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"Digital Poetry: A Look at Generative, Visual, and Interconnected Possibilities in its First Four Decades"

By Christopher Funkhouser

Digital poetry is a new genre of literary, visual, and sonic art launched by poets who experimented with computers in the late 1950s. Digital poetry is not a singular "form" but rather a conglomeration of forms that now constitutes a genre even though the creative activity itself — in terms of its media, methods, and expressive intent — contains heterogeneous components. Digital poetry is an evolving process, employing various techniques that began to form well before the advent of the personal computer and continues to refine itself in today's World Wide Web (WWW) environment. Poets explore a variety of computerized techniques, from interactive installations to randomized and visual attributes. Interestingly, despite the technological advancement and popularization of computers, most approaches to the production of digital poetry realized in the wake of the WWW's emergence were at least roughly cultivated before the advent of the global network. This chapter seeks to reveal the development, range, and construction of digital poetry, as well as what constitutes the genre.

Labels such as "e-poetry," "cyberpoetry," and "computer poetry" have been used to describe creative work in this area. The titles of two important books on the subject, Loss Pequeno Glazier's *Digital Poetics: The Making of E-Poetries* (2002) and Brian Kim Stefans's *Fashionable Noise: On Digital Poetics* (2003), contain the phrase "digital poetics." Both of these collections discuss and question the various labels, and neither book argues for a singular nomenclature. The strongest definition of the genre is found in the introduction to the volume *p0es1s: Aesthetics of Digital Poetry*, which proclaims that digital poetry: "applies to artistic projects that deal with the medial changes in language and language-based communication in computers and digital networks. Digital poetry thus refers to creative, experimental, playful and also critical language art involving programming, multimedia, animation, interactivity, and net communication" (Block et al. 2004: 13). The authors of this essay (Friedrich Block, Christiane Heibach, and Karin Wenz) identify the form as being derived from "installations of interactive media art," "computer- and net-based art," and "explicitly from literary traditions (2004: 15–17). At least one other essay, Janez Strehovec's "Text as loop: on visual and kinetic textuality" (2003), affirms that digital poetry is "a new genre all its own" that incorporates "kinetic/animated poetry, code poetry, interactive poetry, digital sound poetry, digital 'textscapes' with poetry features, and poetry generators" (Text n.pag.). As a genre, digital poetry "intersects the literary avant-garde, visual and concrete poetry, text-based installations, net art, software art, and netspeak" (n.pag.).¹ Digital poetry is a genre that fuses crafted language with new media technology and techniques enabled by such equipment, and is a reasonable label to use in describing forms of literary work that are presented on screens with the assistance of computers and/or computer programming. A poem is a digital poem if computer programming or processes (software, etc.) are distinctively used in the composition, generation, or presentation of the text (or combinations of texts).

Computer programs that write sonnets, haiku, or other forms, like Margaret Masterman and Robin McKinnon Wood's "Computerized Japanese haiku" (1968), E. M. de Melo e Castro's videopoem, *Roda Lume* (1968), Jim Andrews's interactive sound poem "Nio" (2001), and Deena Larsen's hypertext *Marble Springs*, despite their stylistic differences, all qualify as digital poetry. Digital poetry is a term that represents a spectrum of

computerized literary art that can be appreciated in the context of the poetic tradition. Through broad identification and cataloguing, multiple types of computerized production can be analyzed as one generality that includes hypermedia, hypertext, computer-generation, and other digital manifestations of poetic text. All forms of digital poetry comprise a singular genre that contains multiple subcategories, just as the genre of "poetry" contains many different styles (i.e., free verse, the sonnet, haiku, and so on). Some of these canonical forms have informed formulations of digital poetry, while other works are poetic mutations that disregard convention. The diverse spectrum of digital poems nonetheless presents a challenge in terms of seeing the form or genre as a unified proposition. For instance, in discussing the same general sort of works in a recent entry in *The Facts on File Companion to 20th-Century American Poetry*, Catherine Daly intelligently uses the label cyberpoetry ("concerned with the machine control of the writing process, delivery of poetry in more than one medium, and machine-mediated interactivity between audience and reader or writer and text") to discuss the various formulations of digital poetry (2005: 114). Daly's view sees the genre as divided into three parts: "procedural," "multimedia," and "hypertext and cybertext" poetry (she distinguishes "cybertext poetry" as a form that "involves readers' queries, assumptions, and actions, which change readers' perceptions of the cybertext during the interaction") (2005: 116). Obviously many labels are plausible, each of which acknowledges that digital poetry is a practice — a presentation of expression — that is open enough to include many fringe forms and methods in producing writing and art, as long as they are mechanically enabled by digital hardware and software.

Digital poems, while built on similar principles, are always being technically, culturally, and imaginatively redefined. Various forms of poems — related by technological agency — both represent (i.e., simulate) classical literature (in programs that implement classical forms, or by assembling CD-ROM anthologies of classical poetry) and, more profoundly, embrace new methods of communicating verbal information.

