Electronic Literature as World Literature; or, The Universality of Writing under Constraint

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Abstract   Electronic literature is not just a "thing" or a "medium" or even a body of "works" in various "genres." It is not poetry, fiction, hypertext, gaming, codework, or some new admixture of all these practices. E-literature is, arguably, an emerging cultural form, as much a collective creation of terms, keywords, genres, structures, and institutions as it is the production of new literary objects. The ideas of cyber-visionaries Paul Otlet, Vannevar Bush, and Ted Nelson, foundational to the electronic storage, recovery, and processing of texts, go beyond practical insights and can be seen to participate in a long-standing ambition to construct a world literature in the sense put forward by David Damrosch (2003: 5): "not an infinite ungraspable canon of works but rather a mode of circulation and of reading . . . that is applicable to individual works as to bodies of material." The model for such constructions may be not the global literary commerce envisioned by Goethe and adopted by Karl Marx, not the romantic tradition of poets as world legislators, and not the current model of a "world republic of letters." The model adopted in this essay, rather, is the literary practice of writing under constraint, developed long before the Internet but suited to its computational impositions and gamelike literary presentations. Instead of a canon of works preserved solely by the power of institutions, the essay presents a freestanding network of authors as precursors to, and models for, this potential world literature, namely, the Oulipo.

What the Oulipo intended to demonstrate was that these constraints are felicitous, generous, and are in fact literature itself.
Jean Lescure

Toward a Potential Literature

Introducing an essay collection, *Debating World Literature* (2004), Christopher Prendergast grounds a debate that could easily encompass the entire world by returning to a notable early use of the term "world literature." Goethe, Prendergast reminds us, initially put his notion "in the form of a thought experiment" (ibid.: viii), and he cast the idea in the subjunctive mood: "For my part," Goethe had written, "I seek only to point out to my friends my conviction that a universal world literature is in process of formation" (cited in ibid.: 3). Goethe's sense of "a common world literature transcending national limits" was not, and by its defining terms could not be, offered as a personal vision but as a recognition of new modes of cultural "traffic" (Stefan Hoesel-Uhlig, cited in ibid.: 2). It was, after all, the reception given to Goethe's own work in France, more lively than anything he had received by then in his home country, that stimulated the idea of a world literature. Regardless of how well or badly a work is translated, its cultural and linguistic *differences* resonate in ways not always felt or appreciated in its country of origin, where language was never a constraint in the first place. (Indeed, once translation is perfected and mutual understanding among nations and cultures is assured, a work's global circulation arguably ceases to be literary: "world literature," in one of many current formulations, is what "gains in translation" [Damrosch 2003: 281].)

Attuned similarly to processes of cultural interchange (and especially uneven development), Marx addresses this multinational, infrastructural condition in his equally well-known characterization of a "world literature" that would "arise" out of the "impossibility" of one-sided, nationalist, and local literatures (cited by Franco Moretti in ibid.: 148). The field itself therefore was defined in a condition of perpetual emergence, even as the world system of global capital, complete in all essentials by the Victorian era, has continued to be under construction and constant revision to the present day.[1]

These infrastructural and social developments, though they proceed

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1. The genius of William Gibson and Bruce Sterling's *Difference Engine* (1992) is not that it transposed computers ("engines") and hackers ("clackers") back to the era of Lord Byron, William Gladstone, Benjamin Disraeli, and Ada Lovelace. The collaborative novel is not so much an alternative history (like Phillip K. Dick's *The Man in the High Castle* [1962], which imagines a post–World War II world where Nazi Germany emerged victorious). Rather, the novel simply recognizes, by putting literal machines in the hands of its Victorian characters, how fully the conditions (and to some extent materializations) of a world system of communications were already in place in England and its territories by the mid-1800s. Arguably, the electronic infrastructure of today, set up by national governments and competing corporations, is less complete than that available to the Victorians or, for that matter, to the Thurn and Taxis couriers that inspired Thomas Pynchon in *The Crying of Lot 49* (1966).

largely independently of literary developments, nonetheless affect the thoughts of authors and constrain the forms that an emergent literature can take. The awareness of a potential global reception, for example, which develops together with the development of a modern literature, can enter the consciousness of an author during composition—as when James Joyce launched his career (and drafted many of his first stories) in self-imposed "exile," a model consistent with the great expatriation of U.S. authorship from Henry James to Ezra Pound, Ernest Hemingway, and Gertrude Stein. Certainly, there were authors of world stature who remained self-consciously local in their settings and idioms: William Faulkner in his imagined Yoknapatawpha County; W. C. Williams in Patterson, New Jersey; Wallace Stevens in his Hartford, Connecticut, office and the Florida of his mind. Yet their professional status, and to a large degree their distinctive literary styles, were realized through the expectation of a worldwide literary reception. The welcome given in France and Germany to William Gaddis, Thomas Pynchon, Don DeLillo, and Toni Morrison has proven decisive in raising the profiles of these American world novelists. Currently, when authors from all nations claim "otherness" and "identity," the claim is understandable less as a refusal of the world system than as a demand for inclusion in an imagined "world republic of letters" (Casanova 2004), whose center of operations, if not inevitably Paris, will be departments of comparative literature and (in the United States) programs in creative writing established in the aftermath of World War II precisely for the purpose of multinational reception (cf. Chow 2006). As we move, however, from the modernist Pound Era (Kenner 1971) to our current Program Era (McGurl 2009), we can observe an opening of the canon but at the same time a containment of the world-literary potential in an earlier cosmopolitanism (admittedly elitist, largely Western, and male-dominated but formally inventive and globally active).

Of course, the contributors to Prendergast's collection are aware of the highly uneven development of a world literary tradition. "Let me put it very simply," says Moretti. "We have not lived up to these beginnings [in Goethe and Marx]: the study of comparative or international literature has been a much more modest intellectual enterprise, fundamentally limited to Western Europe, and mostly revolving around the river Rhine (German philologists working on French literature). Not much more" (Prendergast 2004: 148). Significantly, Moretti titles his essay "Conjectures on World Literature." Consistent with this spirit of conjecture, I would note that the concept of a world literature has been described, over time and across borders, as in every case a *potential* literature. While most often associated with Goethe and Marx, the concept belongs to "no one in particular," because

its shape and content are "as yet" far from clear. Similarly, the "reflection and debate" offered by the world-literary scholars in Prendergast's collection promise to be open-ended and "indefinitely extended" (ibid.: viii). The concept of a world literature, as Prendergast's survey makes clear, is tied to the creation of newly internationalized reading publics and to the loss of such publics (and their renewed creation) with the rise of new communications infrastructures.

The Literary Prefiguration of the Internet

Unfortunately, the environment in which such potential is at this very moment being realized is neglected by most of the contributors to Prendergast's volume. We find there, on the very first page, an observation by a leading theorist of postcolonial studies that should give pause to anyone who wants to create a space for literature in new media: "Public spheres," Arjun Appadurai (2000: 22) writes, are "increasingly dominated by electronic media (and thus delinked from the capacity to read and write)" (cited in Prendergast 2004: i). That "thus" can rankle. Obviously, Appadurai is not thinking of the Internet, which is still (and likely always will be)[2] overwhelmingly textual, despite an insistently instrumental visual presence. The assumption that reading and writing are of course "delinked" from electronic media shows just how deep the separation of spheres has become for scholars like Appadurai, who continue to evaluate globalization primarily through the reading and writing of printed materials. Appadurai and most of the contributors to *Debating World Literature* want to locate a world literature commensurate with processes of globalization. But by dissociating reading and writing from electronic media, these scholars fail to entertain the idea that writing produced in new media might in fact *be* an emerging world literature.

It was not supposed to be like this. Appadurai's casual dismissal of reading and writing as active elements in "electronic media" should seem strange if one recalls how cyberculture visionaries advanced the idea of a universally accessible, open-ended archive that primarily stores *texts*. That was the idea behind Vannevar Bush's (1945) "Memex" and Ted Nelson's

2. In a scholarly work, Charlie Gere (2006) takes a similar stance concerning the nineteenth-century fulfillment, in all essentials, of the current technological world system.

Handling images is still something of a strongman act, at least in applications that I use in my own writing life—which is nonextreme but I think not unrepresentative for those invested in e-lit. For example, I went over two years using less than 1 percent of the generous capacity on my Web mail account, but then the account reached 40 percent capacity in a single day after I copied and circulated resized photos from a single vacation.

(2003 [1974]) "hypertext"; not the current expanse of decontextualized hot links that take readers serially away from the text they are reading at any given time but rather a means of bringing documents, in part or in their entirety, to a single writing space for further commentary and the development of conceptual connections. The worldwide collaborative potential of collecting documents, not lost on these American information specialists after World War II, had already been expressed by the Belgian Paul Otlet in his *Traité de documentation* (1934). There the thought of connecting people to the libraries of the world via telephone and electronic screens led to his vision of a technological *encyclopedia*. In Otlet's "conceptual prefiguration of the Internet" (préfiguration conceptuelle d'Internet), every extant work in print would be but chapters and paragraphs in a single "universal book" (unique livre universel).

