

the changing profession

Responses to Ed Folsom's "Database as Genre: The Epic Transformation of Archives"

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Against Thinking

PETER STALLYBRASS

BY MAKING "POEMS, ESSAYS, LETTERS, JOURNALS, JOTTINGS, AND IMAGES, along with biographies, interviews, reviews, and criticism of Whitman" "freely" available in the online *Walt Whitman Archive*, Ed Folsom and Kenneth Price are helping to liberate Whitman from the economic and social constraints that govern archival research: the grants, travel money, and time necessary to visit the depositories where the materials are held and the credentials necessary to see the materials when you get there. At the same time, my sense is that the archives are being used more widely than ever before. The difficulty of gaining access to at least some of the archives has been exaggerated. It is a pleasure to see the wide range of people (of whom I would guess academics are a minority) who now use the Public Record Office (PRO) in London, where they are not only allowed access to an extraordinary range of old and new documents but are also allowed to photograph materials without charge. Permitting photography has had a radical effect on the use of the PRO, since it encourages readers who may only be able to spend an hour or two in the library to work for days or years afterward on deciphering and understanding the materials they have photographed. Photography has also provided one of the main bridges between database and archive. Seeing online images of the *Mona Lisa* has done nothing to decrease people's desire to see the painting in the Louvre. Quite the contrary.

The same is true of the libraries that have begun making their materials freely available online. The small and magnificent staff of the Department of Special Collections at the University of Pennsylvania's Van Pelt Library are overwhelmed by the clamorous de-

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mands of undergraduates, graduates, and faculty members to work on texts ranging from the medieval manuscripts generously made available by Larry Schoenberg, to a fifteenth-century French chansonnier, to one of the three known copies of the poems of the sixteenth-century Venetian poet Veronica Franco, to the corrected typescript of Theodore Dreiser's *Sister Carrie*, all of which are accessible through the Schoenberg Center for Electronic Text and Image.

But if database has been an incitement to the use of archive, it has changed our relation to the ownership of knowledge. One of the most radical aspects of database is its power to separate knowledge from academic prestige and from its attendant regime of intellectual property. Scholarship, as traditionally conceived, has maintained its prestige partly through its privileged relation to the protection and retrieval of scarce resources. Now, however, millions of people who cannot or do not want to go to the archives are accessing them in digital form. And digital information has profoundly undermined an academic elite's control over the circulation of knowledge.

This circulation has created a panic among academic gatekeepers about plagiarism. The more knowledge circulates, the more energy goes into establishing a strict accountancy of mine and thine. Database and its resources are now used to track down plagiarism that previously could only be detected by scholarly labor. Academics who are more interested in producing knowledge than in reproducing the divide between their own knowledge and their students' ignorance should ask students to use good databases and reward them for doing so well.¹ Paradoxically, database will make the gatekeepers' work increasingly problematic. New programs, like the *Montaigne Project*, which I am using to analyze how Shakespeare read Montaigne, will allow us to compare any texts to trace the transmission of phrases. They will also reveal the extent to which the gatekeepers are themselves trespassers who do,

perhaps unconsciously, what Shakespeare deliberately and shamelessly did in the construction of his poems and plays. He appropriated for his own use what he read or heard, as can readily be seen in his most famous soliloquy:

- 1573 Ralph Lever: "to be or not to bée" (67)
 1584 Dudley Fenner: "to bee or not to be" (C1)
 1588 Abraham Fraunce: "to bée, or not to bée" (86)
 1596 William Perkins: "to be or not to be" (4)
 1601 John Deacon: "to be, or not to be" (46)
 1603 Robert Rollock: "to be or not to be" (*Treatise* 177–78)
 1604 Henoeh Clapham: "to be, or not to be" (A2v)
 1604 William Shakespeare: "to be, or not to be" (G2)
 1585 Thomas Bilson: "That is the question" (264)
 1604 William Shakespeare: "That is the question" (G2)
 1576 Thomas Rogers: "with a quiet minde to suffer" (folios 32v–33)
 1582 James Yates: "a patient minde to suffer" (folios 72v–73)
 1600 Robert Rollock: "with his owne mind to suffer" (*Exposition* 210)
 1604 William Shakespeare: "in the minde to suffer" (G2)
 [1540] Desiderius Erasmus: *Mare malorum, Kakôn thálassa* ("a sea of troubles" [1.3.28])
 1566 William Painter: "a Sea of troubles" (folio 115v)
 1585 John Norden: "raging sea of troubles" (folio 92v)
 1590 Everard Digby: "a sea of troubles" (128)
 1604 William Shakespeare: "a sea of troubles" (G2)
 1578 Henry Bull: "sleepe of death" (182–83)
 1581 John Merbecke: "the sléepe of death" (1035)
 1600 John Bodenham: "sleepe of death" (233)
 1604 William Shakespeare: "that sleepe of death" (G2)

Shakespeare consciously practiced his own form of database. It is only in a regime of originality that such techniques become secretive and shameful. The only shame that

should attach to such "resemblances" when they are discovered is the extent to which the gatekeepers have tyrannized those less powerful than they for trespassing.

Database renews our sense of language as "a tissue of quotations" from which we cannot, even if we wanted to, remove ourselves (Barthes 146). And while downgrading knowledge from being the secret horde of archive haunters, database will place new weight on inventorying as a means of structuring knowledge. As Mary Carruthers argues:

Having "inventory" is a requirement for "invention." Not only does this statement assume that one cannot create ("invent") without a memory store ("inventory") to invent from and with, but it also assumes that one's memory-store is effectively "inventoried," that its matters are in readily-recovered "locations." (12)

To rediscover the power of inventory is also to rediscover the forms of pedagogy that precede the regime of originality. The great Renaissance tradition of commonplacing was a systematic practice for overcoming the originality (i.e., unacknowledged repetitiveness) of one's own mind by organizing one's reading as a database. In this pedagogy, reading is a technology of inventorying information to make it reusable.

The major way of inventing knowledge in the Renaissance grew out of new forms of databases. Above all, Renaissance readers and writers followed the example of the bee. Francis Daniel Pastorius was still following

the bee's example when, in Philadelphia in 1696, he began his massive *Alphabetical Hive of More Than Two Thousand Honey-combs*, compiled from "all remarkable words, phrases, sentences, or matters of moment, which we do hear and read" (1). The bee provided less a metaphor for understanding than a model for the note-taking practices and database organization that were the precondition for invention (see the table below).² Only after reading, "collecting, like Bees, from every flower," can the writer "hiue their hony on [his] tongue" (1).

While I do not question Ed Folsom's emphasis on the innovations of database in the age of the computer and Internet, it is significant that some of the most powerful modern databases draw on the development of a massive range of finding aids and databases in the Middle Ages and Renaissance. Such finding aids and databases were produced above all for the study of the Jewish and Christian bibles. They provide a model for Web sites like Calvin College's *World Wide Study Bible*, which contains links to commentaries on every verse of the Bible. The first verse of the eleventh chapter of the Epistle to the Hebrews alone connects to commentaries and sermons from the Church Fathers (Ambrose, Augustine, Bernard, Chrysostom, Cyril of Jerusalem, Gregory the Great, Gregory of Nyssa, Hilary of Poitiers, John of Damascus, Thomas Aquinas), a medieval English mystic (Walter Hilton), sixteenth- and seventeenth-century ministers and exegetes (Jacobus Arminius, Lewis Bayly, John Calvin, John Donne, Mar-

<i>The Bee's Work</i>	<i>Material Support</i>	<i>Form of Writing</i>
1. Finding nectar in flowers	1. Books and their margins	1. Underlining, marginal marks, and notes
2. Gathering nectar from flowers	2. Small erasable tablets or waste books	2. "Promiscuous" notes
3. Putting pollen in the correct cell of the honeycomb	3. Large commonplace books	3. Notes under proper alphabetical headings
4. Making honey	4. Sheets or gatherings	4. Composing, writing

tin Luther, Thomas Manton, John Owen, John of the Cross, Samuel Rutherford, Thomas Watson), and eighteenth- and nineteenth-century commentators and preachers (Albert Barnes, Adam Clarke, James Denney, Jonathan Edwards, John Gill, Matthew Henry, Charles Hodge, Robert Jamieson, Philip Schaff, Charles Spurgeon, Isaac Watts, John Wesley). This for a single verse of the Bible.