Introductory Overview of Forms

Computer poems

Poets initially used computer programs to synthesize a database and a series of instructions to establish a work's content and shape. Labeled by its authors as "Computer Poetry" and "computer-poems" (among other terms), these works are generated by computer algorithm, arranged as a sequence of words, or signs and symbols according to a programming code. All works of text-generation, or archetypal computer poetry, can be seen as performing some type of permutation in that they transform or reorder one set of base texts or language (i.e., word lists, syllables, or pre-existing texts) into another form. The permutation procedures of algorithmically generated poems can be devised into three classifications. Works are either permutational (recombining elements into new words or variations), combinatoric (using limited, pre-set word lists in controlled or random combinations), or slotted into syntactic templates (also combinatoric but within grammatical frames to create an image of "sense").

The creative spirit and impetus to combine randomness with order through intricate, technical art alters the human relationship with language. Cyborgian poetry, works co-created by humans and digital machinery, emerged from these experiments. Works produced by artists such as Pedro Barbosa, Charles O. Hartman, Jean-Pierre Balpe, and others prove that language can be digitally processed into sequences to create a type of synthetic poetry. Such work has roots in Max Bense's theory on artificial poetry, but from its earliest manifestations in Theo Lutz's "Stochastic Poems" computer poetry has been a predominantly disconnected movement, without central figures or theories. An argument could be made that digital technology available at the time better suited "operational" poets, whose work was computational in character (and, later, poets whose work would

be graphical or nonlinear). For instance, Jackson Mac Low and John Cage perpetually used the computer because the device facilitated the type of work they had been doing for many years. Someone who wants the computer to write a Petrarchan sonnet, for example, and expects it to write it as well as Petrarch, is asking the machine to perform the wrong type of task.

From a general point of view, the majority of combinatoric and permutation works produced feature variations, extensions, or technological implementations of Dadaist technique. Many aleatoric poems contain few parameters and, at the very least, share sensibilities common to open-form poetry. Somewhat ironically, however, the poems are not pure-chance occurrences — they are preconfigured to be randomized, and some examples contain fixed attributes, as in slotted works, where the author strives to imbue rigid syntax or comply with established parameters. Digital poetry made with text-generating programs gradually developed into a multifaceted form of its own, exploring many styles of literary expression.

Typically, text generators rapidly produce many poems, using a programmatic formula that selects words from a database to create output. Computers cannot be programmed to engineer a "perfect" poem; some poets use the computer to alter or subvert typical forms of expression; others seek to be imitative. In either mode, selecting appropriate input text is the most important element in the process of pronouncing meaningful expression. Whoever establishes the database co-authors the poem, as does the writer of the program; the user of the program also has authorial prerogatives in selecting from and editing output. The program *TRAVESTY*, written by Hugh Kenner and Joseph O'Rourke, in particular highlights human input through the imperative role of the source or database on the computer-generated poem; as Stefans observes, "Without 'human' intervention nothing can get into a CP [computer poem] that is not in the database or acceptable to the program" (2003: 65). Computer poems challenge and invite the reader to participate imaginatively in the construction of the text; some mock the conventions of poetry, and others reify them.

Graphical poems

By the mid-1960s graphical and kinetic components emerged, rendering shaped language as poems on screens and as printouts. Since then, videographic and other types of kinetic poems have been produced using digital tools and techniques. This advancement — foregrounding the visual aspects of language at least as much as the verbal — marks several changes in the development of digital poetry. In contrast to works discussed above, these visual and kinetic works largely employ mutation as opposed to permutation. As with text-generation, these works use mechanized language expansively, although most de-emphasize randomized output. Static and kinetic visual works introduced a poetry of sight, overtly conscious of its look, sited on and incited by computers; standard typefaces became a thing of the past. Digital poets began to work with prosody that was literally in motion.

Early graphical works by [Marc Adrian \(1968\)](#) and Carl Fernbach-Flarsheim (1970–1) were, like text-generated poems, automatically spawned by viewers confronting a program in an installation setting. With the development of graphics software, subsequent works embodied visual methods that approximated concrete and visual poems rendered and fixed on the page that are not interactive. The computer became a convenient tool to manipulate the appearance and presentation of text. Some titles closely follow earlier manifestations of visual poetry; others (like the video-graphic and hypermedia productions) venture further afield and do not aim simply to reconfigure the style of poems that are read and understood exclusively through alphabetic language. By the 1980s poets increasingly presented moving language on screens as a result of the development of PCs. These efforts foreshadow many later experiments in poetry that proliferated in animated, hypermedia formats. Kinetic poems long pre-dated a style of digital poetic practice that erupted with the emergence of the WWW, typified by works such as Stefans's *the dreamlife of letters* as well as those found archived on Komninos

Zervos' *Cyberpoetry* site, and elsewhere.² Groundwork for today's animated digital poems (e.g., those made with Macromedia Flash) was in fact under way by the mid-1970s, in coded works such as Arthur Layzer's "textured animated poetry" (written in FORTRAN) that featured words "streaking" down the page ([McCauley 1974](#): 118).