Of course, Otlet, Bush, and Nelson understood that electronic media might include works of all countries, cultures, and languages. But inclusiveness alone did not make their vision universal. Rather, the operative feature everywhere in early cybernetic thought, what would make the technologically enhanced book more than the sum total of books in print and in manuscript everywhere, was its promise of reshaping boundaries. National and cultural divisions would thereby shift toward more conceptual discriminations: the kind of distinction that does not separate people categorically but is capable of connecting them in discourse. Concepts and connections that had remained potential (because of the book's physical separation from other books) could now be *activated* in the mind of a reader. The technological excitement lay, that is, precisely in its promise to renew the "capacity to read and write" (Appadurai), with the added value (so necessary to universalist thought) that the results of one's reading could be conveyed to others, debated, and revised. In every case, the knowledge transfer would occur not through interpretive activity or through description or summary alone but because every user would be similarly free, in Nelson's (2003 [1974]: 332) words, to "list, sketch, link, and annotate the complexities we seek to understand, then present 'views' of the complexities in many different forms."

Reconsidered in the context of computational and communications media, the universality of literature would not lie in attaining a single common language or in the expression of an essential human spirit but rather in inhabiting a *common workspace*. A word Nelson coined for this process was "transclusion"—an inclusion through site transfers of separate texts that could be full or partial, depending on one's requirements: in every case, the "original" document or set of documents remains at its home

address while being reproduced at the target address (not just referenced or linked sequentially). The achievement of this capacity, which can make reading and researching also a kind of worldwide consortium building, could potentially bring to the public a literary project that had earlier been considered private and secluded. In *If on a Winter's Night a Traveler*, occasional Oulipian Italo Calvino (1981 [1979]) implies the threat posed by new media to literary privacy when he has his narrator advise the reader to shut the door and "let the world around you fade. . . . Tell the others right away, 'No, I don't want to watch TV!' Raise your voice—they won't hear you otherwise—'I'm reading, I don't want to be disturbed!' . . . Speak louder, yell: 'I'm beginning to read Italo Calvino's new novel!' Or if you prefer, don't say anything; just hope they'll leave you alone." The situation is different in the collaborative, receptive media that, like the Internet and unlike television, include text as a primary component. Though here too demands are made on a reader's time and attention. In new media, readers can risk becoming like Calvino's harried publisher later in the novel, whose room is full of books that are never read, only circulated and recirculated, and their authors too well known to us, as personalities and occasional celebrities, for their works to hold any fascination.

In reception media such as Otlet's universal book and the Internet, documents and imaginative discourses are not given as ends in themselves but as material to be reworked, relocated, and remixed (to use an anachronistic formulation that came into vogue after the digitization of music). The idea that this potential needed to be *liberated* by humans, implicit in Otlet and Bush, is made explicit in Nelson's titular concept of "computer lib." Nelson's program for the freeing of mental capacities through human/machine interaction, consistent in so many ways with contemporary programs of racial, sexual, and lifestyle liberation (and often exceeding these in rhetorical fervor),[3] to a degree brought technological transformations into the realm of worldwide social and cultural transformations. The prospect of *freedom*, as we shall see, has always been a feature of the aspira-

3. Adelaide Morris (2007) articulates the contemporary context and political tendency of Nelson's liberatory rhetoric: "What Women's Liberation aimed to accomplish for gender, Civil Rights for African Americans, gay and lesbian rights for sexuality, and the New Left for workers, Nelson's *Computer Lib* envisioned for the ways in which we use our minds. Its engine—the microcomputer or desktop 'dream machine'—was for Nelson no less revolutionary than the social ferment contemporaneous with its development. 'The human mind is born free,' Nelson declared, repurposing for an informational era Marx and Engel's industrial call to action, 'yet everywhere it is in chains. The educational system serves mainly to destroy for most people, in varying degrees, intelligence, curiosity, enthusiasm, intellectual initiative and self-confidence. We are born with these. They are gone or severely diminished when we leave school'" [the quote is from Nelson 2003 (1974): 309].

tion toward a world literature—indeed, it is one of the "world thoughts" characterizing the genre, according to George Brandes and Eric Auerbach (cited in Prendergast 2004: xiii–ix).

Criteria; or, What in the World Is World Literature?

Let us list, for convenience, the criteria for world literature that emerge from the introduction and the opening essay in Prendergast's volume. Inevitably, these will be criteria for literariness itself, and the articulation of criteria in one medium might offer a glimpse of what can be carried over into new media (or not):

1. A world literature must transcend boundaries of nation and language, as these serve mostly to mask "all manner of divisions and constituencies"   (Prendergast 2004: 12);
2. it must be hybrid, conjoining written and unwritten language   (ibid.: xi);
3. it must be universal and advocate freedom   (ibid.: xiii–ix);
4. it must not be identified with a canon of major works; and yet
5. it must be exclusive.[4]

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4. David Damrosch (2003: 281) offers a quite different, but not incompatible, set of criteria in his book *What Is World Literature?*

　　1. World literature is an elliptical refraction of national literatures.
　　2. World literature is writing that gains in translation.
　　3. World literature is not a set canon of texts but a mode of reading: a form of detached engagement with worlds beyond our own place and time.

Like Prendergast, Damrosch regards world literature as a formation rather than a settled state—hence the refusal of canon formation as a criterion of world literature. In Damrosch's case, the decision to avoid canons in large part derives from his careful study of recent efforts, all mostly futile, of simply adding pages to existing anthologies under the name of world literature. His observation that critiques of nationalism have an odd way of coexisting with "a continuing nationalism in academic practice" seems right and is wholly consistent with the persistence of canons in the construction of purportedly postnationalist, feminist, subaltern, and other previously excluded literatures. Similarly, one of electronic literature's defining moments as a field came at the Electronic Literature Organization Conference at the University of California, Los Angeles (2002), when N. Katherine Hayles suggested that the inaccessibility of many texts due to technological obsolescence was preventing the formation of a canon "necessary to the creation of a field." Yet there does exist a small set of texts—by Michael Joyce, Stuart Moulthroup, Shelley Jackson, John Cayley, and others— that *do* get anthologized and referenced regularly without as yet a "field" coalescing around them (see my essay "Toward a Semantic Literary Web" [Tabbi 2007: "Credibility"]). All this suggests that world literature, understood as a reading and writing practice, *not* as a list of texts, is the preferred genre for field construction.

　　Concerning writing that gains in translation, see my reference in this essay to *A Void* (1994), a translation of *La disparition* (1969) by Georges Perec.

There are clearly many places where cybervisionaries and writers on world literature in the print tradition can agree. New media, for example, are readily suited to contain and facilitate classifications of all books written and published in "all countries in every epoch" (in Otlet's [1934] words: "Ce qui a été écrit et publié dans les différents pays et aux diverses époques" [cited in Levie 2007]). But a *transcendence of national and linguistic boundaries* does not in itself alter the necessity of discerning what counts as "literary" within the diversity of materials. The dialogism that distinguishes Fyodor Dostoyevsky's major narratives, the mixture of the vernacular and the metaphysical in Herman Melville's Ishmael, and the conflation (even in a single portmanteau word) of ancient, scholarly, local, and official languages in *Ulysses* and *Finnegans Wake*: these characteristic world-literary devices clearly grow out of commercial and cultural exchanges distinctive among recently (and always partially) formed nation-states with expansive ambitions. But the literariness of these world fictions, like the collaborative writing space of new media, is achieved by selecting and staging dialogue among the diverse national languages—and also *within* nations, through encounters among professions, classes, cultures, and so forth, at various stages of development in speech and writing. Dialogism, certainly a key quality of literariness at least in the novel genre, can be recognized, in the print literary tradition, as an anticipation of a communicative condition actualized today in electronic media. As with most literary qualities conceived in the mind of individual print authors, however, that anticipation does not guarantee that such qualities will be experienced in the more literal world-spanning dialogues and distributed collaborative networks of our time.

World literature has also always involved migration and *hybridity*. Traditionally, world literature has been energized by a movement of peoples across national borders and from the countryside to cities. (Depending on the scale of migration in coming years, the world literary tradition in print could expand or come to a close, though the persistence of literary writing in electronic environments surely will require more conceptual boundary crossings among professions and cultures, not necessarily among peoples in migration.) Geographical displacements and ideological impositions in turn produce combinations of the literate and illiterate, the written and the unwritten. This does not mean that both written and unwritten, what is printed and what is oral, are equally valued, since these distinctions necessarily only reach literary expression by established or upwardly mobile members of the mass of migratory peoples. In practice, then, world literature is exclusive, turning the material of mass movement into an occasion for the mental development of a few.