To make database entirely a feature of the present is to ignore what information is stored and why. Christianity has had nearly two millennia of accumulating and organizing its databases, and there is nothing random about that—not even about how and why Christians began to organize their databases alphabetically to facilitate rapid retrieval.³ Equally, there is nothing random now about the organization of databases around a canonical American poet. I do not mean this as a criticism of specific databases, any more than I mean to criticize Calvin College's Web site, which has transformed how I approach teaching biblical texts. But databases are neither universal nor neutral, and they participate in the production of a monolingual, if not monocultural, global network.

But at the same time databases can help free us from the tyranny of proprietary authors, solitary thinkers who produce knowledge out of their own minds. For the last few years, I have been experimenting with a pedagogy that explicitly opposes proprietary authorship and the model of thinking that supports it. The following, for instance, is one strategy I developed for a course, using databases to disrupt thinking:

AGAINST THINKING

Here is my vulgar recipe for working as opposed to thinking.

THINKING is

Hard, painful

Boring, repetitious

Indolent

NB. Hard *and* indolent.

WORKING is

Easy

Exciting, a process of discovery

Challenging

There is nothing mystical about working. I suggest breaking it down into a series of procedures. The larger the question, the greater the need to reduce it to practical steps.

(1) Always use *The Oxford English Dictionary* and other relevant dictionaries to develop your sense of language as an active, historical medium. For your exercises and projects, build up your own list of useful words (e.g., for Benjamin Franklin, I've been working with words like *accounting*, *almanac*, *binding*, *blank*, *books*, *broad-sides*, *composing*, *compositor* (*sorts* and *out of sorts*), *copy*, *edition*, *ink*, *newspaper*, *pamphlet*, *paper*, *paper money*, *press*, *print(er, -ing)*, *printinghouse*, *publish*, *publication*, *rags*, *type* (*typeface*), *uppercase*, *lowercase*, *warehouse(ing)*, *woodcut*.

(2) After reading Franklin's *Autobiography*, download the text from the Web and use it and other Web resources to generate material. (Over 25,000 books are freely available from the *Online Books Page* on the University of Pennsylvania library's Web site.)

(3) Compare, when possible, different versions of the "same" book or image to train yourself to notice large and small linguistic and material differences. For instance, using online resources, compare John Foxe's Master Rogers story in an early edition of his *Book of Martyrs: Actes and Monuments* and in several editions of the American eighteenth-century *New-England Primer*. While teaching yourself to notice small differences, don't overlook the obvious (e.g., the massive difference in *size*—and, as a result, in cost and accessibility; the primers sold in millions).

(4) Compare visual depictions of the same text with each other and with the text on which they are based. Look at images of Genesis 3.7 (are Adam and Eve naked, wearing a fig leaf, or wearing fig leaves tied together?) and 3.21 (are Adam and Eve naked, wearing leaves, or clothed when they are expelled from Eden?). See Web sites of the Metropolitan Museum, National Gallery in Washington, National Gallery in London,

etc. Having read Genesis 50.26 and looked at the depiction of the verse in the online *Brick Testament*, would you call the man who is mummified Joseph or Zaphnath-paaneah?⁴

(5) Spend more time on less. Databases create information overload (Blair, "Reading" and "Note-Taking"). It's good to browse so as to generate information and ideas, but then you need to focus on specific passages, images, theoretical problems, etc.

When you're WORKING, you'll be in the good company of the writers we'll be working on. None of them had a writer's block. When Shakespeare sat down to write a history play (say, *Richard II*), he made sure that his table had the right things on it: Holinshed's *Chronicles*, from which he took the plot, and a commonplace book that I imagine as having entries under *death, Ireland, Cain and Abel*, etc. Shakespeare and Anne Bradstreet wrote. They assembled the necessary materials (this was called "invention" in the Renaissance) and then got on with the job according to two fundamental principles:

(A) IMITATION: This means that you *read* (or listen) so as to write. If you look at scenes of medieval writing, you cannot tell if you're looking at a scribe, a translator, or an "author"—all have books around them from which, in their different ways, they are transcribing (or "translating" [Chartier 18–20]). Shakespeare (who invented in the modern sense at most one or two of his plots) "translates" Holinshed and other chroniclers. In *Hamlet*, Shakespeare rewrote a ten-year-old play called *Hamlet* (which doesn't survive). In *King Lear*, he rewrote an earlier play called *King Lear* (which does survive).

(B) INSPIRATION: This is a complex way of rethinking imitation. It means allowing yourself to be "breathed into"—as your own voice has been breathed into you at school and by parents, lovers, those whom you aspire to be like, etc. When you're working, as opposed to thinking, ideas will indeed "come over you" (as in, "I don't know what came over me"). Thinking does, in that sense, take place, but dialectically. You are not, nor should you be, the origin of your own thoughts (any more than you are the origin of your own voice). Having

your own thoughts in the literal sense is as impossible as having your own language. It's not only impossible; it's silly and unnecessary to attempt it. You should have better things to do with your life. When I'm tempted to think, I commonplace Pepys or Montaigne instead.

When you're THINKING, you're usually staring at a blank sheet of paper or a blank screen, hoping that something will emerge from your head and magically fill that space. Even if something "comes to you," there is no reason to believe that it is of interest, however painful the process has been. ORIGINALITY (an unhelpful concept connected with thinking and deep thought) is another name for repeating other people's ideas without knowing that you're doing so. What would it mean to speak with an original voice, if our voices are the (unique) combinations of hauntings through which we speak and through which we are spoken? In this sense, originality is not only a bad concept, it's a cruel one that would excise what makes us who we are—the voices that have taken up a local habitation and a name in our bodies.

There is no relation between the quantity of pain and the quality of the work produced. I can agonize for days—thinking—and still produce platitudes. The cure for the disease called thinking is work.

Learning requires imitation and inspiration, which today are marginalized by a concept of originality that produces as its inevitable double the specter of plagiarism, a specter rooted in the fear that we might have more to learn from others than from ourselves. Franklin made this clear when, in the longest pamphlet that he ever wrote during his career as a printer, he defended Samuel Hemphill, a preacher who had been accused of religious unorthodoxy, from the subsequent charge of plagiarism. Franklin noted that Hemphill's accusers

endeavour to lessen [him], by representing him as a Plagiary, and say, *They are apt to think, that if he had honestly given credit to the several Authors from whom he borrowed much of what he deliver'd, it wou'd have made*

a considerable Abatement of the Reputation he supposes he gain'd, &c.

But which of these Gentlemen, or their Brethren, is it, that does give due Credit for what he borrows? Are they beholden to no Author, ancient or modern, for what they know, or what they preach? . . . They chuse the dullest Authors to read and study, and retail the dullest Parts of those Authors to the Publick. It seems as if they search'd only for Stupidity and Nonsense. . . . But when Hemphill had Occasion to borrow, he gave us the best Parts of the best Writers of the Age. Thus the Difference between him and most of his Brethren, in this part of the World, is the same with that between the Bee and the Fly in the Garden. The one wanders from Flower to Flower, and for the use of others collects from the whole the most delightful Honey; while the other (of a quite different Taste) places her Happiness entirely in Filth, Corruption, and Ordure. (Franklin, *Papers 2*: 96–97)⁵

For Franklin, ideas were a common treasury to be shared by all. The problem is not imitation or even plagiarism but the claim to intellectual property, a claim that justifies itself by producing plagiarism (i.e., the possibility of shared knowledge) as its moral and legal antithesis. Franklin argued that the immorality lay in the fences that intellectual property erected, which, preserving knowledge for the rich and powerful, prevented its free circulation.

Database is beginning to make scholarly work (previously the mystified privilege of an elite) available to anyone who's interested in doing it. One group (much despised by the academy) doing such work is amateur genealogists who have trained themselves in paleography, codicology, databases, and a range of other subjects that academics do not have the time to learn because they are too busy accrediting students (and one another) and tracking down cases of plagiarism. I am no particular fan of genealogy. But it certainly produces more substantial knowledge than ranking academics and universities and persecuting students who are held to a standard

of originality by which their professors manifestly do not abide. If you really want to learn something new, ask a librarian or a conservationist. Among other things, they're busier sharing information than trying to protect it from the prying eyes of their "competitors." For academics, the competitors are no longer just our colleagues; in the age of database, they are also the students whom we claim to be teaching. The imperative that was once ethical is now pragmatic as well: share your "original" knowledge if you don't want others to find out where you appropriated it from. Better still, think of knowledge as what we share for future creations rather than as the private property of past and present authors.