With the advent of publishing projects such as Xexoxial Endarchy and dbqp (founded by visual poet Geof Huth) in the 1980s, digital processes became ostensibly implemented in static visual poems. The influence of poststructural critical theories, such as deconstruction, spurred poets to challenge their imaginations, and invent new appearances for poetry. While some artists, like André Vallias, eschewed the use of words on the surface of their works, most did not reject language but worshipped it more deeply, a spirit divulged boldly on the dbqp WWW site: "Once the religion of the sacred word became obsolete, the word itself became the object of our reverence" (Incunabula). Bob Grumman's entry on Visual Poetry in *A Companion to 20th-Century American Poetry* reports that numerous visual poets were using digital methods in the 1990s, each of whom steadily published in alternative little magazines, including K. S. Ernst, Crag Hill, Huth, Jonathan Brannen, Mike Basinski, Stephen-Paul Martin, Jake Berry, mIEKAL aND, Grumman, John Byrum, and John M. Bennett.

Digitally rendered poems portray at least three different traits: words are arranged into literal shapes; words show patterns that represent dispersal or displacement of language; or words are combined with images (as in a collage). Viewer-activated (static) poems place words either randomly or through pre-plotted designs that do not move on the screen (or require interactive manipulation but do not move on their own accord). In kinetic works optical mutation of words and letters is the operative principle; poems, by design, move and change before the viewer's eyes. Poems that inscribe kinetic language can be divided into two general categories: projected and interactive. Projected works set poetry in motion in two distinct ways. Words are plotted into motion (or letters themselves change shape or morph) or are presented as part of kinetic collages in which elements of language are combined with visual objects or symbols in single or multiple visual scenes/scenarios. In the few interactive works that are kinetic and do not involve overt hypertextual operations, viewers are invited to set some of the poem's parameters (used in the activation or appearance of words) or interact with a virtual object that is fixed in position on the screen (and may or may not inscribe words).

In kinetic works poets find dozens of ways to portray poetic text as shifting, vibrant verse. Palimpsest is used powerfully; images can be a mélange of fragments of words complemented or replaced by imagistic forms. These poems show that many different expressive elements can be plotted at once, or in a short period of time, layered on top of one another. Putting phrases in motion as sliding, spinning objects, and otherwise synthesizing words, lines, and symbols are the techniques established as typical of all visual works. The inclination to display poetic work in such ways developed alongside the technology capable of accomplishing the task, which has only increased with the technical developments in the WWW era. Experiments by those who made activated or interactive works represent an important and fascinating step in the production of poetry. Using computers to make visually charged language and programming it to move were novel applications of technology that foreshadowed contemporary visual works. Digital poetry's emphasis on cultivating active language added overtly kinetic language to its canon of generated and graphical texts.

In the visually oriented works of digital poetry, technology intended for the creation of graphical artwork is used to process language instead of images or language as images. For many years writers and artists have used computers, software, and fonts to do more than make shapes on the page. Graphical poems as such are not new to literature, though the tools for producing them alter, accelerate, amplify, and, ultimately, animate the process. Contributing to a trend that fosters changes in the act of reading, an increase of poetry containing graphical elements has intensified in recent years because both the software and publishing medium of the WWW enables (if not encourages) the incorporation of visual elements.

Hypertext and hypermedia

In the 1980s, hypertext (nonlinear texts that are intrinsically, mechanically interconnected) developed in sync with the increasing availability of the personal computer. Theorist Michael Joyce classifies presentational modes used by authors into two distinct categories: "constructive" and "exploratory" (Joyce 1995: 41). These models are useful towards establishing the broadest codification of hypertextual poetry. Within these parameters, nearly all works are explorative, and various forms emerge within this vein of production which pertain to the media inscribed and methods of navigation. As defined by Joyce, exploratory hypertexts allow their audience to guide themselves through a text as interest, engagement, and curiosity dictate, and reflect the author's sense of structure. This mode, according to Joyce, ideally allows the audience the ability "to create, change, and recover particular encounters with the body of knowledge, maintaining these encounters as versions of the material, i.e. trails, paths, webs, notebooks, etc." (1995: 41). A reader explores a body of work that has been set before them on the computer. Constructive hypertexts, on the other hand, are steadily built by their audience, as part of a process of transforming the knowledge previously presented; Joyce has described dynamics of such texts as "versions of what they are becoming, a structure for what does not yet exist" and "serial thought" (1995: 179, 189).

Programmers developed tools that facilitated such nonlinear writing, enabling authors to create links within and between texts while simultaneously incorporating visual, kinetic, sonic, and static verbal texts. In these works a number of different files (comprised of various media) are programmed into arrangement with each other, presenting poems in segments through a series of links (which can be simple and obvious or complex and veiled), or may be otherwise conceived, as Jay David Bolter observes in *Writing Space: Computers, Hypertext, and the Remediation of Print*, as "visual objects with which the reader interacts" (2001: 156). Once hyper-works were developed, all the principle possibilities of contemporary digital poetry were available — the genre has proliferated in the past twenty years by synthesizing and cultivating each of its modes. We can identify distinct characteristics in every digital poem, but the accumulation of styles confounds any single critical definition of artistic works that merge poetry with digital technology.