Will world literature's *exclusivity* necessarily be reproduced in the migration of reading and writing practices to electronic environments? Certainly, the conceptual freedom celebrated by Nelson is no longer the same, and the open-source, do-it-yourself culture of file sharing is no longer so fluid when the interfaces encountered by most readers have been largely pre-formatted to serve commercial and instrumental ends. Computers, in the time of Nelson and Bush and during the rise of the IBM mainframe, were still largely available to big business and a cohort of researchers. The personal computer only came later, and its transformation of the writing space into essentially an *office* and *entertainment center* was not predicted by anyone. Under such conditions, the liberation of "minds" from the constraints of new media now requires a more active, oppositional role available not to the mass of computer users but only to a subgroup of "hackers" who are capable (often by breaking copyright laws and proprietary protections that did not exist in Nelson's heyday) of penetrating and changing configurations at the level of source code. That kind of competence remains the domain of a few.

In these new configurations, the world-literary ambition for *freedom* becomes surprisingly, and intimately, aware of the constraints on expression and the creative redistribution of texts, contexts, and source texts. And this in turn creates new and various understandings of how to realize, through the newly available archive of *all* texts, past and present, written and in progress, the *universality* and borderlessness of a possible world literature. "To hack," writes the literary critic Adelaide Morris (2007), "is to work within a set of constraints—linguistic rules, programmatic structures, protocols that organize data exchange and enable telecommunication connections—to keep possibilities in circulation. In this sense, the purpose of a hack is to interrupt inevitability, to put ghostly alternatives back into motion, to engender fresh abstractions, to find a way, like Emily Dickinson, to 'Dwell in Possibility.'" Only by keeping these constraints in view and at the same time "engendering fresh abstractions," posing alternative source codes as well as experimental textual formations against the achieved configurations of worldwide commerce and communication, is it possible to maintain literature in its potential state—not as a revolutionary program to be realized (Nelson's "computer lib") but rather as a condition for creativity.

By revisiting the old but undying idea of world literature, by having considered each of its defining criteria in turn and seeing how they play out in electronic environments, I hope to have identified an alternative trajectory of world literary production. This trajectory is different from that of Goethe and Marx but also from current cultural formations as

presented by the authors in Prendergast's volume, for example. I will not be advancing Appadurai's "global literature" or any of the alternative canons of world literature promoted in anxiously revised and expanded anthologies (see Damrosch 2003: chap. 3). With Moretti (in Prendergast 2004: 109), I would discourage any notion that engaging in the practice of "world literature" today means simply reading "more" or including a more diverse set of authors. Only a redistribution of concepts, a way of thinking about the conditions of literary writing, will take us to a place, a collaborative workplace, where works by many different authors can reach a selective audience more diverse than any faction could be (even if the faction has offices worldwide and the capacity to produce entertaining fictions of insubordination and resistance).

Rather than attempting to produce a cross section of world literature in new media, my approach in this essay is to advance a notion of "the literary" different from the print-based model that (as Appadurai's offhand remark makes clear) is so thoroughly embedded in the very idea of a world literature. Other equally embedded ideas, like the "grand thought" of freedom (Brandes, Auerbach) and the yearning toward universality, also need to be investigated in the conception of cyber visionaries no less than in longtime scenarios of world literature. What is universal, I argue, is no longer a single world vision that necessarily transcends its national, racial, gendered, or cultural origins. What is universal is instead the ability, by observing the constraints on the current world system as it configures itself in our actual writing spaces, to enter into meaningful conversations with other creators in written as well as nonwritten forms. In this sense, a world literature today, the electronic networks that support it, and the social networks that sustain it can be regarded as an alternative formation to globalization (with its ideal of *unconstrained* flows of capital and information and its ideology of progressive freedom). What is literary about world literature can be recognized in this capacity to disturb the smooth operation of global communications, using textual instruments whose operations are largely conceptual.

The model adopted in this essay for such collaborative writing under constraint will be the work of the Oulipo. This group is not often associated with world literature, but its concept of a collective workspace for a *potential* literature (the "ouvroir de littérature potentielle") can help us think differently about the field, reformulate the "categories" and conceptual interconnections of the problems that world literature presents us with (Moretti, in Prendergast 2004: 149). At stake in this conceptual revision (and the ongoing construction of writing spaces in new media environments) is not the inclusion of this or that previously excluded group in the

world-literary pantheon but rather the inclusion of literary writing itself in a collective work space that tends otherwise to thwart the free circulation of a literary sensibility and collaborative writing practice.

Potential Literature

The Oulipo may have been the literary group that best understood, or perhaps best communicated, the collective necessity of writing under constraint. Among these writers, the promotion of constraints—mathematical constraints on formal production but also on the selection, sorting, and programming of texts at the semantic level—developed as a critique of the Romantic cults of genius and originality, on the one hand, and of surrealist celebrations of random creation, on the other. Certainly one impulse for this stance was founding member Raymond Queneau's expulsion from the surrealist group, which was uninterested in Queneau's project of researching forgotten constraints from past literature. For the most part, however, this emphasis on constraint was not the usual literary infighting and exclusiveness nor simply a matter of challenging the supreme position of Romantic poetry, for example, and offering Oulipian poetics in its place. I should confess that I personally would not prefer the text of any one of Queneau's *100 Trillion Poems*, or the impossible all of them, over a single "Ozymandias" or ode to Solitude, Beauty, Duty, or Desolation. I might admire the computer-aided virtuosity of *2002: A Palindrome Story*, 2002 words in length, by electronic literary artist Nick Montfort and Spineless Books publisher William Gillespie. Beating a record set precisely by an Oulipo member, *2002* establishes a direct line from the Oulipo to electronic literary practice. But the primary continuity—what counts as a *world* literary practice—is more a matter of Montfort and Gillespie's perpetuating a literary network of collaborative text production. In this case, with the passing of print into one tradition among many emergent practices, the constraint "discovered" in past literature is the Oulipo program itself.

Montfort/Gillespie and Queneau certainly share a willingness to subject themselves to arbitrary rules: that a "story" must read the same going forward as going backward or that a line in a Queneau poem must make sense when read with previous or subsequent lines in another poem from the same ten-page collection. But Oulipian and electronic literary practice do not aim at creating compelling narratives or absorbing poetic meditations. Those will continue to be produced in print, a medium perhaps uniquely suited to narrative demands for the creation over time of beginnings, middles, ends (a working out of information through sequence and duration that more often than not is frustrated in electronic environments).

Even a subversion of closure or a nonchronological narrative, to be meaningful, needs to happen against prose structures that reasonably extend over a period of time. Indeed, one signal accomplishment of electronic literature may have been to help locate narrativity not as a literary universal but as one of many literary qualities best realized in a particular medium: print. In this sense, new media bode neither an "end of books" nor an "end of literature" but rather a revaluation and relocation of the literary in multiple media.

"O readers, meet Bob. (Elapse, year! Be glass! Arc!) Bob's a gem" (Montfort and Gillespie 2002). Indeed, he is. At any rate, Bob's as good a protagonist as Anna or Inna, Kiki or Abba, or for that matter Bob's babe, Babs. For once we can forego champagne and ring in the year 2002 with regal lager or local cola. Individual preference is beside the point when it comes to the production and reception of Oulipian works and works of electronic literature. What the Oulipo offered instead of isolated, subjectively rich poems, stories, and critical prose was an alternative way of looking at literary practice, a new formulation of its problems and its potential. This alternative in turn would be as much a project of rereading and reformatting achieved work as of creating new works. What the Oulipo was doing, not coincidentally during the same early years of cybernetic exploration that produced the visions of Otlet (1934), Bush (1945), and Nelson (1974), the sociology of Gregory Bateson (in *Steps to an Ecology of Mind* [1972]), and the mathematics of Norbert Wiener (in *Cybernetics* [1948]), is caught up in the unprecedented proximity of literature to computers, the coexistence in the same writing space of code and text, perceptual image and temporal narrative. The technologies that have transformed the infrastructure of global communications have also definitively resituated books as one medium and narrative as one literary quality among many.

