

Cunning Crafts or Poetic Place-Making? Towards a Historiography of Generative Art

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Abstract

This paper begins by considering the meaning and relationship between generativity and art. From there an historical analysis of these terms maps out the philosophical terrain of generative art in practice and theory. It is hypothesized that the degree to which a generativity, or birthing, may be understood as inherent in art understood as a poetic making, is the degree to which the term generative becomes a redundant qualifier of the term art. An argument is then made that art and art-making as a poetic production has an ethical vocation to critique its sources and its media in order to imagine worlds where the marginalized other, as other, is received. As a result, the unqualified adoption of computer, machine, biological or chemical media, as well as the mathematic or pragmatic instructions that define the execution of their works, needs to be questioned.

I conclude with an historiographical examination of the Babylonian *abacus* and the medieval *ars memoritiva*, in particular, Ramon Lull's 1274 *figura universalis*. Even though computing historians have claimed these as proto-computers, a deeper examination of their meaning, use and context reveal a fundamentally mimetic vocation that provides the possibility of poetic place-making, as an ethics, which is otherwise absent in the contemporary microprocessor. The question is therefore raised whether the works presented at "generative art" galleries, websites and conferences such as this may make any claim to poetry, ethics or art *per se* if their use of mathematics and automation remains uncritical.

Paper

If controversies were to arise, there would be no more need of disputation between two philosophers than between two accountants. For it would suffice to take their pencils in their hands, and say to each other: Let us calculate.

—Gottfried von Leibniz, *Dissertio de Arte Combinatoria*, 1666.

What is generative art? That is, what do we mean when we use the word generative, and how does it qualify the word art? The English word *generative* first appeared in the 14th c. but can be traced back to the Proto-Indo-European root, *gen-*. This root word has five key derivatives: 1. *gen-es-*, meaning a birth, a family, a tribe, a race, as in the Latin word *genus*, the Greek *genos*, and the English words generate, general, gene, genocide; 2. *gen-yo-*, meaning an inborn or innate quality associated with the divinities, as in the words genius, genial or engine; 3. *gen-*, meaning born-in-a-place or indigenous; 4. *gen-wo-*, meaning native, genuine; and 5. *gen-men-*, meaning germ, germane as in the Latin word *germen* meaning shoot, bud, or embryo. Together *gen-* and all that may be termed “generative” may be understood as that which germinates, births or reproduces through a mysterious innate quality that begins, necessarily, in a particular place.[1]

That being said, the question immediately arises how generative qualifies the word art. In the current Western context, art may be understood through its Latin relative *ars* where a poetics, a “harmonic reason” guides a skill or craft to achieve an ordering or “fitting-together”. Poetics, here, may be understood through Plato as the making visible or bringing into existence of what is otherwise invisible or non-existing, and through Aristotle as any productive activity having an end or value beyond itself.[2] Plato, here, set *poiesis* outside philosophical *logos* as a form of divine “inspiration” or “enthusiasm” (*entheos*, meaning “full of the god”).[3] Aristotle placed both *poiesis*, understood as artistic production of everything from poetry to architecture, and *praxis*, or ethical action, outside *theoria*, since the former two were both more provisional, tentative and more informed by the trial-and-error, hit-and-miss contexts of lived experience and example. It is worth noting that Plato and Aristotle both refer to Herodotus' earlier use of the term *poiesis* to refer to the making or birthing of Greek culture, as demonstrated by Hesiod and Homer through their making of stories about

the birth, names, characters and actions of the gods.[4] The birthing that is circumscribed by poetry may be said to have an ethical vocation to seek a place to “let-dwell”—as understood by the Greek word *ethos*—thus inviting rather than defining a place for the mystery of another’s “otherness”. [5] Indeed, ethics for Aristotle was the *telos*, the final cause or end, of poetical production: *praxis* requires *poiesis* in order to show itself as ethical action.

The poetics of art seeks an economy of words or symbols to express a surplus of meaning. And the crucible wherein a poem fires, smelts and purifies experience is the metaphor.[6] According to the philosopher Paul Ricoeur, a metaphor, such as “the sky is crying”, brings a verbial motion to the noun *sky* by substituting for absent but available ordinary words, such as, “the sky is overcast and raining”. [7] The movement that a metaphor generates is the oscillation between two qualitatively different things—a vast sky and a sobbing face—that can happen in a single phrase. If ethics may be understood as the permission for an imagined ideal to interact with, if not substitute for, the real, then metaphor mimics that operation. In both ethics and poetry, the ideal and the real can mysteriously coexist, however uncomfortably, in one place.[8] Poetics, in Ricoeur’s understanding, proposes to the imagination “thought experiments” which can link together ethical aspects of what is said. Our “free imaginative play” with the myths, dreams, fictions, metaphors and narratives of our culture enables us to make a habit of the virtues shared by that culture.[9] Mythopoeic imagination allows for the ethical and poetical envisioning of future communities of justice, of “worlds otherwise.” [10]