NOTES

1. If you want to hear predictable responses that you can buy on the Web or, worse, to hear "original" responses, ask your students about "the redemption of *King Lear*" or "filial ingratitude in Shakespeare's *King Lear*" or "the theme of blindness in William Shakespeare's *King Lear*" or "*King Lear* and the fatal flaw" or, best of all, "self-discovery in Shakespeare's *King Lear*," which has the advantage of being the topic of a free paper, beginning, "Through the course of the play, *King Lear* goes through a process of attaining self-knowledge, or true vision of one's self and the world. With this knowledge, he goes through a change of person, much like a caterpillar into a butterfly" ("Self-Discovery"). It's easy to avoid such essays by asking your students to plagiarize better databases, like *The Oxford English Dictionary* or the online "Shakespeare in Quarto" at the British Library or the First Folio and promptbooks at the Schoenberg Center for Electronic Text and Image. If you ask silly questions, you deserve silly answers.

There is nothing silly in writing about blindness in *King Lear*. What is silly is for a teacher who has read, say, Stanley Cavell's brilliant analysis of the topic to expect students to come up with original versions of it, which will be judged by the degree to which they depart from Cavell and the degree to which they reproduce Cavell; they will inevitably fall short on both counts. It would be a better exercise to ask students to commonplace "eyes," "blind," etc., in *King Lear* and to see which passages Cavell has not commented on and what difference they might make to his argument.

2. For my discussion of the material practices of commonplacing, I am deeply indebted to Francis Goyet's

account of Philip Melanchthon in an unpublished essay on *Hamlet*.

3. Folsom quotes Lev Manovich's "most provocative claim" that "the database represents the world as a list of items, and it refuses to order this list." But it's worth noting the profound shock caused to Christianity by the alphabetization of knowledge in the Middle Ages. The alphabet, as a technology of ordering knowledge, creates "a list of items" whose only principle of order is its randomness. When theologians and scholars alphabetized knowledge, they sacrificed a sense-making hierarchy (from God to the angels to humans and so on down the scale) for the sake of the easy retrieval of information. Indeed, the alphabetical system that we take for granted was at first resisted, because it led to arbitrary relations between words, to logical inversions in which the created preceded the creator (*filia* 'daughter' coming before *pater* 'father,' *angelus* 'angel' before *deus* 'God'), and to inversions of social hierarchy (*filia* 'daughter' coming before *filius* 'son,' *mater* 'mother' before *pater* 'father' [Daly 69–84]). The battle between narrative and database is a general structural problem in the ordering and retrieving of knowledge, not a specific historical event. And the desire to transform persistent synchronic tensions into a single moment of diachronic rupture replaces historical difference with a phantasmatic historicism.

4. See Genesis 41.41–45: "And Pharaoh said unto Joseph, See, I have set thee over all the land of Egypt. And Pharaoh took off his ring from his hand, and put it upon Joseph's hand, and arrayed him in vestures of fine linen, and put a gold chain about his neck; And he made him to ride in the second chariot which he had; and they cried before him, Bow the knee: and he made him ruler over all the land of Egypt. And Pharaoh said unto Joseph, I am Pharaoh, and without thee shall no man lift up his hand or foot in all the land of Egypt. And Pharaoh called Joseph's name Zaphnath-paaneah; and he gave him to wife Asenath the daughter of Poti-pherah priest of On. And Joseph went out over all the land of Egypt." For the relevant scenes in Lego in *The Brick Testament*, see Smith ("Pharaoh's Dream" and "Jacob").

5. I am deeply indebted to Michael Warner for drawing this passage to my attention and for his brilliant observations on it and on Franklin more generally. Franklin's account of the bee and the fly is itself "plagiarized," as he would have been the first to acknowledge, from Plutarch's *Moralia*:

[L]ike as Bees have this propertie by nature to finde and sucke the mildest and best honie, out of the sharpest and most eager flowers; yea and from among the roughest and most prickly thornes: even so children and yong men if they be well nurtured and orderly inured in the reading of Poemes, will learne after a sort to draw alwaies some wholesome and profitable doctrine or other, even out of those places which moove suspicion of lewd and absurd sense. (43)

That Franklin had no intention of deception in this, as in any of his other borrowings, is made clear by his proud claim to be imitating Plutarch for the modern age. For his other borrowings, see for instance Poor Richard's defense of the fact that "not many of [my verses] are of my own Making":

I know as well as thee, that I am no poet born; and it is a trade I never learnt, nor indeed could learn. . . . Why then should I give my readers bad lines of my own, when good ones of other people's are so plenty? 'Tis methinks a poor excuse for the bad entertainment of guests, that the food we set before them, though coarse and ordinary, is of one's own raising, off one's own plantation, etc. when there is plenty of what is ten times better, to be had in the market.

(*Poor Richard* 2)

For a fuller account of Franklin's writing practices, see Green and Stallybrass 3–23.

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Database, Interface, and Archival Fever

JEROME MCGANN

[I]

ED FOLSOM'S PRESENTATION OF WHITMAN'S work as many-faceted and multidimensional is true and important. "[H]is work resists the constraints of single book objects." Indeed. "[T]he entity we call *Leaves of Grass* is actually a group of numerous things. . . ." Just so. These are some of the characteristics not only of Whitman's work but of all imaginative works, which are by their nature multidimensional. Some—like Whitman's works—foreground their multidimensional qualities. Folsom and Ken Price undertook their project because they registered the truth of Whitman's flaunting declaration: "I am large, I contain multitudes."

But then Folsom, happy with the scholarly opportunities made possible by digital technology, goes on to construct a tale (dare I say a narrative?) about the *The Walt Whitman Archive* as an example of "a new genre, the genre of the twenty-first century." This genre is "database," and the Whitman archive is one of its incarnations: the "archive is, in actuality or virtuality, a database."

This statement is seriously misleading—more accurately, it is metaphoric, like Derrida's use of the term *archive* in his well-known book of 1995, *Archive Fever*, which has been so important for the story Folsom is telling. *The Walt Whitman Archive* is not—in any sense that a person meaning to be precise would use—a database at all. What Folsom calls the archive's "rhizomorphous" organization does not emerge from a database structure. It

emerges from a core framework consisting of two parts: an inline markup structure (XML) and an XSL-generated interface. Together they allow users to access and—through an X-query-based search engine—manipulate *The Walt Whitman Archive* in the ways that Folsom rightly celebrates.

You will think I am being pedantic, and in a certain respect I am. But accuracy here is important. Folsom's central double theme—that database is a genre displacing book-based narrative genres and that *The Walt Whitman Archive* exhibits this displacement—misrepresents both the archive and the functional character of works of this kind, which are now fairly widespread and will only grow more so. No database can function without a user interface, and in the case of cultural materials the interface is an especially crucial element of these kinds of digital instruments. Interface embeds, implicitly and explicitly, many kinds of hierarchical and narrativized organizations. Indeed, the database—any database—represents an initial critical analysis of the content materials, and while its structure is not narrativized, it is severely constrained and organized. The free play offered to the user of such environments is at least as much a function of interface design as it is of its data structure—whether that structure be a database structure or, as in the case of *The Walt Whitman Archive*, a markup structure.

As humanities scholarship and its inherited archives migrate into their digital conditions and sets of practices, it's crucial to be clear about what is involved and how we want to shape the changes that are under way. I honor Folsom's enthusiasm about our "twenty-first century" opportunities and his adventurous

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scholarly spirit in collaborating on the Whitman archive. But Folsom's essay introduces a loose way of thinking about our paper-based inheritance as well as about these new digital technologies, and that looseness endangers the work he has committed himself to.

This looseness does not originate in Folsom, however; its source is Lev Manovich's *The Language of New Media*, often cited by humanists who get excited about digital technology. Folsom extrudes his idea that the database is "the" genre of the twenty-first century from passages like the following:

After the novel, and subsequently cinema, privileged narrative as the key form of cultural expression of the modern age, the computer age introduces its correlate—the database. Many new media objects do not tell stories; they do not have a beginning or end; in fact, they do not have any development, thematically, formally, or otherwise that would organize their elements into a sequence. Instead, they are collections of individual items, with every item possessing the same significance as any other.

This kind of talk debases our understanding of the matters being discussed, which are far more interesting and complex than such a pronouncement suggests. "Narrative," even "privileged narrative," is as ancient a form of cultural expression as we know. And so far as narrative goes, "the modern age"—presumably, here, the modernist twentieth century—is famous for the inventive ways it fractured and overthrew narrative, especially "privileged narrative." But Manovich needs an easy binary to install the progressivist story that underpins *The Language of New Media*.