While there have appeared, certainly, dozens of recognized works of electronic literature, these will be discussed at length in future essays—partly because of my still developing familiarity with the material but also because world fictions and world poems tend to emerge only after the infrastructure is complete.[5] Scholarship has shown how each successive world-literary formation has been shaped in part by the communications system in place at the time—Melville's by early imperialist naval technology; Pynchon's by cold war technologies of space travel and inter-

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5. Under way, at the time of this writing, is the collection of several hundred URLs featuring works of electronic literature. The collection is undertaken by the Electronic Literature Organization with my involvement and is being assembled at the Archive-It Web site (www.archive-it.org). Electronic literature is one of numerous disciplines whose signal works are being collected and preserved under the sponsorship of the Library of Congress.

national surveillance; Joyce's by film and telegraph; Goethe's by courier post—the system underlying what Pascale Casanova (2004) has called the "world republic of letters" and what media scholar Friedrich Kittler (1984) has called, more generally, the "Discourse Network" in and around the year 1800. In every case, the world fiction appeared a decade or two after the worldwide infrastructure was already complete and beginning to yield to new structures (for example, the "Discourse Network: 1900" [Kittler 1984], which demoted handwritten pages in favor of type, thus delinking the implied continuity of mind, body, and page during the act of composition; the network of television and radio, which carried sound and images out of the realm of the theater and the local commons; the Internet and cable network of today, which literalized and so ended Pynchon's [1995 (1974): 703] paranoid vision where "everything is connected" and "nothing" is known). In each case, the world fiction as such fails to reproduce itself once its associated discourse network ceases to predominate, even if particular innovations live on in generic form (as earlier technologies are not replaced but are absorbed by later ones).[6]

In advancing the prospect of electronic literature as the emergence of world literature today, I want to bear in mind some of Prendergast's precautions against certain provincial and marginalizing forces that defeat the project. If in the past world-literary works were few and the project of a transnational literary discussion was largely unrealized (Moretti, in Prendergast 2004), that is partly because literature, as Prendergast demonstrates, is often understood as a mere reflection of (and on) social and political conditions *in* the world, not a means for conceiving, and to some degree materially generating, possible worlds. When dealing with world-historical processes, with the construction of a world order whose outlines today are clear but still highly contested, there is a tendency for "literature" as such to drop out of the discussion.[7] Prendergast (2004: x) suggests, reasonably, that, instead of focusing on the location and global journeys of texts and authors, literary critics need primarily to account for the

6. To the extent that a world fiction *is* determined by its engagement with a specific technology or discourse network, as John Dos Passos engaged with "camera eye" pseudo-objectivity in the *USA* trilogy (1930–36), or David Foster Wallace engaged with mideighties drug and entertainment cultures in *Infinite Jest* (1996), or William Vollmann's two-note variations on the telephone network in *Europe Central* (2005), these fictions trade techno-determinism for constraining structures. Where the former, deterministic motifs remain outside the work, constraints are internal, and they affect, without determining, all that can be said within the constraining framework.
7. Prendergast's (2004: viii) essay opening *Debating World Literature* criticizes Casanova's idea of "internationalism" based, largely and historically, "on relations of inter-national competition."

"actual structures and modes of functioning of literary genres." And this is what electronic networks are uniquely equipped through search routines to do—although (needless to say) the work of tracking literary genres and structures will not *get* done unless scholars, archivists, and authors work actively and systematically to bring these fundamental literary concerns into electronic environments.

The Longue Durée

Conceivably, the next generation will be the first to realize a "common world literature transcending national limits" (Goethe, cited in Prendergast 2004: 3), though not in the way that Goethe foresaw, since *all* limits, not only the national ones, become negotiable when communications are instant and world spanning. According to Emanuel Wallerstein (2003), the really new notion underlying the current world system, from perhaps the 1970s forward, has been that capital formations and world constructions will be not a progressive development guided rationally and collectively toward some determinate end but an all-at-once, distributed process whose only purpose is to sustain itself in a condition of continual change. Its networks will host not a "conversation" (Goethe), cosmopolitan or otherwise, but a wealth of transactions whose topical limits and rules of operation would need to be *created* at every occurrence. With the demise of every "grand narrative" (Lyotard 1984) capable for a time of conducting beliefs and a people's self-understanding along national, scientific, or political lines, the narrative of change itself is now all that remains in the political discourse of the "modern." But "change" by itself does not easily translate into political transformation: in fact the universal necessity of change has only reinforced the world system in what theorists describe as a *longue durée*, a lasting (though not eternal) "now" whose extension, around five hundred years according to Wallerstein, can be appreciated as consistent roughly with the "five hundred years of print literature" (Hayles 2007: "A Context for Electronic Literature").

Particularly vulnerable to the requirement that "change" should be "endless" are the conceptual and nonnarrative arts. As avant-garde production in the arts gets reduced to a concern with "the new," art tends to be not so much valued by as *identified with* markets, and one response among the current generation is a widespread boredom with the art that their parents were collecting through the boom years of the 1990s: "He liked paintings that his guests did not know how to look at. The white paintings were unknowable to many, knife-applied slabs of mucoid color. The work was all the more dangerous for not being new. There's no more danger in

the new" (DeLillo 2003: 8). Retrograde modernism is not the only possible response, however. This reflection by Eric Packer, the twenty-eight-year-old multibillionaire in an exemplary world fiction by DeLillo, goes beyond one dot-com era businessman's impatience with the avant-garde in the arts and extends, during the long day's journey of this short novel, to all aspects of corporate communication throughout global America. In *Cosmopolis* (2003), DeLillo gives us the longue durée in a stretch limo making its live-long way through crosstown Manhattan traffic, a presidential motorcade and its trail of globalization demonstrators and performance artists, their protest serving less as an alternative than as a bracing resistance to power. Amid the flurry, the lunches, the meetings, the clandestine stops for sex, Eric Packer's observations unfold like a series of medieval tableaus, and DeLillo's narrative maintains a determined stateliness. Between stops at hotels and restaurants and speculating all the while on currency markets, Eric is mostly concerned with language. He knows in his heart that nothing changes tangibly, not even as a result of the massive buy orders he has placed using the computer in the backseat of his limousine (disastrously as it turns out for his personal fortune, for the world economy, and for his wife's private holdings in an account he easily hacks and purposely throws into the speculative fire to avoid having to accept her offer of financial help in his impending ruin). Knowing all this and possessing (in the morning) all that the system might make available at any price, Eric for the most part thinks about the obsolescence of words: The "skyscraper" where he keeps (kept) a forty-eight-room penthouse seems to him anachronistic, not in its structure but in "the quality of the word . . . no recent structure ought to bear this word. It belonged to the olden soul of awe, to the arrowed towers that were a narrative long before he was born" (ibid.: 9). "The word office was outdated now" (ibid.: 15), "chairs have arms and legs that ought to be called by other names" (ibid.: 164). His security guard's handgun is of course not outdated yet, "but the word itself was lost blowing in the wind" (ibid.: 19). A corpse "laid out" brings to mind "an embalmed term in search of a matching cadaver" (ibid.: 136). The language in Eric's world is as disposable and changing as the pure products and precious objects that he owns and disregards (and loses, with his life, affectless to the end).

This is not only nihilism on the part of DeLillo or his character—who, significantly, got his start "[hacking] into corporate systems" (ibid.: 123). Investigations into verbal transformations are now, for Eric, both a symptom and an engine of potential worldwide transformations. As "works," including print novels, increasingly enter into communication with networks, the word itself becomes the unit of literary exchange whose frequency of occurrence and ever-changing connotations can be tracked.

In electronic literature, not infrequently, not even the word but the *letter* becomes the unit of operation, as in Brian Kim Stefans's "*Star Wars*: One Letter at a Time" (2006b [2005]). There, for example, he might present, flashing on the screen and accompanied by the sound of a clicking type-writer, the letters purportedly typed by *Star Wars* creator George Lucas, one letter at a time. Typically for works of electronic literature, Stefans presented the work in the context of an art exhibition. Significantly, he presented the work along with a generic tag: "lettrism." Playfully, since the ring of the typewriter can be heard at the end of each typed line, the author further locates the work under the category of "bell letters."

The invention of terms and creation of new categories on the page or in linked documents, if conducted collaboratively in a networked environ-ment of metatags, keywords, and coded reference, might appear to give the literary community control over language's current development and its materiality in letters. Authors of born-digital work (notably Mez [Mary-Anne Breeze], who has invented a literary language, Mezangel, mixing coded symbols and English) might appear to extend this control to computer code, which is sometimes written to be read *as* text, though this practice is surely exceptional. As John Cayley (2002) puts it in the title to his contribu-tion to the "cyberdebates" at www.electronicbookreview.com, "The Code Is Not the Text (Unless It Is the Text)." When code operates at speed, it is not being read by humans: and besides, those who create code will always be a minority, a professional cadre or community of hackers whose spe-cialized and often proprietary knowledge is less and less likely to reach the universality (among educated classes) of print literacy. Even if widespread code literacy were achieved, it is unlikely that people would *think* in code, the way everybody thinks (and communicates) in language. Information might be lost in translation from one language to another, and this is not a hindrance but rather a condition of literariness—as David Damrosch (2003: 281) recognizes when he makes the capacity to "gain in translation" one of his criteria for world literature. Code, by contrast, is not enriched by being brought into written language—it simply becomes inoperable.