Essentially four types of hypertext works were designed: (1) those which feature only text presented as a series of nodes which are directly interlinked (sometimes with some sort of "map" that can be used as guidance); (2) those that feature significant graphical and kinetic components (i.e., hypermedia), also based on the 1:1 link—node premise; (3) those that present a virtual object that the user negotiates (without having to constantly "click" on links to traverse that text); and (4) those that are formed through methods of aleatoric progression. Authors who have made profound works of poetry using hypertext and hypermedia prior to the WWW include: mIEKAL aND, Jean-Marie Dutey, Robert Kendall, Jim Rosenberg, John Cayley, Glazier, and Deena Larsen. Christy Sheffield Sanford, Diana Slattery, Glazier, Aya Karpinska, Stephanie Strickland, Maria Mencia, and many other poets have created potent hyper-works for the WWW. Typically, hypertext and hypermedia poems prior to the WWW contained interlinked text and sometimes image files. They are "interactive" in that they require choices to be made by the viewer.

Digital poetry on the WWW is brought together in HTML (hypertext markup language), a comparatively uncomplicated process of coding which allows a synthesis of graphical elements (in color), animation, sound elements, and other coded features, with any "written" text. HTML (and other coding schemes like JavaScript), beyond connecting disparate forms of text by using graphical communication, has had minimal impact on the development of digital poetry, although it has unquestionably increased its readership. Aesthetically, even WWW digital poetry presentations that use "random," "animation," and "looping" procedures are usually self-confined, mainly linear segments that appear as individual works of art. Though they theoretically exist within a much larger domain of potential images, the teleologies and terminal points at which a reader may go no farther are numerous; these digital poems can theoretically branch in infinite directions but they engineer themselves into a corner, forcing readers to begin again.

Internet publications, network writing initiatives, digital projects conducted in physical space (including holographically presented poems), and audio poetry have been produced since the 1980s. In these manifestations of digital poetry, the expressive issues do not include whether or not the computer can write poetry, or graphically enhance it, but how various types of machinery have been used to accentuate and modify poetic process and range. The collaborative composition of online texts, as practiced by groups, in MOOs and elsewhere, extends previous forms of written collaboration into a virtual environment. Atypical modes of design and delivery are characteristics of quickly and widely delivered publications. In the network era, computers are no less a creative tool, and are now being used as a mechanism to circulate contemporary and historical productions. Digital sound tools and processes alter the way voices are constructed, heard, and combined. In so many ways, computer technology has been used in conjunction with poetry, as writers invent new practices, and reinvent old ones with digital media.

Contemporary Perspective

Mechanically it is true that a contemporary poet has novel technology at her or his disposal, but critically speaking, many poems available on the WWW cannot be classified as "new" because the digital techniques used to present them were cultivated in the decades prior to the WWW. Furthermore, investigations such as Glazier's *Digital Poetics* prove digital poets have largely conceived these works with the same poetic and theoretical practices used by artists who worked with nothing more than paper and ink. The high-tech composition and presentation of poetry, using the latest available means, has, of course, reflected a sense that something innovative was under way, and many artists working in the pre-WWW period can rightfully claim that they were doing something mechanically original. This is obviously true in terms of surface aesthetics — particularly the development of kinetic works — but nothing particularly new has emerged since the initiation of the WWW. Contemporary digital poetry essentially refines earlier types of production and disseminates works to a wider audience via the network.

The versatile, massive, global network unquestionably ignited a proliferation of digital poetry, boosting the confidence of artists who had previously been wary of the instability of technologically based writing. Growth of the WWW undoubtedly benefits and increases the visibility of digital poetry, so the form has grown and works have been refined. Nonetheless, earlier endeavors reveal the basic elements, procedures, and historical approaches to the composition of digital poetry. The genre has clear and persistent boundaries, despite advancements in hardware, networks, and software. Despite the transitory, ever-evolving technologies and elements, the principles and features of digital poetry — text generation, flexible and collaborative language, use of sonic and visual attributes, interactivity and intertextual linking — have only been altered slightly if at all in texts that have been produced since the dawning of the WWW. The coming years will indicate whether a more televisual poetry, such as we begin to see in the highly animated, visceral Shockwave or Macromedia "Flash" poems and WWW works in general, will dominate artistic literacy or the culture at large. Digital poetry is still forming and gradually progressing, though it largely continues to embrace the characteristics, and sometimes the limitations, of its forebears. Computer science and creative expression have integrated well with one another; progress in all aspects of computing has led to complicated verbal and vibrant multimedia works that are far richer and more spectacular than the texts originally produced in ASCII text. Language is presented in alternative creative forms (sometimes generated, sometimes fixed), enhancing the visual qualities of texts. Viewers are presented with a stimulating and challenging textual scenario; these are the successes of digital poems since the beginning. In the 1970s, very rudimentary kinetic poems by Arthur Layzer streaked down a computer terminal; in the 1980s, the same approach was developed and technically refined by Melo e Castro in his *Infopoems* and by hypermedia works created and published by Philippe Bootz and in the French hypermedia journal *Alire*. A few years later, the multimedia program Macromedia Flash brought these effects to the WWW, as

in "The Dreamlife of Letters." New technologies led to refined kinetic poems.

