to a slow, ongoing series of permutations from the perfectly flat, ordered grid to a more curvilinear organic form, which represents a different concept of the nature of order. Thus, we have to think about Watz's project not only as a computational transfer of Vasarelian optical schemas into a computational, kinetic form, but as a test case of what experiential dimensions can be added by the dynamic visualization of growth, change, and decay.

Watz creatively and professionally identifies with a group of artist-programmers who utilize the productive constraints of software to produce algorithmically evolving code-based abstractions that they call 'generative art'. Put very simply, a work of generative art comes into being when an artist defines a set of rules that set into motion a process or series of processes resulting in a complete work of art. Generative art is a term that applies to a strategy of image-making rather than to a particular style or genre, and does not necessarily rely on electronic computation for its success[1]. Most often, however, it describes a computer-based trend in software art in which randomness is built into a chain of executable coded commands to introduce unpredictable results into the 'final' work of art. Influenced by the conceptual, algorithmic practices of artists such as Sol LeWitt, Victor Vasarely, the Algorists, Jean TInguely, Jean-Pierre Hébert, Manfred Mohr, and Roman Verostko, generative artists are deeply invested in the questions of 1) how code and

[1] For a more thoroughgoing discussion of the definition of generative art, refer to Philip Galanter's paper "What is Generative Art? Complexity Theory as a Context for Art Theory." (2003).

algorithmic proceduralism can shape the final outcome of artworks and 2) whether code bears a specific materiality that imprints itself on the face of the artwork. In short, Watz and other generative artists take principles of structure and form as their central conceptual and aesthetic material.

Some reservations about the historicization of generative art have led Watz to comment that '[u]ncritical use of the term [generative] risks conflating artists from different periods and assuming that their artistic interests are the same, when in fact the contexts in which they produce their works are very different' (Watz 2006). Nevertheless, Watz in *Electroplastique* creates a necessary and explicit link to Vasarely's earlier formal investigations by performing a series of formal permutations of Vasarely's basic elements of structure, and suggesting ultimately that his optical surfaces contain a latent multidimensionality that reveals itself when the structure is subjected to stretching and compression both spatially and durationally. In other words, while Vasarely's optical constructions can gesture towards spatial play and dynamism, there is also a sense in which their kinetic energy becomes frozen or dormant on the canvas, forcing the viewer's attention to the frozenness of Vasarely's formalism rather than its dynamic potentiality. Rewriting Vasarely's interest in kineticism into the context of generative code, Watz adds actual instead of virtual duration and dynamism to the image. In so doing, he echoes Vasarely's fascination with the optical possibilities in kineticism, which he believed could supply the activating element that would 'engender a humanistic and philosophical concept of the plastic arts' by encouraging a conceptual, technological, aesthetic realm that placed mutation at the centre of thought and experience (Diehl 1972: 44).

Marius Watz's appropriation, alteration, and intensification of Vasarely's 'software', transforms Vasarely's creation of something 'like software' or 'like a program', into the technological phenomenon - a computationally executable, binary machine language - that Vasarely can only imagine and describe. The incorporation of generative change and the replacement of intention with algorithm make this art even less humanistic than Vasarely's but more about the form, movement, and actions of an anti-humanistic, perhaps even vitalist organic force. We are dealing with a paradoxical organicity here, precisely because the works are generated by a computational language and epistemology within an enclosed computational universe. The unfurling of branchlike structures, the growth and decay of forms does not, contrary to discourses surrounding artificial life, need to mimic biological life to evoke poetic associations with biological processes. We might anthropomorphize

computational output, or even invent associations between computational and biological processes that we write into the code, but there is nevertheless a sense of the alien, of synthetic artificiality to the graphic output of computational processes that makes them seem too smooth and our interactions too frictionless.

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