What the creation of terms in print and metatags in networks *can* accom-plish is a positioning of the imagination at the place where language is generated. Hence the creativity of Ben Marcus, whose aesthetic emerges from the intersection of mathematics and semantics, is a mode of invention wholly consistent with an electronic environment where letters, words, and sentences themselves are capable of becoming elements of a network:

> SHIRT OF NOISE Garment, fabric, or residue that absorbs and holds sound, storing messages for journeys. Its loudness cannot be soothed. It can destroy the member which inhabits it.   (Marcus 1995: 14)

CARL Name applied to food built from textiles, sticks, and rags. Implements used to aid ingestion are termed, respectively, the *lens*, the *dial*, the *knob*.   (Ibid.: 41)

SPEED-FASTING EXPERIMENTS Activity or practice of accelerated food abstention. It was first conducted in Buffalo. The record death by fasting occurred in two days, through motor-starving and exhaustion, verbal.   (Ibid.: 44)

Marcus's writing is not born digital. Published in 1995, *The Age of Wire and String* could have accounted for the Internet only in its infancy, when it was still used mostly by scientists, small working groups, and niche social networks. If Marcus's work is "experimental," it is so in the best sense of *trying out* concepts and carrying a certain hypothesis through to the end (however counterintuitive or defamiliarizing the conclusion might be). *Wire and String*, more than any work I have yet encountered online or on disk, has the feel of electronic literature. It has the capacity to conceive of language in some primordial state of semantic mutability where (against the "verbal exhaustion" Marcus shares with DeLillo's Eric Packer) each word can first take on meanings arbitrarily, based on how we happen to hear of a term or where we look it up, and then can build new meanings in use, as one term comes into contact with other terms. Meanings accrue not by narrative means alone but (primarily) by glossary-like definitions and cross-references, a "dreamlife of letters" that Stefans (2006a [2001]) would literalize in his "Internet text" but which has haunted print culture for a long time.

Marcus's "wire and string" constructions take on a life of their own, as nouns in his work become verbs, characters become concepts, and words come into contact with other words, equally removed from familiar contexts and connotations. Marcus's books differ from experimental writing of previous generations in the United States: his ambition, while large, is realized in patterns, recurrences, combinations, and recombinations, not in the promulgation of "grand 'world-thoughts'" that had been, for the critic Georges Brandes (cited in Prendergast 2004: ix), the key feature of prior world fictions composed in times of monumental technological constructions and competing ideologies. "Freedom" may have been first among these grand thoughts, a product of the optimism engendered by the Western nations' universal embrace of rationalism and progress as ideals. The generation of Gaddis, Pynchon, DeLillo, and Robert Coover (mid-1950s to the present) still recognized that universality, even as those authors worked simultaneously to dismantle ideologies and literary traditions alike. The first generation of born-digital literature (circa 1987–95), consistent with the "computer lib" ideology of Nelson, often took as its theme the cre-

ation of patchwork, cross-gendered, cyborg identities empowered by the affordances of what was then known as the personal computer, whose promise of universal access at the level of programming now seems dated. The appearance of such work as Shelley Jackson's *Patchwork Girl*, Michael Joyce's *Afternoon: A Story*, and M. D. Coverley's *Califia* on disks using customized software proved to be as much constrained as enabled by that relatively short-lived moment in the history of computer technology: the imaginative engagement with one proprietary software platform, facilitating the original performance and the author's organization of text blocks and accompanying images, could not be repeated with each upgrade that would be required for the work to be read on later platforms. What are often presented as technological "affordances" (consistent with the rhetoric of personal freedom) are thus more properly recognizable as "constraints" specific to a particular arrangement of media the moment a given platform becomes obsolescent.

By contrast, the work of Marcus and Stefans and second-generation e-lit authors, developing in the context of the Internet and database technology and aware of the limitations of proprietary technologies, tends to be more consciously about writing under constraint. While embracing expressive freedoms in their vocabulary and syntax, such works formally reflect a growing sense that limits have been reached, materially and ecologically, in the rationalist technological project.

Aware of the contingency of technology (and the more likely universality of abstract mathematics and language, which are of course embodied in but not tied to some specific technology or software), electronic literature can develop differently, more universally, by placing more importance precisely on the *words* whose presence is less platform specific, or at least strives to be in a Semantic Web (Web 2.0) environment of shared keywords and metatags (discussed in the next section). The renewal of semantic diversity could be as important to "ecological" literature as any topical engagement with questions of biodiversity and declining resources. The "exhaustion, verbal" cited by Marcus and felt by DeLillo's character Packer compels a renewed verbal invention as well as a backward-looking, etymological, and (in Stefans) typographical exploration.

This displacement of writing from formal to semantic constraints is already recognizable in the work of several Oulipo members. The reasons for shifting to semantic constraints were set out, for example, by Harry Mathews, who (consistent with Marcus and DeLillo) defines literary potential as a question of new words, "beyond the words being read," lying "in wait to subvert and perhaps surpass them" (Mathews, in Motte 1998 [1986]: 126). With computers as one—but not an exclusive—context for

renewed literary creation, Mathews approaches the problem of writing in constrained environments through a straightforward and familiar distinction, between syntax (how a phrase, sentence, or work is *structured*) and semantics (what a site or work is *about* conceptually and not only in terms of information). The distinction has been important in the development of the Oulipo away from mainly structural, combinatorial, and material experimentation (where the mathematical structure is *outside* the process of creation) toward a concern with the ends of narrative, content, and creativity. "Mathews's Algorithm," an essay in Warren F. Motte's *Oulipo: A Primer of Potential Literature* (1998 [1986]), is remarkable precisely in its concern with gathering and recombining semantic elements from past literatures—as, on the one hand, a mode of literary commentary and, on the other hand, a stimulation to the creation of new stories, potential stories that haunt those we know from the literary canon.

I settle on this one essay by Mathews not precisely because it concerns electronic literature. Mathews's concern with semantic innovation (rather than narrative or generic continuity) hints at the kind of continuities that are enabled in our move from predominantly print to electronic environments. Not least, the Oulipian project of *recovering* not masterworks but constraints from prior eras (even prior to print) offers an excellent precursor to the current project of carrying literary qualities from the past into new media environments. "Mathews's Algorithm," instead of proposing numerical constraints, would enable authors to identify and select "semantic elements" from (for example) a play by Shakespeare so as to mark phrases, words, and episodes and then to reconfigure the events and outcomes, producing alternative plays. (Doubtless, the reconfiguration and recombination of classic elements already take place semiconsciously in the thousands of popular entertainments produced in filmic, televisual, video, and gaming media. Mathews himself needn't attempt to realize one more instance. The point of the "algorithm" is to sensitize readers to the automaticity of narrative production, and hence to open a conceptual space for alternative creative practices.)

Mathews, however, does not limit his algorithm to episodes and events. He extends his tabulation to include elements in *Hamlet* of "love," "possession," and "victory" and how these terms course through moments of "consummation," "danger," "war," and so forth. Here "the elements are far more abstract" than the numerical constraints on plot and structure, though still the "abstractions fall short of a concept." That prospect, using words to generate conceptual configurations, while still to be realized, is now actively being pursued by many, among them several literary writers, in the (as yet speculative) construction of a worldwide Semantic Web (Web 2.0).

A Semantic Literary Web

The idea of a potential world system in a condition of perpetual change is also, perhaps not coincidentally, the feature that is best suited to bring world literature into conformity with current conceptions of the Internet—though not exclusively the Internet of blogs and chat rooms, e-mail communications, banner advertising, character string searches, folk encyclopedias, and interoffice face time. More promising, in part because it is as yet unrealized, is the so-called Semantic Web of conceptual connections, keyword descriptors, metatags, and ever-changing alliances and separations. The Semantic Web project (Web 2.0), to realize itself, depends on the adoption of Web standards and a certain a priori agreement in principle by practitioners in numerous fields, among which literature is unlikely to take the lead (though one hopes the literary won't be left behind, its critics debating technoculture while the work of material creation is left to others). What is found during electronic searches would depend, in principle, not on a matching of character strings but on the identification of metadata and the development of a terminological vocabulary shared among numerous content providers, creators of literary works among them. Not all texts on the Internet would be so marked, but those that do conform to a developing conceptual vocabulary would be available to searches and (proponents argue) would reinforce and be reinforced by other texts using a conforming vocabulary. This conformity at the level of the database, however, should not produce conceptual uniformity: new names, hybrids, and descriptors can be created continually. The development of the field would in some sense *be* the change in the frequency with which certain names are used and others drift into disuse.