For scholars interested in migrating our cultural inheritance to digital environments, databases are by no means the most useful tools for the task—or for the related critical tasks of investigating and rediscovering those materials. The inline markup approach of the Text Encoding Initiative (TEI [www.tei-c

.org])—now evolved into XML—became a standard for digitizing literary works for a reason. There are good reasons why *The Walt Whitman Archive* is not a database.

Let's be clear. The TEI and XML do not adequately address the problem of knowledge representation that is the core issue here—that is, how do we design and build digital simulations that meet our needs for studying works like Whitman's?—but they get a lot further along with that task than do database models. They are better because they model some of the key forms of order that are already embedded in textual works like Whitman's. They are better because they understand that works like poems and novels are already marked data.

A deeper problem with Manovich's influential commentary comes from his ideas about the "privileged narrative" order of pre-digital works like poems and novels. So in place of "grand Narratives of Enlightenment" like, say, *Clarissa* or *Don Juan* or *War and Peace*, we are to imagine a future—a twenty-first century—democratically liberated from their single-minded clutches. Folsom's essay wavers on the question of whether our received literary works are "privileged narratives" requiring fractal redemption, as we see when he writes that "database begins to reveal that it has been with us all along, in the guises of those literary works we have always had trouble assigning to a genre—*Moby-Dick*, 'Song of Myself,' the Bible."

Perhaps there are sheep and goats, and these are examples from the sheepfold. But in this context we want to remember Walter Benjamin's trenchant remark "Every document of civilization is at the same time a document of barbarism." The point is that all our documents are always multiply coded and that scholarship preserves and studies the multiple meanings. If pressed, Folsom would surely agree that anyone could reach back into our cultural inheritance and pluck out, in place of his three examples, three others. For the truth is that imaginative work, as an imitation

of life, is necessarily n-dimensional, protean, shifting: as another poet said, "Changeable too, yet somehow *idem semper*" (Byron 17.11). Is the "democratic beauty" of Whitman's work any more complex or open than the God-haunted and authoritarian Bible or than the savage and aristocratic beauty of the *Iliad*?

I pose that rhetorical question because it exposes a second large problem with Folsom's essay. Drawing on Derrida's representation of books and the archives that house them, Folsom contrasts what he sees as the flexibility of database with the rigidity of museums and libraries. Riffing on Derrida's "archive fever" as an infection spawned by the archive's physicalities, Folsom tells us that

archives reify the period they record. They contain not only the records of a period but its artifacts as well, their dust the debris of toxins and chemicals and disease that went into making the paper and glue and inks, that went into processing the animal skins that wrap the books we open and, in the dusty light, read and inhale. When we emerge from an archive, we are physically and mentally altered.

Such fulsome prose is partly a Folsom jeu. But Folsom isn't *just* kidding around; this view of an archive as reified knowledge (and database as liberated knowledge) runs as a theme through his essay. Implicit in the idea is a now common but lamentable misunderstanding about libraries, museums, and the works they preserve and transmit. The misunderstanding is especially dismal in this context because we will not design and build effective digital tools and archival repositories—a task we now have clearly before us and that Folsom and Price have themselves embarked on—unless we work from an adequate understanding of our paper-based inheritance.

[II]

In a late lecture, "What's Past Is Prologue," D. F. McKenzie speculated briefly on comput-

erization and textual criticism. His remarks addressed two ways that scholars were using digital tools: for electronic storage of large corpora and for the dynamic modeling of textual materials. McKenzie saw modeling as the more interesting prospect, even if it would "represent a radical departure" from his central "article of bibliographical faith": "the primacy of the physical artifact (and the evidence it bears of its own making)" (259).

McKenzie was a great theorist of the archives in which he spent his radiantly dry-as-dust life as a scholar. "Rigidity is a quality of our categorical systems . . ." Folsom tells us, and in celebrating the idea of a transgeneric database he looks to escape those categorical imperatives. But databases and all digital instruments require the most severe kinds of categorical forms. The power of database—of digital instruments in general—rests in its ability to draw sharp, disambiguated distinctions.

Libraries and museums—let's call them archives—also deploy categorical systems and subsystems ("cross-references"). No more than databases do these complex systems exhaust, or define, the multiple possible paths through which we may negotiate and (so to say) narrativize our way(s) through these great towers of Babel. The power of a database is a function of its elementary abstract structure. But therein lie the advantage and the disadvantage of a database compared with an indexing system like a card catalog. The physicality of an archive's categorical system shows a flexibility that a database does not have, because a card catalog is itself an interfaced database.

Moreover, the physicality of the card catalog allows useful interventions in the "rigidity" of the library's categorical substructure. The notations, typed or written, added to hand catalogs graphically demonstrate the historical dimensions licensed by these traditional archival systems. *Leaves of Grass* will have many card entries in the catalog, and each of those cards will not only carry basic metadata, each will carry as well cross-references and the

notations of various archivists. In addition, because even the most well-established notation systems undergo changes over time, the cards and entries bear the evidence of their historical passage and making. Of course, we have to learn to use such instruments, as we have to learn how to design and use databases. But that only brings us back to the basic point: these tools are prosthetic devices, and they function most effectively when they help to release the resources of the human mind—in short, when their interfaces are well designed. Archival-system design must build interfaces that allow user-initiated annotations to enrich the underlying data structure without compromising its formal stability.

In considering how to design and build effective digital systems, we want to think back through the physicality of card catalogs to the materials these catalogs are designed to organize for our use. The dust and toxins and chemicals—every material aspect of “the records of a period [and] its artifacts”—are the minutest surviving particulars of the historical process “that went into making” the preserved work. And from that level we move up to higher levels of historical facticity—for example, to the histories of the depositories and of those who have made and used them. Any system that intends to preserve and organize materials for critical analysis must do everything it can to “save these appearances” (see Barfield), integrate them, and make them accessible for critical study. Databases are useful parts of the digital systems we are moving toward. Like pawns in chess, they are essential elements of the game.

Everyone is impressed—or should be—by the n-dimensionality of literary works, and we are always developing tools, digital or not, to analyze how they work, to help us think about them critically. McKenzie understood, better than most, that the n-dimensionality of a literary work is a function of its historical character and that its historical dimensions are coded in the work's material circumstances. If

anything threatens to “reify” the human materials we organize through systems like databases, it is the latter. The threat is avoidable, or can be mitigated, if we think carefully about the character of the materials we are trying to model. A network of devices is needed—not just hypermedia environments, imaging software, markup systems, databases, and searching and data-mining tools but the complex administrative apparatuses that will control, as much as possible, the limitations as well as the capacities of these devices. *Leaves of Grass* is many-splendored because of its complex production and reception histories, because it has been repeatedly mediated and remediated. “It” is more than one thing because people, including Whitman, have continually sought and found different ways to use it and read it.

Toward the end of his essay, Folsom remarks on his “surprising realization” that a “less visible database, the database of users” has been growing along with the archive's core data content. I don't know if this “database of users” is a fact or another figure of speech for *The Walt Whitman Archive*. The last time I looked, the archive had not set up a database to track its users and their types of use, though such a database would be an excellent addition. Because the Whitman archive participates in the Networked Infrastructure for Nineteenth-Century Electronic Scholarship (NINES [www.nines.org])—an online, peer-reviewed aggregation of nineteenth-century British and American scholarship—it belongs to a digital environment designed to integrate users into the intellectual life of a larger system, which necessarily includes the intellectual life of *The Walt Whitman Archive*. NINES materials exist in a distributed network of servers, not a central location, but its design is such that (a) all these materials are aggregated for searching, collection, analysis, and remediation and (b) the individuals using NINES and its materials are formally looped into the system so that their activities can also be searched, collected, analyzed, and remediated.

These critical operations are enabled not by a database or a set of databases but by an open-source toolset, Collex, that represents data as a function of the histories of their use.

Reflecting on digital technology, McKenzie saw that its simulation capacities were forcing him to rethink a "primary article of [his] bibliographical faith," the material self-identity of the archival object. He did not live to undertake an editorial project in digital form. Had he done so, he would have found that his "social text" approach to scholarly work was greatly and practically advanced by the resources of digital technology. He would have seen and embraced these technologies because he understood the dynamic structure of all archives and all their materials.