In a Literary Context

In his preface to the anthology *Computer Poems* (1973), Richard Bailey identifies four poetic tendencies that influenced the works included in the collection: "concrete poetry," "poetry of sound in verbal orchestrations," "imagistic poetry in the juxtaposition of the unfamiliar," and "haiku" (n.pag.).³ The poems in the anthology reasonably support his (somewhat) dated viewpoint, but there is a correspondence between poetry and digital poetry. Of course, beyond digital poetry's relationship to literary works and theories, it would be remiss to omit to mention that early works were also influenced by trends and possibilities in mathematics (stochastic operations and other types of equations), computer science (hypertext theory), and other fields. Further, digital poems share so much with other forms of multimedia art that it can be difficult to make distinctions between works that employ sound, imagery, language, and animation.

Digital poetry is pluralistic in the creative (poetic and poetics) influences it embraces, the media it employs, and genres it fuses. Many poems embody expressive potentials realized on the page by previous generations of poets, and it is not difficult to find stylistic elements associated with previous epochs of literary history in many digital works. Digital poetry's stylistic foundation is first established by pre-Modernist literary beacons. French Symbolist writing, particularly Stéphane Mallarmé's late-nineteenth-century poem, "A Throw of the Dice Never Will Abolish Chance" (1897), is unquestionably an artistic predecessor that directly impresses upon the disruption of textual space and syntax found in digital poetry. The variations in typography, incorporation of blank space, and the liberal scattering of lines often found in digital poems can be discerned as having roots in Mallarmé's work (which also strongly influenced the development of Concrete Poetry in the 1950s). Such patterning has been extended by the addition of interactive and kinetic components. Mallarmé's importance was previously acknowledged (albeit briefly) from a different perspective in Bailey's preface to *Computer Poems*, which largely featured randomized poetry created by computer programs:

Mallarmé published a slogan for modernism: A throw of the dice will never abolish chance. Chance is not abolished by the computer's randomizing power but is re-created in different terms. The poet-programmer finds this power a tool to create a new set of dice, multi-faceted and marked with elements of his own choosing. (n.pag.)

Here Bailey privileges the power of Mallarmé's thematic content, although I would assert that the aesthetic properties of "A Throw of the Dice," particularly its visual attributes and the fact that it requires readers to make decisions about how to read the poem, are equally important, if not more so.

The programmed permutation works that emerged near the outset of digital poetry have even earlier predecessors in combinatory works that date back as far as ad 330. In the essay "Combinatory Poetry and Literature in the Internet," Cramer defines combinatory poetry as "literature that openly exposes and addresses its combinatorics by changing and permuting its text according to fixed rules, like in anagrams, proteus poems and cut-ups" (n. pag.). Samples and reinventions of writings by Optatianus Porphyrius (Carmen XXV, fourth century ad), Julius Caesar Scaliger (*Poetices*, 1561), Georg Philipp Harsdörffer ("Fivefold Thought Ring of the German Language," seventeenth century), and other works are capably presented on the Permutations site, illustrating how the mechanics of contemporary (and prehistoric) digital poems have roots in works produced several centuries ago.

The first works of digital poetry, text-generating programs written in BASIC, TRAC [Text Reckoning and Compiling] Language, APL [A Programming Language], FORTRAN, and other now-ancient programming languages, predominantly reflect the Modernist

propensity to synthesize disparate voices and cultural details. Pound's *The Cantos* and T. S. Eliot's *The Waste Land* achieve this effect, as Bolter observed in *Writing Space: The Computer, Hypertext, and the History of Writing*, by replacing poetry's narrative element with "fragmented anecdotes or mythical paradigms" (131). The early "Tape Mark" (digital) poems by [Nanni Balestrini \(1962\)](#) pronounce this tendency by appropriating texts by Lao Tzu's (*Tao Te Ching*), Paul Goldwin (*The Mystery of the Elevator*), and Michihito Hachiya (*Hiroshima Diary*); such re-inscription is a common trait of digital poetry. These poetical collage techniques are reminiscent of *The Cantos* and William Carlos Williams's *Paterson*, which juxtaposes poetry, the language of the people and natural world of his locale, and correspondence with other writers into a sequence of writing encompassed in the poem. Like Williams, Pound, and Eliot, in their era, digital poets are confronted with social and artistic fragmentation in the world around them and — whether consciously or not — use the atomization and hybridization of texts to both subvert and reflect the complex of cultural information. Authors working on the page and screen in the post-atomic era use fragmentation to legitimize fragmentation and challenge the stability of language as a point of meaning; this process of reassembling disparate pieces via technology offers the means to impart a sense of coherence.

Early computer poems show great effort (in terms of preparing code and selection of database material) to give digital poems a sense of cohesion. Despite the random effects imposed on the poems by complex programming, one can find an intentional plotting of associated fragments of language and thought, similar to those found in Modernist works. Another style emulates the Dadaist practice of reordering the words of one text in order to make a new text, which has been called "matrix" poetry by several practitioners (e.g., Barbosa, Robin Shirley, Bootz).