This is a viable use of the Semantic Web. It differs from the utopian promise, roundly critiqued by Florian Cramer (2007), that "semantic technology" can "allow people to phrase search terms as normal questions, thus giving computer illiterates easier access to the Internet." The quest for natural language intelligence using computers, a grail of artificial intelligence research for the past thirty years, had best be set aside—just as the pursuit of narrative can be safely left to its continued development in print. Not all literary qualities need to migrate into electronic environments, but *some* qualities, semantic descriptors, for example, can be put to literary use. In this more limited version, enacted by humans in collaboration with machine intelligence, the Semantic Web would appear to be consistent with the cultural traffic that in past centuries generated the idea of a world literature, though it differs from past exchanges in that literary genres are not just discussable but capable of being identified and tracked during the time of their development. There is substantial support for the project. It

has a notable founding figure in the person of Sir Tim Berners Lee (credited with the proposal behind the original World Wide Web); it also has a following in the Open Source movement that continues to earn the respect of numerous organizations if not the market share and publicity that was co-opted very quickly by companies selling controlled goods (and lobbying hard to criminalize unsponsored activity at the level of source-code development and content creation).

The reason authors would want to interest themselves in a Semantic Web is straightforward. This Web promises to establish within electronic environments a place where connections have to do with semantics, involving conceptual linkages among documents, not the decontextualized hot links of the Internet as we have known it (namely, Web 1.0). Semantic Web database technology allows not only the tracking of keywords and concepts but also an awareness of their evolution in time. If works are identified and tagged not just according to bibliographical criteria (author, title, and publication date) but also according to literary *values* (for example, representations of the "actual structures and modes of functioning of literary genres" cited in Prendergast 2004), then the opportunity emerges for the creation of a living archive consistent with what really lasts in literary culture: not works but only words in the mind of a reader and a potential for further creativity based on the way previous words have been received by many readers and circulated through various media in various times. "Leaves and writings fade, but words remain," as Jean Lescure noted in "A Brief History of Oulipo" (in Motte 1998 [1986]: 32). A literary deployment of database technology has to be, like literature itself, reflexive and flexible, capable of looking forward to corresponding works by others as well as backward to discovered precedents, able to reference print and born-digital works with equal ease. A viable electronic literary practice also needs to persist and continually reproduce itself in a shifting "now" that changes each time a work is brought in touch with another work, past or future. Indeed, "publication" itself needs to evolve so that the density of connection accounts for a work's significance, not the number of hits or number of objects distributed and sold.[8]

A critical practice equipped to engage the world-building potential of electronic literature will emerge, however, only when such syntactic/materialist awareness is also informed by a semantic approach, one that can trace what works are about: what genres they employ and deform, and how concepts circulate within individual works and in networks too. Indications of such a critical approach turn up not frequently but often enough

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8. I address the likely adjustments in publishing and peer-to-peer review structures in an essay posted on the National Humanities Center blog, onthehuman.org (Tabbi 2009).

to give a sense of what is at stake. When Jaishree Odin (2007) describes a prominent e-lit production by Talan Memmot as being about "the coming into being of words and sentences as codework" and when Odin notes, moreover, that such a development reflects "a coalescence of theory and fiction," this literary critic is finding in Memmot's work a promise held by the Semantic Web itself. When Lori Emerson (2008) describes an "emergent, flexible poetics" that embraces avant-garde traditions in both book-bound and digital poetries, she indicates how poetry always tends to "move toward abstraction," using formal invention not as an end in itself but as a way to convey meanings beyond the materiality of sense and syntax and (on screens especially) to enact spatial relations beyond measure and number. Eric Rasmussen (2008) in his turn has usefully proposed the term "senseless resistance," for describing how affective elements of aesthetic objects resist being encoded into the symbolic mode.

The attention of these first-generation critics of electronic literature[9] is distinguished by an invariable concern with emergent aspects, new literary and distinctly textual configurations, not varieties of new media per se, and hence their work differs from the approach set out by N. Katherine Hayles in her survey, "Electronic Literature: What Is It?" (2007). Hayles, in seeking to identify the emergence of "major genres in the canon of electronic literature" in part "from the structure and specificity of the underlying code," tends to conflate genres with the specificity of their medium and at times of their technology. Granted, while "recognizing the specificity of new media," Hayles recommends not "abandoning the rich resources of traditional modes of understanding language, signification, and embodied interactions with texts." But in her presentation of actual works, these traditional "modes of understanding" remain mostly separate from the technological "means," since language in these works is often at best a commentary on visual, programmable, or otherwise operational elements (ibid.).

Many of the works that Hayles wants to include as "literary" could therefore just as easily be presented as "digital art" or "computer games." For Hayles (ibid.: "Genres of Electronic Literature"), the boundaries among these types are "shifty at best, more a matter of the critical traditions from which the works are discussed than anything intrinsic to the works themselves." But those differences and boundaries developed for good reasons, often so that a literary language could create its own self-awareness, its own specificities, genres, and supporting networks that are needed to

9. Critics in this new generation cited by Hayles (2007) include Dave Ciccoricco, who has introduced the "useful term, 'network fiction,'" Ian Bogost, Wendy Hui Kyong Chun, Florian Cramer, Matthew Fuller, Mark B. N. Hansen, Matthew G. Kirschenbaum, Adalaide Morris, and Rita Raley.

distinguish the literary arts from visual, oral, and computational media, which are more immediate, more closely linked to perception than language. Where games demand interaction and where conceptual arts bring us to a new, embodied understanding of the primacy of perception in the arts, literature does something else, something requiring continuity and development, not constant interruption through the shifting of attention from one medium to another. Literature's cognitive complexity comes not primarily from the media it encounters but from constraints that are peculiar to language.

Mathematics, the primary field of interest to the Oulipo, is relevant to literature because algorithms, patterns, and programs enable operations *on* language, not excursions into more perceptual media. Currently, the frequent location of literary texts on the same digital platform as nonverbal media does give a new perspective on literature's mediality. And Hayles is right to note how the constraints proper to print become more evident, more palpable, when print is regarded as "a particular output form of electronic text" and not as a separate medium (ibid.). But none of this frees language or critical discourse from its existence *as text* and in language. By encouraging endless fascination with the endless creation of new technologies, medium-specific criticism can have the same effect as the focus on identity and gender in cultural criticism: the predominant fascination with "difference" (as if difference could be measured, rather than further differentiated) and a mostly material reflexivity tend to draw attention to what is fleeting and particular in works of literature rather than to the work's involvement in long networks of communication whose stability and continuity depends largely on words.

Another weakness of medium-specific criticism, suggested by the long section in Hayles's essay devoted to problems of technological obsolescence, is that a dependence on ever-changing media without common technical standards places authors in the role of curators and publishers, not creators. This is as much an economic as a conceptual reason for critics to refocus attention on what e-lit authors have in common: to develop a metalanguage for describing works and to create a common workplace rather than to dutifully instruct ourselves about each new medium that is deployed in a given work.[10]

10. One hears frequently about rising paper costs and declining sales of academic press titles, but the costs of hybrid e-lit objects are also substantial considering the obligation to secure grants for cross-disciplinary collaboration and continual system upgrades. That accounting has been common in the sciences, but literary academics might consider whether authors can afford to lose the kinds of informal collaborations (among peers exchanging mainly written texts) that have traditionally characterized our group practices.

The focus on network construction as more fundamental than medium-specificity tends to direct discussion to what practitioners share, to the constraints within which *all* authors must work, bring their work to realization, and offer it to peers and readers who are themselves capable of becoming authors in turn. The obligation of making the results of one's research available universally, to those possessing literacy in both reading and mathematics,[11] is another defining feature of any world-literary enterprise—and an explicitly stated goal of the Oulipo. I focus on this group not for any work it has produced or even the early adoption by some of its members of computers in the production of "artificial" forms. My interest in the Oulipo has to do with how this group came into existence and (one hopes) continues to sustain itself and its offshoots—not as a literary movement, not as a publishing powerhouse, and not as a traveling academic seminar but as a *working literary network*. The Oulipo, more than any other literary organization, has defined its own working structures, as well as many of its literary productions, *as* a network. (The FC2 group in America, initially the Fiction Collective by Ron Sukenick, conceived as a consortium of writers publishing work by writers, is perhaps the nearest transatlantic model, along with the explicitly electronic, networked practice of the Alt-X Online Network based at the University of Colorado: www.altx .colorado.edu [the move to the new server is not yet complete].) This very process, of literature becoming a network, seems to me fundamental and a condition of literature's renewal and emergence in the networked environment of computers, interfaces, and tagged content in databases.