Editors and scholars engage with works in process. Even if only one textual witness were to survive—say that tomorrow a manuscript of an unrecorded play by Shakespeare were unearthed—that document would be a record of the process of its making and its transmission. Minimal as they might seem, its user logs have not been erased, and they are essential evidence for anyone interested in engaging with the work. We are interested in documentary evidence because it encodes, however cryptically at times, the evidence of

the agents who were involved in making and transmitting the document. Folsom is right when he says that "*Leaves of Grass* is actually a group of numerous things. . . ." This is why databases cannot model such complex works. Scholars do not edit or study self-identical texts. They reconstruct a complex documentary record of textual makings and remakings, in which their own scholarly investments directly participate.

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Remediating Whitman

MEREDITH L. MCGILL

ED FOLSOM'S PREDICTION THAT DIGITAL DATABASES will produce an "epic transformation" of archives is based on his firsthand knowledge of the benefits that new-media projects

such as *The Walt Whitman Archive* offer to scholars and critics: unprecedented access to rare or inaccessible materials; comprehensiveness—that is, their seemingly infinite capacity to collect scattered texts and commentary, a capacity so much vaster than a book's that

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it holds out the promise of completeness; consolidation of different media, such as manuscripts, images, and printed texts, into a single, easily navigable digital format; and the open-endedness of the digital medium itself, a quality that points toward a utopian future in which archival scholarship is bound not by financial or physical constraints but by the imaginations of its creators and users. While Folsom does not claim that we have arrived at this future, he thinks we are considerably further along this trajectory than I do. Folsom sees the digital database as an opportunity to liberate Whitman's writing from "the constraints of single book objects," and yet, as I hope to demonstrate, digital projects such as *The Walt Whitman Archive* are significantly more dependent on print conventions than they need to be. Weighing Folsom's claims against the example of the Whitman archive, I will argue that Folsom describes not a transformation but a "remediation" of archives. Jay David Bolter and Richard Grusin coined this term to point to a persistent characteristic of new media—their imitation and incorporation of the medium they seek to supersede. Despite the revolutionary capacities of the new technologies, pioneering digital projects such as *The Walt Whitman Archive* hew surprisingly closely to normative ideas of the author and the work, a conceptual and structural horizon that keeps such projects from functioning in the radical ways that Folsom describes.

I am a long-term, devoted user of *The Walt Whitman Archive*. I simply can't imagine studying or teaching nineteenth-century American literature without it.¹ But however grateful I am for its existence and however invested I am in its future, I don't think that the archive delivers on the claims Folsom makes for digital databases. Folsom is right to assert that his archive offers scholars, teachers, students, and ordinary readers unprecedented access to Whitman's texts, from dispersed, remote, and inaccessible manuscripts to pho-

tographs, engravings, and printed editions that are rare, expensive, unwieldy, or out of print. The general availability of these texts in digital form will undoubtedly transform Whitman scholarship. As Michel Foucault observes in describing the classificatory function of the author's name,² the addition of a significant number of texts to the oeuvre—making them newly or more readily part of the canon—cannot help changing fundamentally what we mean by "Whitman."

But will the availability of these texts on a single digital platform transform our ways of reading, permitting readers to follow "the webbed roots" of Whitman's writing as they "zig and zag with everything"? Whatever centripetal forces might be unleashed by the poetry itself, *The Walt Whitman Archive* relies on the centrifugal force of the idea of the book in order to consolidate and make coherent a far messier archive of printed works. While this database is a work in progress and the editors promise to add Whitman's other published writing as time and funding permit, the archive is currently organized around the six major American editions of *Leaves of Grass* (1855, 1856, 1860, 1867, 1871–72, 1881–82, 1891–92). It is perhaps easiest to perceive the consolidating force exerted by this series of identically titled books by considering the numerous other freestanding volumes that might otherwise be listed under the heading *Books*: Whitman's temperance novel *Franklin Evans* (1842); the Civil War poetic sequences *Drum-Taps* (1865) and *Sequel to Drum-Taps* (1865); the prose treatise *Democratic Vistas* (1871); *Passage to India* (1871), a collection of poems published as a supplement to the 1871 edition; the chapbook *As a Strong Bird on Pinions Free* (1872); and the prose-heavy later work, such as *Memoranda during the War* (1876), *Two Rivulets* (1876), *Specimen Days and Collect* (1882), *November Boughs* (1888), and *Good-Bye My Fancy* (1891). While detailed headnotes to each of the archive's editions of *Leaves of Grass* specify how poems from these

other volumes were incorporated and rearranged within them, the effect of the archive's design is to streamline Whitman's writing so that it begins with, gravitates toward, or orbits around the masterwork *Leaves of Grass*. The example of *The Walt Whitman Archive* suggests that digital databases cannot in and of themselves realize Wai Chee Dimock's vision of "an archive that errs on the side of randomness rather than on the side of undue coherence" (qtd. in Folsom). Indeed, the promise of comprehensiveness and the sense of simultaneity produced by digital databases pose problems for scholars interested in recapturing the provisionality of Whitman's writing—the experiments that were ventured and abandoned—as well as Whitman's conviction at various points in his career that a particular edition of *Leaves of Grass* would be his last. The comprehensiveness of the database is a liability as well as a strength. Digitizing archives makes it harder to see the partial nature of the printed record, the limited reach of print at any moment in history, and the supersession of one edition by another.

There are good reasons for the editors of *The Walt Whitman Archive* to have focused on *Leaves of Grass* in the project's initial stages. In an essay written to commemorate the tenth anniversary of the project (and posted on the Web site), Folsom's codirector, Kenneth M. Price, details how the editors launched *The Walt Whitman Archive* with threadbare funding, struck deals to acquire digital texts at minimal cost so that they could continue to offer free access to the site, won grants, recruited contributors, and substantially redesigned the site in response to improved technologies and changing digital standards. Their editorial choices have clearly been shaped by such contingencies but also by the need to make the project legible and valuable to scholars, teachers, and students still operating in a codex-dominated world. In remediating Whitman, they have staked the value of the digital database on fidelity to the con-

ventions of the book, intensifying rather than sundering the ties between the two media.

The digital medium doesn't necessarily deliver us from the perceived rigidities of print.³ Indeed, the editors of *The Walt Whitman Archive* have reproduced in the architecture of their site many of the constraints that Folsom claims in his essay to want to leave behind, including mass culture's reductive treatment of genre. Far from providing an antidote to the identification of Whitman with poetry, the archive fosters this equation by failing to signal its own partiality, its noninclusion of the vast corpus of Whitman's prose. The editors' decision to amplify the section of the Web site devoted to Whitman's biography before editing the prose suggests how mutually reinforcing and productive the closed circuit of life-and-work criticism can be. Consider by contrast the "rhizomorphic" connections that might have been encouraged by providing hyperlinks to Whitman's editorials in the *Brooklyn Daily Eagle* (www.brooklynpubliclibrary.org/eagle) or to his short fiction that is available through public-domain Web sites such as *Making of America* (cdl.library.cornell.edu/moa/).⁴ Expanding its purview beyond *Leaves of Grass*, *The Walt Whitman Archive* recently added a section on Whitman's poems published in periodicals, complete with an image of the page on which each poem appeared. And yet this welcome addition to the site doesn't really enable readers to "follow other root systems into the unknown." Readers of the archive can summon an image of a poem as it appears on a page of the *Atlantic Monthly* or the *New York Herald*, but they cannot turn that page. Periodicals are marshaled as important contexts for Whitman's texts, but they are not independent nodes capable of launching a new investigation. *The Walt Whitman Archive* gestures toward the world outside Whitman's writing but zigs and zags mostly within itself.

What would it take to realize Folsom's vision of a database that allows readers to follow Whitman's writing as it "darts off in

unexpected ways"? New ideas about database architecture and new developments in technology promise to take the digital humanities beyond the familiar confines of the author and the work. Take, for example, *The Vault at Pfaff's* (digital.lib.lehigh.edu/pfaffs), a Web site that focuses on the literature and social commentary of a group of nineteenth-century bohemians, including Whitman, who met at Pfaff's beer cellar to drink, cruise, argue, and exchange ideas. This digital project is built around the *Saturday Evening Press*, a literary weekly that published the writing of many of the Pfaff's bohemians. The site is designed not only to provide access to this rare periodical but also to encourage readers to track the intersecting lives of more than 150 individuals who crossed paths at the beer hall and to call critical attention to the handful of literary and social groups that formed or met there. *The Vault at Pfaff's* provides access not to the works of an author but to the social locations of culture, drawing readers' attention to the jostling of coteries and to points of overlap between and among discourses. In *The Vault at Pfaff's*, a reader encounters Whitman's poems alongside other poems, tales, and social commentary; one can follow his response to criticism, imitations, and parodies and catch the poet in the process of developing a recognizable style. *The Vault at Pfaff's* breaks new ground by venturing beyond the mutually stabilizing categories of author and work, mapping cultural and social connections that have yet to be adequately traced in print.