Adding visual components to poetry was not new (e.g., William Blake). The most glaring examples of this trend in the Modern era are Pound's interest in (and implementation of) calligraphy (which also asserts the applicability of scientific method to literature), Apollinaire's "Calligrammes" (which shape language into discernable images), Charles Olson's "Projective Verse" ("composition by field" with attention to breath and the extension of perception), as well as various methods used by Concrete, Constructivist, Dada, and Futurist poets. While visual design is a characteristic of many digital poems, it should be noted that the relationship between graphical digital poems and the aforementioned models often exists on the surface but is not intrinsically supported by shared ideologies or methods, especially in contemporary forms where elements are not always fixed into place. Fragmentation and disruption of sensibility through the images produced — attributes generally associated with postmodern productions — were practiced from the very beginning. Graphical digital poems — which use many different approaches and take on many different forms — emerged in the 1960s and have appeared steadily ever since. This advancement, which overtly and visually foregrounds material aspects of language, represented significant aesthetic growth in the development of digital poetry.

Poems by artists preoccupied with visual elements are reminiscent of certain Concrete poems, in that they use atypical and oversized lettering, but the connection is closer in graphical philosophy to earlier shaped poems by Apollinaire, or George Herbert in "Easter Wings," where the shaping of the poem is an embodiment of its content. The "tension of things-words in space-time," — which is one of the theoretical and artistic objectives of Concretism stated by Augusto de Campos in the "Pilot Plan for Concrete Poetry" — is sometimes but not always perceived in digital works ([Williams 1967](#): 48). Materials that directly associate object and meaning do not foster the same level of "tension" in the reader as the more oblique communication strategy of Concretism.

In kinetic poetry we encounter a style of work that has not been previously produced. Though a mechanical possibility through the use of film, poetry was not literally put into motion, probably because of a lack of access and the expense of film equipment and processing as well as a set preconception of what film as a medium entailed. Videographic works and devices used to make animated poems have gradually become available during the past two decades. These techniques have galvanized a synthesis of

media in the construction of poetry, in which meaning is produced through the recognition of differences between instances in the chain of pre-programmed sequences. Poems in this style thus impart a type of deconstruction through their shifting, activated rhetorical structure. Melo e Castro outlines the central elements of this neoteric form, which emphasizes, as poets have throughout the ages, "the importance of phonetic values in oral poetry, of scriptural values in written poetry, of visual values in visual poetry and of technological values with computer use and video for the production of poetry, and not only for simple repetitive and non-creative tasks" (1996: 141). Melo e Castro sees Videopoetry as an inevitable response to the challenge of new technological means for producing text and image. In some instances, messages are succinctly and directly transmitted, but more often the combination of words, symbols, and images requires viewers to decide what this conflation or concatenation of elements means.

John M. Slatin's essay "Hypertext and the Teaching of Writing" recalls how Pound develops his concept of Vorticism in *Gaudier-Brzeska: A Memoir* by devising an aesthetic strikingly appropriate to hypertext based on the unconventional juxtapositions of discrete images into "a radiant node or cluster... from which, and through which, and into which, ideas are constantly rushing" (1998: 114–15). Digital poetry (and other forms that use multiple texts) embody the concept of intertextuality and show that any text has the potential to be a "collectivity of texts ... composed of and by other texts," which makes demands on the reader (1998: 115).

Developments since the appearance of computer networks, such as collaborative activities, the establishment of archives, as well as online communities and publishing, hearken back to earlier historical practices or efforts put forth by poets as analog artists. For instance, the "Mail Art" movement, surrealist "exquisite corpse" writings, organizations (e.g., The Poetry Project in New York City), and small press publishing taken up in previous periods, which may (or may not) have operated on a smaller scale, all served purposes similar to network initiatives. The attention given to creating innovative audio works recalls both the earliest iterations of poetry, in which language was exclusively oral, and performance poetry that has been practiced since Dadaism.

Digital poems are more inclined toward abstraction and are largely depersonalized, especially as the media used in composition has become hybridized. While many authors vigorously attempt to produce poems that make grammatical and human sense, certain artists, like Cage and Mac Low, employ narrative strategies that are intentionally unfixed or utterly fragmented as a result of the media implemented in composition. Randomization, patterning, and repetition of words, along with discursive leaps and quirky, unusual semantic connections, are almost always found in digital poetry, though sometimes these effects are so amplified that the poems would not be considered poetry by someone using traditional definitions.

Digital poetry is not a fixed object; its circuitry perpetuates a conversation. Poetry is a socially constructed art form, always situated within other texts (not limited only to poems) and extended by readers. Meaning and significance are not completely dependent on the verbal material itself; they are formed in the mind of the reader, who synthesizes various tiers of influence (inputs) and, potentially, extends them (outputs). Made obvious in viewing any digital poem is its release from a fixed format. A dramatic break from sharing real physical space occurs, whereby the signs that constitute the poetic text are immaterial. Contemporary modes challenge authors to avoid looking at any part of the systems involved — audible, alphabetized, imagistic — as discrete or independent units. Building a widely conceived philosophy of text is the responsibility of authors working with fully integrated (audio/video/alphanumeric) and layered (linked and coded) texts.