In sum, once the skill or craft of art is poetically infused, the verbial generativity of the metaphor is already germinating, birthing or reproducing an ethical relationship to the other that can only begin through a “letting-dwell” or place-making. “Generative” as a descriptor of art, therefore, repeats what is already innate in the term art, making “generative art” a redundant term. And yet this conference, dedicated to “generative art” is in its 3rd year, and the artistic works produced have only increased in number since this time. These works are typically automated by the use of a machine or computer, or by using mathematic or pragmatic instructions to define the rules of execution. Computing, in its essence, however, is not about generativity but teleology. Indeed, the word computer is derived from the Latin word *computo*, meaning to reckon, add up or sum up. Its operation is *putare*, meaning to think over, reflect, or consider, as well as to prune, clean, or settle an account. All these words share the Proto-Indo-European stem *peu-* meaning to cut, strike or stamp.[11] Together

we may conclude that computing is an operation, akin to thinking, that ends in a definite sum or striking conclusion. Thus, computing, by nature is teleological: its essence is defined by its ends or results. If generative art is a redundant term, generative computing is an oxymoron: generativity is about birthing and reproduction, computing is about ending and summing up.

Only if we consider the word generative less as an adjective or qualifier and more as an amplifier of the word art, can we begin to make sense of this term in our context. That is, art which is generative emphasizes *the way* it gives birth: its *techne*, technique or technology of procreation. Doing so, however, demands a critical consideration of the issues at stake: in its original Greek meaning, *techne* was considered only one part of *techne-poietike*, the product of divine craftsmanship. *Techne*'s counterpart, *poiesis*, or poetry, and *tyche*, or chance, found their source in *mimesis*: that is, in creative imitation in order to re-enact of the elementary order of the world.[12] *Mimesis* sought to balance the ever-fragile harmony of the cosmos to reveal its mystery through the ritual of dance, music, and the rhythmic process of making itself. Early on in Greek culture, however, *techne-poietike* began to be severed. *Techne* became emancipated from intuitive making, as a practical “cunning” knowledge able to teach something general about objects and tasks, without reference to the things themselves, their placement or place. As emancipated knowledge it carried the awesome and dangerous power of ideas which may cease to refer to things and places.[13] *Techne* carried the possibility of unstoppable destruction. According to Greek mythology, ethical responsibility always remained in the hands of the gods. However, once fire was stolen from them by Prometheus--the archetypal “cunning” craftsman--the ethical burden lay with mortals. The weight of this burden was so great, however, that the fate of Prometheus--to be chained to a cliff where the vultures could tear at his eternally regenerating liver—stands as a reminder to all humans who wish to dispense with the ethical responsibility of poetic action.[14]

In practice, the complete emancipation of *techne* from *poiesis*, however, was a long process in the West. Despite what computer historians claim, the Babylonian abacus of three millennia ago, still in wide use today, was less an early form of the modern computer than a memory-helper. The word *abacus* is the Latin derivative of *abak*, *abhaq* or *abax*, meaning “sand” in Phoenician, Hebrew and Greek respectively.[15] It was into sand, spread on a flat stone, that finger marks could make impressions and order those marks into an understandable or “memorable” pattern. Just as the ancient “digging stick” was a necessary

metaphor for what was produced by its use, so the sand of the abacus was a metaphor for memory itself. Etymologists have traced the English word 'memory' back to a single Proto-Indo-European root *(s)mer-*, whose meaning was cultivated in an intricate pattern of musical and visual imagery.[16] Its grammatical structure offers three striking images: the first of something folding back upon itself meaning "to mourn"; the second relates to the Old High German *smero*, the inner essence, the flow of the body in breath and blood, the *smear* of a healing salve; and the third meaning "to receive a share of something", a *merit*, a portion. Together these images attest to the concrete rather than abstract notion of reflection: the deep waters of time smash against the rocky shores of a crisis, and as the flow folds back over itself, it returns over and over to the smooth jagged edges, calming the crisis with the meditative balm of its rhythm over a sandy shore.[17] The undifferentiated sands of the abacus are the flow out of which memory is marked. After quick fingers (digits) have marked out their series of events and calculated their conclusions, the sands would be smoothed out again and calmed. All subsequent calculations, like all previous ones, disappear into the same sands. The abacus seems to respect a fundamentally cyclical cosmology where its calculations represent a "linear hiccup" in the general swirl and flow of events. In modernity, however, the terms become reversed: the "irrational" flow of life is a stick in the spokes of linear time of efficiency and production.