More dramatically, the Collex interface developed at the University of Virginia and launched as part of Jerome McGann's NINES project (www.nines.org) is designed to break down barriers between digital databases. Accessing *The Walt Whitman Archive* through the Collex interface allows readers to search relevant databases, such as *The Rossetti Archive* and *The Swinburne Project*, at a single stroke. When a user conducts a search with the Collex interface, the program generates

"cloud visualizations" of related search terms created by other readers, terms that invite the reader to use the database in unanticipated ways. Readers can also create their own tags for the items they retrieve. The system's incorporation of the connections that readers construct between and among texts produces a distributed database, one that responds to the ways it is used. The Collex interface promises to decenter the architecture of the database.

These are still early days for the digital humanities. It seems premature to call database a genre—to assimilate it to a system of literary classification—when we are only just discovering what databases can do for the study of literature. Rather than take Whitman's interchangeable lines to be the primary data of a poetic algorithm that boldly defies narrative, why not use hypertext to enable readers to identify and compare the many rhetorical structures, both smaller and larger than the line, that Whitman uses to hold his poem together? Scholars such as Folsom who have done the hard work of marking up Whitman's texts know better than anyone how complexly organized—at multiple levels—they are. Digital technology could be used to create an edition of *Leaves of Grass* that would allow the comparison of modes of address in the poems, or one that would track Whitman's shifting of poems into different sections and subsections, his construction and dismantling of clusters and enumerated series. Or a database that would place the 1856 edition in the company of other books published and sold by the phrenologists Fowler and Wells—if a group of scholars willing and able to take on the task of producing one could be found. Like their printed predecessors, digital scholarly tools are limited by financial and physical constraints as well as by the imaginations of their creators and users. If we misconstrue media shift as liberation, we are likely to settle for less than the new technologies can offer us.

NOTES

1. In the interests of full disclosure and of collegial encouragement, I should also note that I am a financial contributor to the archive. At some point last fall when finishing an essay on Whitman, I realized I had depended so heavily on this database that it was only appropriate to support it financially. I would encourage all regular users of the archive to help the editors meet the three-to-one matching requirements of the grant they were recently awarded by the National Endowment for the Humanities. The Web site makes contributing easy by including a link to the University of Nebraska Foundation on the home page.

2. Foucault delineates some of the relations we might expect critics to find between and among texts that are marked by the author's name: "homogeneity, filiation, authentication of some texts by the use of others, reciprocal explication, or concomitant utilization" (107).

3. Virginia Jackson argues that even experimental electronic editions of the writing of Emily Dickinson rely on and perpetuate assumptions about printed lyric poems (50–53).

4. That a good deal of Whitman's early prose is digitally available only to those who have access to the sub-

scription database *American Periodical Series* (APS) suggests that there are significant material obstacles to tying the threads that digital media can weave so well. And yet including a bibliographic list of Whitman's prose fiction in *The Walt Whitman Archive* would help counteract its emphasis on Whitman's poetry and might encourage readers with access to APS to toggle back and forth between the two sites.

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Whitman, Database, Information Culture

JONATHAN FREEDMAN

I'M WRITING THESE WORDS FROM MY OFFICE AT the University of Michigan, next door to the massive Harlan Hatcher Memorial Library, somewhere in whose bowels (no one knows exactly where) books are being carted off to—well, again, no one knows exactly where—to be digitized by the new thousand-pound gorilla of the American high-tech industry, Google. The cloak-and-dagger quality of the project (also under way at seven other libraries around the world) might strike us as oddly antithetical to the celebratory spirit of Ed Folsom's invocation of database not just as a new way of

organizing bits and bytes of knowledge but as the basis of a new genre—a contemporary version of epic—that generates a new process of cultural, social, and (it seems) global community making. Indeed, Google has come in for some trenchant criticism of late, most notably from the Society of Authors, worried about the violation of copyright laws, and from the chief librarian of the Bibliothèque Nationale, Jean-Noël Jeanneney, who complains that Google's endeavor extends the imperatives of the market and of United States cultural imperialism into the information society of the future. But Google's aspiration—and much of its rhetoric—has the same utopian ring as Folsom's. According to Mark Sandler, a researcher at the University of Michigan, the digitizing project

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will replicate and extend the success of a pilot project to digitize ten thousand "low use" monographs, which elicited

between 500,000 and one million hits per month. In the past, these works were accessible to a base population of 40,000 students, faculty, and staff. That's about four readers for each book included in the project. When electronic versions of these works were made accessible to the entire world, suddenly 40,000 potential readers became 4 billion, and the odds of consumer interest jumped from 4:1 to 400,000:1. (18)

Underneath the cool technologese, the aspiration is clear: today the Harlan Hatcher Library, tomorrow the world!

Let me be clear: I find both projects, Folsom's and Google's, incredibly useful. Surely no one teaching Whitman for the first (or even the seven hundredth) time would want to forgo *The Walt Whitman Archive*, with its easy access to insights into the texts and variants that compose the poet's massive corpus, its masterly biographical sketch, and its multitude of links to the criticism of Whitman's contemporaries (not to mention those sample syllabi!). Just as surely, no one doing research would want to forgo the amazing search capacities that Google puts literally at one's fingertips: hours spent at the library or, at best, searching concordances now telescope into microseconds; the Boolean ability to link heterogeneous subjects and find once-occluded connections and interconnections makes scholarship invigoratingly fun. Yet the rhetoric used in both cases makes me, as utopian rhetoric always does, a tad nervous, and I want briefly to explore the sum and substance of my skepticism. These visions, impressive in their sweep and totalizing in their ambitions, celebrate the contours of experience in an information society—a world in which cascades of data make greater and greater claims on our lives and those of our students. But such a world is paradoxical. On the one hand, it is a space of ever-expanding possi-

bilities, marked by exhilarating new forms and vehicles of knowledge, made accessible to everyone on the planet with an Internet connection. On the other, it generates an ever-increasing need for guidance, classification, or just plain ordering: how else are we going to make sense of all the stuff that bombards us from every possible source? The more data we have access to, the more we need aggregators and entrepreneurs of information like Folsom and the Googlizers; the more we are freed to experience and construct our own world of knowledge through Google searches and Web crawling, the more dependent we become on the ways in which those searches and databases are constructed for us. To celebrate the branching, rooting, rhizomic, proliferating quality of database—to celebrate database as a kind of autonomous form, rooting and branching by a logic of its own—is (in this case, somewhat weirdly) to downplay the inclusions, exclusions, choices that have gone into the making of databases and hence to occlude the possibilities for questioning those choices. Not to get too Frankfurt school about it, but the seeming conditions of our freedom—our increasing access to a world of information—only conceal our greater constraint. *Quis ipsos custodiat* the databasers?

How we might negotiate this conundrum remains an open question, one that I want briefly to address with respect to Walt Whitman, the source of Folsom's enterprise. Folsom's own rhetoric is remarkably Whitmanesque, in its ever-expanding aspirations, its attempt to argue for a new creative form as conveying a new mode of apprehension that reinvigorates the older modality of epic, and its vaunting self-celebration. The same expansive ambition (although not the same concern with new literary forms) is evident in the rhetoric of the Googlizers. There is, I think, a reason for this: the deep continuity between Whitman's experience and our own. No less than we do, Whitman lived in the midst of an information revolution, one that can be (and

has been) dated as early as the invention of the printing press but that spun with increasing rapidity in mid-to-late-nineteenth-century America, as high literacy rates, extensive (but not universal) education, the rise of steam-driven printing presses, the move to pulp and hence to cheap paper all combined to make the production and dissemination of information a national and—somewhat problematically to foreign copyright holders—a worldwide industry. The United States became an enormous market for letters, a place where books sold in the tens or hundreds of thousands, where new publishing houses like Harper's found innovative ways to publish and market books, where mass-market magazines like *Godey's Lady's Book* and newspapers like the *New York Herald*—or, for that matter, the *Brooklyn Daily Eagle*—circulated news, opinions, advertisements, and announcements, creating in their wake new publics with new demands for new products as periodicals were borne across an expanding nation by the new railroad-augmented postal service.