Network and Guild

From its origin with the author Queneau and the mathematician François Le Lionnais, the Oulipo group has gained credibility, and just as often given rise to incredulity, in its dedication to bringing mathematical forms

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11. Purposely I leave out so-called computer literacy for a simple reason: the commercial dumbing down and contracting out of interfaces is perhaps the greatest obstacle to creativity in networked environments. "Universality" is not achieved by making computers "available" to every person on the planet. Neither is a worldwide literacy approached by the development of a "semantic technology" that can "allow people to phrase search terms as normal questions, thus giving computer illiterates easier access to the Internet" (Cramer 2007). Easier access (what Alan Liu [2004] more broadly critiques under the phrase "user friendliness") generally means a more complete cluelessness on the part of commercial interface users about what is actually being searched at the level of code because, at this level, there can be no "semantic language understanding" (Cramer 2007). As Cramer points out, that grail has eluded artificial intelligence researchers for decades. Cayley (2002) concurs regarding the very limited conflation of semantics and informatics when he argues that "The Code Is Not the Text (Unless It Is the Text)."

to literary production. Its stated purpose, to "discover" literary forms, is less historical than militantly of the present in that the forms are valued not so much for their own sake as for their reuse in new works. Oulipian "research" is prospective rather than restrospective, "that is, it consists in tracking down work analogous to our own in the past" (Queneau, in Motte 1998 [1986]: 52). The Oulipo authors are especially taken by discoveries of "plagiarism by anticipation" (a phrase, incidentally, that was adopted by Gaddis in his last fiction, *Agapē Agape* [2002]). Apart from their effectiveness as literary provocations, such positions have their technocratic limitations. The very notion (not infrequently voiced by individuals within the Oulipo) that forms are available *outside* the process of their production and the person of their maker is an assumption that needs to be critiqued and set aside if literature is not to be made subservient to an instrumental practice. There has always been, in the Oulipo, a trace of its origins in first-order cybernetic thinking, where forms do not so much emerge as they are "discovered"—as though they existed somewhere "out there," in the world or in literary history (conceived of as an archive, not as a lifeworld populated by words held in the mind of an individual reader).

Another way of putting this would be to say that the Oulipo, for all its mathematical inventiveness and its celebration of literary oddities and methodical madmen, remains Euclidean in its mathematical outlook. Emerson (2008: 73) argues, in her above-mentioned essay on mathematical form in bookbound and electronic poetics, that computers and other techniques of writing under constraint were often used by the Oulipo in a way that closes down, rather than opens, a literary potential:

> As Jacques Roubaud puts it, the aim [of Oulipian methods] is "to comport oneself toward language as if the latter could be mathematized; and language can be mathematized, moreover, in a very specific fashion . . ." (Motte 1998 [1986]: 82). As such, the rigid set of rules at the heart of Queneau's work (a matrix of ten sonnets which generate 100 trillion poems) along with its unreadability—as Queneau himself puts it, if one were to read a sonnet per minute, eight hours a day, two hundred days per year, it would take more than a million centuries to finish the text—make it an odd variation on post nineteenth-century anti-romantic poetics. For while it is clearly opposed to the notion of divinely inspired creative genius (as the inspiration is purely mechanical), its mathematics is still based on Platonic objectivism in which there is a clear separation between mathematics and the one using the mathematics. In other words, Queneau simply sees himself as carrying out, by way of language, operations based on a stable reality of mathematics that exists, unlike Queneau himself, apart from the space and time of its creation and which therefore makes possible the concept of an infinite text—or a text that, in consisting of 100 trillion poems, might as well be infinite.

"Purely mechanical" is an overstatement, as Queneau did need to do the semantic work of making sure that each line would make sense when read after all nine or ten previous lines and before all nine or ten subsequent lines in the decade of sonnets. But the key distinctions are in place here: between a syntactic and a semantic inventiveness and between an imposed, stable, and external structure (in the tradition of "Platonic objectivism" and Euclidean geometry) and an emergent, flexible "space of . . . creation" associated with non-Euclidean geometry, network dynamics, and topologies.

The Queneuvian example, however, while among the group's first and most famous literary productions, is not necessarily definitional of the Oulipo. Indeed, the group may have saved itself from an overly literal application of any single mathematical model or from the promotion of any mechanistic system capable of dominating everything, and this self-delivery was due in part to the humor of its members but mostly to the way that the network was set up. Affiliation is closed to the outside (members are selected by a vote of all living members)[12] but at the same time open to all formal innovation in all genres, past and present, popular and academic. The discretion of the Oulipo members, their infrequent public appearances during the group's formative period, their yearly meetings (prone to "somewhat sybaritic manipulations," in Noël Arnaud's words), give to each member a guild-like awareness that his or her craft is *shared*. And this awareness is at least as important to a networked author as the knowledge that the work might be read by a "public" less clearly defined than an author's fellow craftspeople.

Consistent with the professional guild formation is the maintenance of networks as *reception media* rather than broadcasting media. Walter Benjamin (1969 [1936]) was prescient when he noticed how the layout of newspapers, including reader response through letters to the editor, helped create a potential for more, not less, activity in a mass audience for literature in general. Yet despite this promise in theory, for most of its life print remained an authoritative medium (where authors write and readers listen), and it was not until the advent of the Internet that Benjamin's ideas could have full play. This is not to say that the ease of response in online environments must necessarily produce an active readership. The vast majority of image/text produced *as literature*, through blogs and Web pages, is not read by anyone,[13] and that which is read is now written (and

12. Decades after the group's establishment, there are still fewer than thirty members, living and dead.
13. Joe Amato (2006) questions whether even the authors of most blogs ever go back and read what they have written for an audience that is for the most part never even hinted at

often published) largely by authors for authors through institutions that are distinctly *opposed* to commercial circulation and with the expectation that a response will be equally literary and channeled through similar, exclusively literary/aesthetic institutions rather than, say, a local or mass circulation magazine or newspaper or an author's appearance on broadcast television.

This receptivity in the medium helps explain why the first fully realized works of e-lit tended to include readers not as coauthors but as members of a select group among whom the work would be circulated, and this circulation itself is often an integral part of the work's design. Rob Wittig's *Blue Company* (2001), a deftly illustrated epistolary novel about a marketing executive who finds himself transferred to the fourteenth century, is readable now, in full, in the archives. Initially, though, it was received as e-mails by a select group of recipients, at least one of whom (Scott Rettberg, who wrote a sequel to the novel, *Kind of Blue* [2002]) has remarked on the distinctive experience of receiving installments while also plowing through the day's allotment of social, business, and professional e-mails—already an accepted component of full-time employment by the year 2001. (About his own collaborative hypertext narrative, *The Unknown*, Rettberg has noted that most readers seem to be logging in from office accounts: unknownhypertext.com/unknown.htm.)

Similarly, William Gibson's *Agrippa* (1992), which purports to erase itself in the process of being read, depended for its initial impact on a carefully staged media campaign that has been reconstructed with equal care by Matthew G. Kirschenbaum (2008). Even before its launch at the Kitchen, an art space in Manhattan's Lower East Side, those in the know had already broken the work's code, although the code breakers all waited for the Kitchen event before releasing the smuggled text, knowing that their hackwork would benefit from the opening's publicity.

Kirschenbaum's presentation of the literary history of *Agrippa* as a history of *transmission* again points to the importance of networks of storage and transmission in the creation of an electronic literary history. The emergent literary network is in this case neither populist nor elitist (the favored terms of cultural theory), neither democratic nor hierarchical, but closer

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in the writing. A literary text contains, traditionally, an "implied reader" within its rhetorical structuring. Premature announcements of hypertext's "interactivity" notwithstanding, a close reading of random unsponsored Web writing reveals a deep inability of many would-be authors to imagine that someone actually could be reading or responding. Those sites that do attract readers generally (still) attract *authors*—but authorship may differ from print in that authors do not speak while readers listen; rather, both authors and readers expect to be responded to in a reasonably short period of time.

perhaps to a *guild* organization, a not quite secret, media savvy, but still largely closed circle of participants who aspire to inclusion as more than audience members. The online life of such group formations, however, tends to last only so long as a given technological formation is in place—and this material consideration is one reason why the Oulipo, whose work after internal circulation is generally destined for print publication, has outlasted the occasions of its various experimentations in many media.

The Oulipo is not, strictly speaking, a guild. Admittance is to a certain extent arbitrary; you will not necessarily be admitted even if you are good and willing to enter the profession, as would be the case in a guild structure. There are also numerous Oulipian works that do not reveal their constraints to the reader. The tendency toward occultism, despite the interest it generates, may well work against the group's world-literary potential, even as the use of proprietary source code limits this potential in the literary practice of electronic environments. Even when a constraint does enter the public, its value is not as a tool for generating similarly constrained works: one novel lacking the letter *e* is sufficient to demonstrate the stringencies of that constraint—although the novel's translation by Gilbert Adair, from *La disparition* into *A Void* (1994), helps reveal the concept of avoidance that was only implicit in the original. Translation releases an expressive potential available in English which was not available in just this way in Georges Perec's French. Communications made possible by such interaction, while respecting the semantic integrity of the work, are advanced primarily by two authors working independently, in separate languages and at different times, in a field defined by a common linguistic constraint. That is the guild-like professionalism that writers in networked environments can take over from the Oulipo.