Consider another early "computer", according to historians, Ramon Lull's *figura universalis* of 1274. As published in his *Ars magna*, Lull invented the idea of a set of up to fourteen concentric discs, each revolving within the next.[18] The edges of the discs were imprinted with letters and symbols, which, when aligned, would combine together to produce ideas able to be quickly cross-referenced.[19] But before we rush to call this a computer, let's consider the context of its production. Lull's *figura universalis* was depicted by Lull for memorization: it was to exist in the imagination only. As such, it stands within a long tradition of "memory palaces" created by poets and orators for the rapid memorization, retention and retrieval of enormous amounts of data. By the time of Lull, the *ars memoritiva* was, according to Mary Carruthers, considered the principle and aim of medieval education, such that without it any development of character, ethics if not sainthood would be impossible.[20] According to the 12th century historian of pedagogy, Hugh of St. Victor, a sensual, intense and contextualized concentration was the cornerstone of memory work.[21] A pupil's first lesson, for example, was how to remember a verse from the Psalms in its unique visual context: its exact position on the page, the colour of its initial, the lines above,

below and beside it. But one did not stop there; the context extended to the specific day, hour, classroom, weather or anything that could jog the mind of the unique occasion when it was first committed to memory.[22] Together with singing the verse silently, and smelling and tasting the imagery it evoked, each verse was to be received in an interior sensual synthesis.[23] Within Hugh's genealogy of time the students continually had to find their unique place: a psalm's praises and laments became their own, its characters sitting next to them, and its setting, their monastery.[24]

But in order to progress from the maxims or Psalms to memorizing the Bible proper, the pupil, according to Hugh, would need to learn more advanced mnemonic skills. This involved the practice of dividing a text into manageable pieces--usually about seven words or bits of information--and keying these chunks according to a series such as the Latin or Greek alphabet, numbers, animals of the bestiary, the zodiac, a calendar or a combination of these.[25] The pupil is advised to leave plenty of space in this memory lexicon for digression or addition and to imagine the area evenly lit so that every item can be clearly seen. Once the sections are addressed and filed, the student is able to both cross-reference the information and re-combine the text in order to meditate on a theme or fashion a composition.

Lull's *figura universalis* is a typical example of Hugh's "memory palace": as circles turn within circles, it was a Kabalistic metaphor for the union of all symbols, letters, languages and faiths into one God. Even though Lull was convinced that his *Ars magna* would be a helpful missionary device for convincing Jews and Moslems of the unity of all faiths, it was primarily a vehicle for contemplation and ethics. From Homer to Ramon Lull, the medieval *ars memortiva* was primarily generative: it gave birth to the oscillation and flow of metaphors where the "coincidence of opposites" was not a problem to be solved but to be continually returned to. Its teleology may be ethics, but the mystery of a thing, its placement and the place where ethics is ultimately acted out, is never sacrificed, but folded into the equation.

From the Babylonian abacus and Lull's *figura universalis* to Charles Babbage's steam-powered *Difference Engine* of 1822 or the microprocessor of the late twentieth century, an historical, critical and poetic context of these media demand interpretation. To the degree that a careful examination of the presuppositions of computing and the *wunderwerk* of memory, place and metaphor is embraced, could one begin to consider the work presented

here as art—be it generative or not—less as “cunning” craftsmanship than the “harmonious reason” of poetry grounded in ethics.

References

[1]*The American Heritage Dictionary of the English Language*, Fourth Edition, 2000.
<http://www.bartleby.org/61/>.

[2]Plato, *Symposium*, 205e; Aristotle, *Nicomachean Ethics*, Book VI; *Politics*, 1254a, 13261.

[3]Plato, *Ion*, 533e; *Meno*, 99d; *Phaedrus* 245a.

[4]Herodotus, Book II, 53.

[5]Martin Heidegger, "Building, Dwelling, Thinking," in *Poetry, Language, Thought*, trans. A. Hofstadter (New York: Harper and Row, 1971), 145-61. On the other of otherness see Luce Irigaray, *An Ethics of Sexual Difference*, trans. Carolyn Burke and Gillian Gill (New York: Cornell University Press, 1993).

[6]Metaphor, argues Paul Ricoeur, is at the basis of poetics: the poem in miniature. *The Rule of Metaphor: Multidisciplinary Studies of the Creation and Meaning of Language*, trans. Robert Czerny (Toronto: University Press, 1977), 222.

[7]Ricoeur, *Rule of Metaphor*, 16-20. His definition springs from metaphor as defined by Aristotle in his *Poetics* 1457 b 6-9.

[8]Ricoeur, *Rule of Metaphor*, 22.

[9]See, for instance, Paul Ricoeur, *The Symbolism of Evil*, 3-24.