I rehearse these well-known facts to remind us that Whitman was an intensely engaged participant in this information revolution—a “huckster author,” Folsom observes, but much more as well. He was, after all, a reporter, an editor of many newspapers, a published author who was aware of the vicissitudes of copyright,¹ and, most important, a public intellectual whose relation to the cosmopolis—and to the social landscape for which it serves as a prototype—was profoundly mediated by the burgeoning new print media. As he writes in “Song of Myself”:

This is the city, and I am one of the citizens,
 Whatever interests the rest interests me,
 politics, wars, markets, newspapers,
 schools,
 The mayor and councils, banks, tariffs,
 steamships, factories, stocks, stores,
 real estate and personal estate.

(lines 1075–77)

In Whitman's city, newspapers are not just one potential subject of interest; since virtually every topic Whitman cites as fascinating to his fellow citizens and himself would have been mediated through these papers, the city seems a palimpsest of print—in Folsom's terms, a gigantic database, accessible to all. Whitman's vision is also Google-like in its understanding that the interests of others determine what becomes interesting, the way Google's subjects are ordered by a complex algorithm that records the number of links to (and in) any given Web site, so that what one receives and the order in which one receives it come constructed by the interests and preferences of one's fellow Net citizens.

But what we might, adapting Manuel Castells's term, call Whitman's “informational city” is also a place where the profusion of data renders the conditions of acquiring knowledge—here defined in purely operational terms, as the shaping of data into patterned or ordered structures of significance—problematic.² Note how in the lines in which Whitman describes this city, cascading data, heterogeneous objects, events, and social facts are brought together into one amalgamated yet mobile agglomeration: wars, stocks, schools, banks, tariffs, personal and real estate all wheel into one another, jostle about, command attention and then yield it to the next item on the list. The effect is simultaneously to blur the distinction between the items in the catalog—in these lines, at least, a war is of no more consequence than a real estate transaction—and to establish the sense of a contingent, vague, metonymic relation between the objects, topics, and sources of speculation thereby enumerated. Whitman observed, according to Horace Traubel, that “[t]he newspaper is so fleeting, is so like a thing gone as quick as come; has no life so to speak, its birth and death coterminous”—so too the city, or at least the city considered (and responded to) as database (qtd. in Larson 106). The urban locus, and, by extension, contemporary experience itself, is for Whitman

a space where information *flows*—not only a place (as David Henkin has argued) articulated by buildings and street signs, by vagrant scraps of newsprint and books or pamphlets, but an infoscape where encoded bits of data imprint themselves successively on the avid subject seeking to make sense of the world.

Whitman's poetry offers a phenomenology of experience in a world organized by the relentless flood of information and offers itself as a kind of a mimesis of such a world. It offers as well a critical understanding of the technological changes that make these processes happen in the first place. Information flow is not merely an inevitable result of the extension and burgeoning of print culture but also a consequence of the rise of the telegraph, which facilitated—even demanded—the dissemination of a wide variety of data across a broad swath of the world. As a contemporary British observer wrote:

The American telegraph, invented by Professor Morse . . . employed in transmitting messages to and from bankers, merchants, members of Congress, officers of government, brokers, and police officers; parties who by agreement have to meet each other at two stations, or have been sent for by one of the parties; items of news, election returns, announcements of deaths, inquiries respecting the health of families and individuals, daily proceedings of the Senate and the House of Representatives, orders for goods, inquiries respecting the sailing of vessels, proceedings of cases in various courts, summoning of witnesses, messages for express trains, invitations, the receipt of money at one station and its payment at another; for persons requesting the transmission of funds from debtors, consultation of physicians. . . . (qtd. in Standage 61)

All these sing across (in Whitman's words) "the wires of the electric telegraph stretched on land, or laid at the bottom of the sea, and then the message in an instant from a thousand miles off"—the rapidity of the develop-

ment enacted by the elision of the verb in the last clause, a Whitmanism profoundly expressive in the context of database; the verb, being nowhere, is everywhere, the world rendered in process and motion ("Chants" 155).³ Such a development, Whitman knew, would create not only a new American infoscape but also a transnational (or at least transatlantic) one. Indeed, this possibility of an enlarged global culture made possible by the alliance of print and telegraph is articulated most fully in "Passage to India" (1871), where the "seas inlaid with eloquent gentle wires" are one of the three great world-unifying "modern wonders" that Whitman celebrates, along with the completion of the Suez Canal and of the transcontinental railroad (346).

To be sure, we are now in view of the particular combination of cultural imperialism and desire for universal knowledge that Jeaneney attributes to the Google project. Seeing the genealogical connection here might be one way of culturally placing database and Google rhetoric, of seeing them as American projects, at least in the scope of their imaginative ambitions. But more useful to us now, perhaps, is Whitman's attempt to register in the form as well as the matter of his poetry what it means to live in a world of eddying information. Consider, for example, the device that Folsom appropriately cites as the one that takes Whitman closest to internalizing database into his work: catalog. Here Folsom is on his strongest ground in his Whitmanesque suggestion that database represents the renovation of a different, collective genre into epic, for epic catalog, as Eric Havelock suggested, had an informational agenda, serving, as it were, as the encyclopedia or even the (nonsearchable) database of knowledge for preprint culture. A similar encyclopedic impulse seems to run throughout Whitman's work, as he moves consistently to inventory, name, define, and (partially) order the city, country, and world, enumerating person, place, and thing in long flowing lines that may well remind us of the list rhetoric of the

celebrator of telegraph culture quoted above. Whitman's catalogs do many things at once: they inventory the manifold and various facets of his habitat (and habitus); they begin to arrange them into some kind of poetic order (much critical ink has been spilled on just how successfully he does so); and by their very proliferation—catalog upon catalog upon catalog—they testify to the impossibility of doing either of these two.⁴ Most important for our purposes, Whitman not only asserts but also dramatizes his will to database, the affective charge that accompanies (or perhaps mandates) his desire to enumerate and catalog. Here is a fine example, from "Starting from Paumanok":

See, pastures and forests in my poems—see,
 animals wild and tame—see, beyond
 the Kaw, countless herds of buffalo
 feeding on short curly grass,
 See, in my poems, cities, solid, vast, inland,
 with paved streets, with iron and stone
 edifices, ceaseless vehicles, and
 commerce,
 See, the many-cylinder'd steam printing-
 press—see, the electric telegraph
 stretching across the continent,
 See, through Atlantica's depths pulses
 American Europe reaching, pulses of
 Europe duly return'd,
 See, the strong and quick locomotive as it
 departs, panting, blowing the steam-
 whistle,
 See, ploughmen ploughing farms—see,
 miners digging mines—see, the
 numberless factories,
 See, mechanics busy at their benches with
 tools—see from among them superior
 judges, philosophs, Presidents, emerge,
 drest in working dresses,
 See, lounging through the shops and fields of
 the States, me well-belov'd, close-held
 by day and night
 Here the loud echoes of my songs there—read
 the hints come at last. (257–65)

This is the poet not just as huckster but as sideshow barker, pointing out the attractions

in the tent just behind him; by the same token, it's the poet as cataloger, cramming into his lines an entire social panoply in which the parts imply a social whole. But it's also the poet as modern subject attempting to come to terms with the sheer imperative of including *everything*—the country and the city, the machine and the garden, the factories and the shops, the masses from whom, in democratic culture, emerge the arbiters of knowledge ("philosophs") and wisdom ("judges" in every sense of the word). The poet's response to this informational flood, however, is not only to enumerate and list (and list and list and list); it is also to appropriate. All these manifold objects and beings are identified as belonging to or, at least, placed in the book for which these lines serve as prologue, enticement, and advertisement. The effect is particularly striking with respect to the era's definitive technology. The telegraph and the printing press—which bring the flood of data to the poet's attention and impel his work out into a world of poems, novels, newspapers, ladies' magazines, and the like—are made an effect of Whitman's text, not the other way around: we are invited to come and see these powers and forces "in my poems," not to see the poems as entities shaped and transmitted by the powers and forces that make and unmake them.