Text and Textile

I want to conclude this essay with a look at some of the ways that a return to the guild in electronic environments is not only possible but useful in distinguishing literary networks. Such networks differ, on the one hand, from academic communities (whose work circulates largely among committees, not primarily among authors) and, on the other hand, from commercial production, which is also networked but where value gets determined externally, mostly by nonwriters concerned first of all with sales. The Oulipo is surely not the only such distinctive model. Others would include (in the arts) the Fluxus group, which continues to be active to this day, the aforementioned FC2 network of authors/publishers, and the Alt-X Online Network, in which I have been active during most of its fif-

teen years online. In each case, the *social*, democratically open, but evaluative and restrictive activities are primary.

In recent years, however, in the Oulipo no less than these others, members have resorted to more regular "readings" and publications of compendia and the like. That bringing to market is a necessary element to the circulation of works—even among the authors themselves, who travel often and far beyond the confines of Paris. In addition to forging connections and a common workplace for sharing documents, authors will inevitably use their networks to their advantage, bringing their work to readers in numbers that could not have been realized even a few years ago. (Jason Nelson [Comment 2009], a prolific author of electronic literature, notes as a matter of fact the "millions" of responses to work he posts regularly online.) The danger of such individualized network activity is not so much "commercializing" the product (nobody will ever get rich off literary publishing) but rather that so much travel and so many evenings spent on performance (or, in Nelson's case, human hours spent maintaining a position among active networkers) can limit the time needed for getting any writing done. Also there is the danger of influencing internal dynamics and deliberations. "Will the Oulipo," asks one founding member, "let itself be voluptuously ravished by glory, even if the latter disfigures it?"

> Will it choose between the streetcorner stall of a master cobbler and the claustral life of its first period? Will it adopt a frankly "reactionary" stance? . . . Will it contemplate, perched on its promontory, the mounting tide of computer science (of which vogue the Oulipo is far from innocent; it was, on the contrary, one of the first to put machines to poetic use, and several of its members have become masterful in the writing of programs and the manipulation of computers)? Will it concede preeminence to the machine? Or will it cut the ties that bind it to the machine, that progressively hold it tighter?   (Arnaud, in Motte 1998 [1986]: xv)

Rather than attempt to answer such rhetorical questions, I only note here that the questions, though published, are in the first place directed by the author as a group member to the other members in the group. That is a sign of the guild mentality: its productions are (at least partly) available to the public but always addressed in the first place to fellow members.

Another sign of the guild, in the same essay by Arnaud, is the way that the group's self-designations take on not a historical flavor but the nature of a narrative, and not a narrative invented but one already "inscribed" in the group's "name." Although Le Lionnais and Queneau began by calling their project a *seminar*, which in the French context recalled the education of "young ecclesiastics" (and, for some group members, the insemination

of racing horses), the term *ouvroir*, or workshop, was proposed by the "eminent scholar and sixteenth-century specialist Albert-Marie Schmidt, one of its founding members." Arnaud (ibid.: xii) summarizes the significance of the name change, which proved to be only one of the many *generative* changes involving naming:

> For an *ouvroir*—a word that has fallen into disuse—denoted a shop and, as late as the eighteenth century, a light and mobile shop made of wood, in which the master cobblers of Paris displayed their wares and pursued their trade. The word could also denote that part of a textile factory where the looms are placed; or, in an arsenal, the place where a team of workers performs a given task; or a long room where the young women in a community work on projects appropriate to their sex; or a charitable institution for impoverished women and girls who found therein shelter, heat, light, and thankless, ill-paid work, the result of which these institutions sold at a discount, not without having skimmed off a tidy profit, thus depriving the isolated workers of their livelihood and leading them (as it was charged) into vice. Later, and for a short time only, *ouvroir* denoted a group of well-to-do women seeking to assuage their consciences in needlework for the poor and in the confection of sumptuous ecclesiastical ornaments. Curiously enough, it was this last notion, the "sewing circle," that prevailed in the minds of the Oulipians; just like those diligent ladies, Oulipians embroidered with golden thread.

I want to draw attention here to the way Arnaud generates both an argument and a narrative from the reflection on one word—or rather on "the successive or parallel definitions of the word *ouvroir*" that have helped generate one important network's early conception of itself. Words shift in meaning both through internal, etymological developments and through changes in context. Their histories, then, can be read not only linearly, as a series of different meanings understood and recorded by different readers at various points in time, but also contextually and, in this case, *texturally*, as new situations and changing cultural frameworks create new practices within the domains designated by the word. It is precisely such changes, and not always after the fact, that databases are designed (or can easily *be* designed) to capture in the tracking of keywords and metatags provided by authors of works. Such trackings, rather than being devoted to language as a resource "out there," are instead involved in the development of databases themselves—or can be if scholars and writers recognize this semantic potential in computers and networks.[14]

14. Readers who wish to engage in an "experiment" in collecting and naming works of electronic literature may participate in the Collaborative Web Capture that is under way under the auspices of the Electronic Literature Organization and the Library of Congress. This project, in the words of the editors, would repurpose "MediaWiki, the . . . platform used for

Arnaud's approach is exemplary not least because his small narrative was seemingly generated off-the-cuff. His writing is distinguished by its attention, in this case, not to any imposed structure or constraint but to the material constraints and cultural contexts that shaped and pushed out from the development through time of a single word through its everyday usage. Arnaud's text generation is not structured from the outside but advances through associations and contexts—like a textile. And a textile is best described not through geometries (although arabesques and other stable patterns can be inscribed for those given to prayer) but rather by topologies, which are less easy to follow. A poetic statement of the distinction is given by Michel Serres (1994) in his book *Atlas*: "I live," he writes, "in geometry. But I am haunted by topologies." Elsewhere Serres delineates how geometrical thinking is embedded in language (and how, not by blurring distinctions but by activating them, language can become more sensitive to topological modes of thought): "Topology has a different and better grasp on space: where, here, all conditions like isolation/closeness (*inside*), openness (*outside*), gaps (*between*), direction and orientation (*towards*, *in front of*, *behind*), neighborhoods and vicinity (*near*, *under*, *above*), immersion (*amidst*), dimension and so forth, figure not to measure but within relations." Serres's formulation is consistent with several formulations I have touched on in the course of this essay. Like Emily Dickinson's elaboration on "internal difference / where the meanings are" ("There's a Certain Slant of Light"), like Morris's "ghostly alternatives," and like Bateson's "difference that makes a difference," topological thought is differential. But the differences thus elaborated go *all the way down*; that is, they do not stop at the skin, or at styles of expression, or at experiences incommunicable between one person and another. Instead, topological thought bears witness to contradictions and differences that "haunt" all expression by all persons capable not just of speaking and communicating but of reflecting on language and the materialities of communication. Here is where the vaunted nonlinearity of networked environments is to be sought and not in hyperlinks (which are only undifferentiated text blocks set out in a branching pattern, not language that needs conceptual and semantic connection for its self-differences to be registered). Nonlinearity, like most networked literary qualities, can be either afforded or constrained by the medium in which a work is written. But such qualities will be known, if at all, in relations, not in measurements and not primarily in the design of software and interfaces. New media writing especially, if it is to be new, needs to be read

Wikipedia, . . . toward literary ends. A successful outcome of [the] experiment will be the acquisition of a robust sample of electronic literature and the development of a descriptive language or metatag vocabulary" (eliterature.org/wiki/index.php/Main_Page).

consistently in relation not to works in its medium alone but to the oral practices and print traditions out of which literary writing emerges.

The point of writing under constraint, for many Oulipian authors, is rarely to celebrate or think about the constraint itself or even about the work produced under constraint but rather to demonstrate the persistence of creativity and invention despite the imposition of automatic, numerical, and other "artificial" frameworks. Oulipians, offered Queneau in one of the group's early self-descriptions, are "rats who must build the labyrinth from which they propose to escape" (cited in Motte 1998 [1986]: 22). Resistance too figures not as a political opposition but as a resituation of the person within a network of relations. Precisely because the author is made aware of constraints, he or she must find, within language, resources that would otherwise not be found, and this is particularly evident when the author brings forward constraints that are often forgotten in print, lettering, and other materials of signification. Perec's composition of a novel without the letter *e* therefore is consistent with his experience, in his job, of being retrained for a computer but with one exception: by resisting retraining, imposed on him arbitrarily, he very nearly lost the job; but by retraining his prose, Perec reasserted the author's literary sovereignty in the face of constraints. What was outside the author's control is thus modestly brought under control, the constraint is overcome, and its importance thereby minimized and made incidental. The imagination, not the constraint, is in this configuration both primary and potentially universal.

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