Poet-programmers have devised numerous methods to handle computer coding, the (often) unseen language responsible for formulating a digital poem. As yet, however, methods of creating digital works are dwarfed by the number of forms of written poetry. For example, more than seventy-five unique forms of poetry are discussed in the *Handbook of Poetic Forms*, a useful guidebook for students of poetry edited by Ron Padgett, and many more are reviewed in *The New Princeton Encyclopedia of Poetry and*

Poetics. This coverage is unsurprising, considering that these books address poetry across centuries whereas digital poetry is (mechanically) less than fifty years old. Though many different variations of digital poems are available, the overall number of general classifications of forms remains relatively small. Computerized literature and artifice are still in their early stages, and will become enriched at a gradual pace. The complexities handled by poets using written language, the challenges met despite perceived limits to alphanumeric forms, have just begun to be broached by digital poets. The first decades of the craft established a few models, which may be ultimately regarded as rudimentary efforts when contextualized within any overall history of computerized writing.

Theoretical Touchstones

Many digital poems can be conceptually interpreted as searching for their essence or as striving to make their essence apparent, as did Modernist endeavors. Yet on a theoretical level these works are in many ways typical of the postmodern condition of text. In the contemporary era, Jacques Derrida and others have theorized that words are not rooted in anything — they only have meaning in relation to adjacent words and texts to adjacent texts. This is certainly true in randomly generated digital works, in works that appear in sequences (either static or animated), and in many hypertexts (which are typically presented as a series of interlinked fragments). When we encounter the various forms of digital poetry, we see a representation of our highly technological world; within the myriad types of expression, the artist often seeks to expose, and sometimes subvert, the various binary oppositions that support our dominant ways of thinking about literature (and, perhaps, about communication in general). The deconstructive contention that texts intrinsically contain points of "undecidability," which betray any stable meaning that an author might seek to impose on a text, is certainly a feature of many digital poems. These undecidable aspects of text situate, for Derrida, "the places where discourses can no longer dominate, judge, decide: between the positive and the negative, the good and the bad, the true and the false" ([Derrida 1995](#): 86). In several forms of digital poetry — particularly in text-generated and hypermedia works — discovering the methods used to produce digital poems reveals that which has been suppressed (underlying computer code or intervention of software) and, typically, texts cover over materials that have been previously shown on the screen. Hierarchically structured binary oppositions within poems are undermined, despite the use of binary (coded) operations used in their production.

In *The Postmodern Condition: A Report on Knowledge* Jean François Lyotard proposes that contemporary discourse can make no claim to finality, even if it does not seek to put an end to narration. He argues that the computerization of society, which shifts emphasis from the ends of actions to their means, has made metanarratives (as a means of legitimizing knowledge) unnecessary and intolerable because technology is self-legitimizing (1984: 108). Cultural transformations (especially the growth of technology) have altered the historical tenets of science, literature, and art. His pluralistic, relativist views suggest that art is no longer required to seek or produce truth and knowledge, and may abandon standards and categories. Lyotard's argument that what he calls performativity "brings the pragmatic functions of knowledge clearly to light" and "elevates all language games to self-knowledge" is certainly substantiated in the diverse traits reflected in digital poetry (1984: 114). The text's identity as a computer form, containing expanded semiotic operations, often subjects the reader to an unfamiliar type of reading. In negotiating the interface, a reader's experience involves thoughtfully participating in the textual activity and thereby experiencing the poem on compounded visceral and cognitive levels.

Containing multiplicities is a driving impulse in many works, as is the impetus to assemble, reassemble (and even disassemble) texts in ongoing, potentially infinite, ways (with rupture but without permanent disruption). Poets are experimenting with computers in many different ways, and it is not surprising to find them working with

previously known structures to begin to build a sense of the machine's capability. Most forms of artistry begin with mimesis, and then branch out into new territory. Since computerized poems are produced and operated by highly structured, precise instructions or codes, it is logical that plotted, ordered, and contained (though not always predictable) designs would emerge. Nonetheless, because literature has now joined forces with mathematics and computer science, as well as other art forms, it foists an entirely different set of circumstances on the reader.

Critical Commentary

Today, digital technology advances poetry into dynamic areas that were at least partially available in the pre-technologic era. Attaining randomized effects without technological components and processes, digital poets re-programmed unconventional analog prototypes — like handmade Dada poems — as well as more orthodox forms such as sonnets and haiku. Thus far, digital poems have been part of a substratum of contemporary art, overshadowed by the abundance of dynamic works produced by writers and artists whose more accessible surfaces (such as books and galleries) gained much broader exposure. Only a few of the works have been strong enough to garner temporary attention at that level, usually in events that focused on computer art. The WWW is a significant point of demarcation, as it signals a profound and historical shift in the way digital poems were made available for viewers. Prior to this moment, multimedia, hypertext, and computer-generated works had been discretely produced "offline." The massive growth of the internet and WWW introduced artists to each other's work. Search engines, browsers that enable hearty multimedia capabilities, archival websites, listservs, and even chatrooms have increased the visibility, consumption, and knowledge of the form — a global community has become possible.