[10]Paul Ricoeur, *Lectures on Ideology and Utopia* ed. G. Taylor (New York: Columbia University Press, 1986), xxvii-xxxv and lecture 1. According to Ricoeur, the inherent totalizing or fundamentalizing danger in the reception of any cultural narrative needs to be kept in check through a certain critical distanciation which entails, in effect, an interpretive dialectic between belonging to and distancing from the given cultural myths. On

distanciation, see Paul Ricoeur, "Science and Ideology" (1974), in *Hermeneutics and the Human Sciences*, ed. and trans. John B. Thompson (Cambridge: Cambridge University Press, 1981), 222-46; and idem, "Myth is the Bearer of Possible Worlds: An Interview," in Richard Kearney, *Dialogues with Contemporary Thinkers: The Phenomenological Heritage* (Manchester: Manchester University Press, 1984), 36-45.

[11]*The American Heritage Dictionary of the English Language*, Fourth Edition, 2000. <http://www.bartleby.org/61/>.

[12]See Dalibor Vesely, "The Question of Technology" in Alberto Pérez-Gómez and Louise Pelletier, eds., *Architecture, Ethics and Technology* (Montreal: McGill-Queen's University Press, 1994).

[13]See Edward S. Casey, *The Fate of Place: A Philosophical History* (Berkeley: University of California Press, 1997).

[14]Aeschylus, *Prometheus Bound*, 250-56.

[15]*The American Heritage Dictionary of the English Language*, Fourth Edition, 2000. <http://www.bartleby.org/61/>.

[16]*ibid.*

[17]In its most reduced form, the root of memory is *mr*. Its letter m, *m*, means "water", as its written form suggests, and forms the bulk of our "watery" words such as moist, mellifluous, mist, immerse, marine, marsh, menstrual, emanate. This sound is related to *m~*, meaning "good" "mother" and "damp" in a seamless whole. The letter r, *r'sh*, means "head" and relates to the roots *er-*, *ar-* and *or-*. *Er-* means "to set in motion" and is at the root of the Latin *oriri*, to be born or "origin"; whereas *ar-* means "to fit together", the Latin *ordo*, the weave, the threads on a loom, *harmony*, *art* and *architecture*; finally *or-* means to speak or pray as in the Latin *orare*. Taken together, *mr* could simply be translated as "head-waters"--evoking the primordial rhythms of music and dance, composing and re-composing, giving birth to poetry, prayer and healing. See Carrin Dunne, "The Roots of Memory", Spring (1988): 113-15; Edward Casey, *Remembering: A Phenomenological Study* (Bloomingtondale:

Indiana University Press, 1987), 273-75. Compare memory as mourning with Heidegger's thinking as thanking in *What is Called Thinking?* (New York, 1968), 138-43.

[18]Paolo Rossi, *Clavis Universalis: Arti mnemoniche e logica combinatoria a Lullo a Leibniz* (Milan: Riccardi, 1960).

[19]After Lull's research, the history of computing typically jumps to 1617 with John Napier's "bones"—a set of vertical rectangular rods able to carry out logarithms like a slide rule; to 1623 with Wilhelm Schickard's six-digit "calculating clock", to 1644 with Blaise Pascal's gear-driven eight-digit "Pascaline", to 1668 with Sir Samuel Morland's non-decimal adding machine; to 1674 with Gottfried Wilhelm von Leibniz's crank-operated 12-digit "Stepped Reckoner"; then to 1820 where Charles Xavier Thomas de Colmar produced a popular machine, the "arithometer", that could add, subtract, multiply and divide, and finally to the invention of the steam-powered "Difference Engine" of 1822 by Charles Babbage, where the automated random-access memory of the modern computer began.

[20]Mary Carruthers, *The Book of Memory: A Study of Memory in Medieval Culture* (Cambridge: Cambridge University Press, 1990), 14. See also Frances A. Yates, *The Art of Memory* (Chicago: Chicago University Press, 1966).

[21]Hugh of St. Victor, *Didascalicon* 3.11; and *De tribus maximis circumstantiis gestorum*, 490, lines 39-41.

[22]Carruthers, 94.

[23]Scribes typically mumbled as they wrote just as the medieval reader had to speak each word out loud in order to release its meaning: the scriptorium was the noisiest chamber in the monastery. Clanchy, *Memory to Written Record*, 89-115.

[24]"Hugo of St. Victor: *De tribus maximis circumstantiis gestorum*," trans. W. M. Green, *Speculum* 18 (1943): 484-93, esp. 491, lines 3ff; and Zinn, "Art of Memory," 227. See also Beryl Smalley, *The Study of the Bible in the Middle Ages*, 2nd ed. (Oxford, 1952), ch. 3 and M.-D. Chenu, *Nature, Man and Society in the Twelfth Century*, trans. J. Taylor and L.K. Little (Chicago, 1968), 99-145.

[25]Hugh of St. Victor, *Didascalicon*, trans. Jerome Taylor (New York: Columbia University Press, 1961), III. II, p. 93; Zinn, "Art of Memory," 221; Carruthers, 83-85.