Programmed works literally assemble language (if not other media components) to the specification of the programmer; formal, precise programming commands are written to perform particular tasks. The earliest works of digital poetry strictly involved coding as there were no other possibilities, although software increasingly shouldered the burden as the genre progressed, facilitating the poet's conceptual application and aesthetic (thereby enhancing prospects for digital poetry and widening the field). As code, the task of handing language is used more often than not to order, rather than disorder, poetry. Even if the poet-programmer wishes to instill disorder, the process calls for prescribed stylistic elements. Alternatively, with software, the programming generally involves establishing frameworks in which disparate elements — whether the different elements of a visual scenario, or files that contain different verbal passages — negotiate with one another, or are negotiated by the viewer. As is always the case with its written counterpart, digital poetry relies on the author's senses, thoughts (or inspirations), and vocabulary to form words (which can be accompanied by other media) into expression. As ever, the poet enacts language amid a range of possible treatments.

Some digital poems — even those assembled by a machine — are grammatically flawless while others completely disregard linguistic conventions. Digital poems do not exist in a fixed state, and may be considered less refined as a result of this condition. Author(s) or programmer(s) of such works presumably have a different sense of authorial control, from which a different sort of result and artistic expectation would arise; consequently, the purpose and production would veer from the historical norm. Because of this shift in psychology and practice, digital poetry's formal qualities (made through programming, software, and database operations) are not as uniquely pointed and do not compare to highly crafted, singular exhortations composed by historic poets. Some will rightfully hold that code and databases or manipulated pools of words (or other media) are more limiting than a powerful mind. Or that the freedom and capabilities of the mind, and skills that result from refined poetic practice, are greater than anything programmed or loaded into a machine (or, for that matter, captured in traditional verse). While this may be proven, I am nonetheless reminded of Olson's potent utterances in *The Maximus Poems* that "limits/are what each of us/are inside of"

(1983: 21). Despite restrictions imposed by technology, using computers, poets can interlink materials mechanically; digital poetry functions to bridge layers of text(s), images, and other effects, that result in reaching beyond the machine to affect the reader's imaginative, intellectual, and other aspects of her or his non-virtual world. The vitality of digital literature relies on how textual possibility and human ingenuity (vis-à-vis programming) are combined to synthesize poetic thought and programmatic expression.

Digital poetry has always been a multi-continental, de-centralized practice. Works have been created in many languages. Not only is digital poetry an unusual idiom of creative expression, it is also an idiom that for more than three decades has resisted, as if by definition, the need to embody a singular set of mannerisms in its use of multiple languages (including computer code) and stylistic approaches. Digital poetry has steadily redefined itself with the development of new tools and artistic interests, and a type of digital poetry culture began to emerge with the International POESIS (1992, 2000, 2004) and E-POETRY (2001, 2003, 2005, 2007) festivals in Germany, the United States, England, and France. The WWW sites promoting these events, which contain links to works by artists who participated in these projects, serve as portals to a loose community of digital poets, and an interconnected network, with its own subcultures, has developed gradually.

Utilizing and relying on more technology than any other era before it, the twenty-first century presents poetry — one of our most intimate and intricate forms of expression — with at least two significant charges. Poetry should continue to remain accessible to its audiences by engaging important social and technological issues, and cultivate readers through the production of stimulating works in all forms. Poetry —stylized language — can allow for innovation and accept adaptations within its forms and tradition. As a craft that remains a vital cultural interest and pursuit during the first decade of the century, poetry is apparently prepared to weather these challenges. At this historical moment, in fact, the fruits of these two charges appear to be interrelated and enhanced by technological advancement. Widespread computer usage and improvements in digital systems and networks have particularly altered the disciplinary sense of what poetry can be, while intimating what the dynamics of literature may contain in the future and how it will be presented to readers. Digital poetry has developed so intensely and rapidly since the 1990s, time alone will tell which events will prove crucial in the progress of this relatively young genre of art. Digital poets have not labored to experiment and invent out of cultural necessity or desperation; works have sprung from self-driven exploration of computer media and the individual desire to craft language with technology that, in turn, modulates and modifies traditional approaches to writing. The computer has presented both a puzzle and formidable sounding board for poetic ideas and articulations. Since the very earliest works created, serious poets have explored computerized composition. Digital poetry was never wholly controlled by scientists, but by writers — sometimes working with programmers — who labor to discover methods for inventively re-formulating language.

Notes

- 1 The term "netspeak," according to Strehovec, implies that, "the language of zeros and ones, and of ASCII and HTML characters is involved in new poetic structures with striking visual, animated, and tactile features" (Text n.pag.).
- 2 For instance, kinetic activity on the screen is also integral to John Cayley's award-winning poem *RiverIsland* and in digital works he and many others produced later, both on and off the WWW.
- 3 Bailey also cites Mallarmé's emphasis on the role of chance promotion of chance (see paragraph below) and the "imposition of order on disorder" as important tendencies present in the works he was able to collect.

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