Not to put too fine a point on it, I also see this self-valorizing impulse in Folsom's Whitmanism and in the imperial language of Google. I point this out not so much to critique Folsom and the Googlizers as to stress something crucial about psychic responses to the information economy that enmeshes Whitman, Folsom, the Googlizers, and, for that matter, the reader of this piece and me: the need or urge to identify with, and ultimately to introject the power of, the technology that makes database not only possible but necessary. But while Whitman hyperbolizes his will to database, Folsom and the Googlizers veil theirs in favor of privileging the genre or medium itself. In Folsom's account

of his own work, the dialectic between database and narrative (in which, as in all dialectics, the terms keep collapsing into each other) is less revealing than the simultaneous treatment of *The Walt Whitman Archive* as product of inspired editorship by Folsom and his colleagues and elevation of database into a self-maintaining, self-sustaining, genuinely collective, genre-transcending human agency—including, ultimately, the editors' own agency. So too with Google, which, as Jeanneney observes, orders and arranges its links on the basis of a mysterious, proprietary algorithm preserved with all the magic (and capitalist razzle-dazzle) of the McDonald's special sauce. In both cases, the choices and decisions, inclusions and exclusions, that go into making the database are occluded or even excluded in favor of a veneration of the database as a reified entity entire unto itself, a genre that works, as genres do, by laws and logic of its own. The effects of such a romantic view of information production can be seen when we question some of the choices that the databasers make for us. The creators and maintainers of *The Walt Whitman Archive* don't include much contemporary criticism (largely, one assumes, because of copyright rather than predilection) but link extensively to Whitman-era responses; the result is to institutionalize certain versions of Whitman while effacing others. The opposite tendency is evident in Google's linking technology, which, as Jeanneney observes, is biased by its nature toward pushing forward recent responses (second under "Walt Whitman," after the inevitable *Wikipedia*, is none other than *The Walt Whitman Archive*) and those from the Euro-American (or English-speaking?) world, where the majority of linking subpages originate, while ignoring more recondite, historically distant, or non-Western links. One can choose to quarrel, or not, with both outcomes—I'm fine with the first, worried by the second—and still wish for a little less celebration, a little more transparency.

The ecstatic mode of wholesale identification is only one possible response to the info-world, even in Whitman—notoriously, a poet of many modes and moods—and I want to close by turning to one of the other responses we have found in his work. In the first passage I quoted, from "Song of Myself," Whitman opens up a different possibility—one also familiar throughout his oeuvre: that of the somewhat skeptical but deeply sympathetic observer, avidly scanning the informational city not only as an end in itself but also as a way to engage with the interests, desires, and needs of other people. Information society brings us this openness to the experiences of others, Whitman suggests: the tidings of "wars," of "stocks, stores, real estate and personal estate," that take us out of ourselves and engage us with the lives of those around us. Whitman pursues these not as a poet or even as an observer but as a *citizen*: an intensely engaged member of a political community who never loses sight of the "personal estate"—the needs of his fellow citizens—as well as the "real estate," structures of economic power and authority. That engaged but slightly distanced, skeptical but sympathetic stance, I've been arguing, gets all but obliterated by the flood of data the Whitmanesque subject is forced to encompass; and it's negated as well by that subject's desire to identify with the technological forces that unleash the flood. But it's a stance worth adopting as we reflect on the brave new world we are entering, one in which we might properly neither sing and celebrate the new art of database nor turn our backs on the new ways of organizing and apprehending knowledge that it brings us but rather affirm the heightened importance of a detached but engaged response (dare I say both in and out of the game?) to the information culture in which we live and to which, no less than Whitman, we are compelled to make imaginative response.

NOTES

1. For a study of just how seriously Whitman took these issues, see Buincki.

2. I'm appropriating Castells's phrase and his emphasis on the city as a "space of flows" but not the specifics of his argument, in which this new species of urban experience (which, in my view, is already there in Baudelaire, or at least Benjamin's Baudelaire, as well as in Whitman) develops in the urban crises of the 1970s, when cities become reorganized as spaces of knowledge and capital production and dissemination.

3. Whitman added these lines in his 1856 edition. In helping with matters like this, *The Walt Whitman Archive* is invaluable.

4. The best treatment of Whitman's catalogs remains that of Buell, who embeds Whitman in the transcendentalist rhetoric of cataloging the world as a way of enumerating and celebrating its multifariousness (166–78). But Buell also begins to get at the problematics I'm trying to address here with his suggestion that what makes Whitman's catalogs unique is their refusal (or, as I would put it, their failure) to organize the world into a determinate form or pattern, a failure for which Whitman more than compensates, in Buell's reading, by his enthusiastic poetry making: "the spirit triumphs over chaos by sheer energy" (178).

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Narrative and Database: Natural Symbionts

N. KATHERINE HAYLES

AH, THE POWER OF METAPHORS—ESPECIALLY those that propagate with viral intensity through a discursive realm. At issue here is Lev Manovich's characterization of narrative and database in *The Language of New Media* as "natural enemies" (228), a phrase Ed Folsom rehearses in his generous and enlightening discussion of *The Walt Whitman Archive*. The metaphor resonates throughout Folsom's essay in phrases such as "the attack of database on narrative," culminating in his figure of database's spread as a viral pandemic that "threatens to displace narrative, to infect and deconstruct narrative endlessly, to make it retreat behind the database or dissolve back into it." In this imagined combat between narrative and database, database plays the role of the Ebola virus whose voracious spread narrative is helpless to resist. The inevitable triumph of database over narrative had already been forecast in Manovich's observation that "databases occupy a significant, if not the largest, territory of the new media landscape." Indeed, so powerful and pervasive are databases for Manovich that he finds it "surprising" narratives continue to exist at all in new media (228). In Manovich's view, the most likely explanation of narrative's persistence is the tendency in new media to want to tell a story, a regression he identifies with cinema. Even this, he suggests, is being eradicated by experimental filmmakers such as Peter Greenaway (237–39).

Rather than natural enemies, narrative and database are more appropriately seen as natural symbionts. Symbionts are organisms of different species that have a mutu-

ally beneficial relation. For example, a bird picks off bugs that torment a water buffalo, making the beast's existence more comfortable; the water buffalo provides the bird with tasty meals. Because database can construct relational juxtapositions but is helpless to interpret or explain them, it needs narrative to make its results meaningful. Narrative, for its part, needs database in the computationally intensive culture of the new millennium to enhance its cultural authority and test the generality of its insights. If narrative often dissolves into database, as Folsom suggests, database catalyzes and indeed demands narrative's reappearance as soon as meaning and interpretation are required. The dance (or, as I prefer to call it, the complex ecology) of narrative and database originates in their different ontologies, purposes, and histories. To understand more precisely the interactions between these two cultural forms, let us consider these characteristics.

As Manovich observes, database parses the world from the viewpoint of large-scale data collection and management. For the late twentieth and early twenty-first centuries, this means seeing the world in terms that the computer can understand. By far the most pervasive form of database is the relational, which has almost entirely replaced the older hierarchical, tree, and network models and continues to hold sway over the newer object-oriented models. In a relational database, the

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data are parsed into tables consisting of rows and columns, where the column heading, or attribute, indicates some aspect of the table's topic. Ideally, each table contains data pertaining to only one "theme" or central data concept. One table, for example, might contain data about authors, where the attributes might be last name, first name, birth date, death date, book titles, and so on; another might have publishers' data, also parsed according to attributes; another, books. Relations are constructed among data elements in the tables according to set-theoretic operations, such as "insert," "delete," "select," and especially "join," the command that allows data from different tables to be combined. Common elements allow correlations between tables to be made; for example, Whitman would appear in the authors table as an author and in the books table correlated with the titles he published; the publishers table would correlate with the books table through common elements and through these elements back to the authors table. Working through these kinds of correlations, set-theoretic operations also allow new tables to be constructed from existing ones. Different interfaces can be designed according to the particular needs of users. Behind the interface, whatever its form, is a database-management system that employs set-theoretic notation to query the database and manipulate the response through SQL and related languages (SQL is commonly expanded as *Structured Query Language* and pronounced "sequel").

The great strength of database, of course, is the ability to order vast data arrays and make them available for different kinds of queries. Two fundamental aspects typically characterize relational databases. One, indicated above, is their construction of relations between attributes and tables. The other is a well-constructed database's self-containment or, as the technical literature calls it, self-description. A database is said to be self-describing because its user does not need to go

outside the database to see what it contains. As David Kroenke and David Auer put it in *Database Concepts*, the "structure of the database is contained within the database itself," so that the database's contents can be determined just by looking inside it (13). Its self-describing nature is apparent in SQL commands. For the database mentioned above containing information about authors, books, and publishers, for example, a typical SQL command might take the generalized form "SELECT AUTHOR .AuthorName, BOOK.BookTitle, BOOK .BookDate, BOOK.Publisher, PUBLISHER .Location," where the table names are capitalized in full (as are SQL commands) and the data elements are categorized according to the attributes, with a period separating table name from attribute. The database's self-description is crucial to being able to query it with set-theoretic operations, which require a formally closed logical system on which to operate. This is also why databases fit so well in computers; like databases, computers employ formal logic as defined by the logic gates that underlie all executable commands.

The self-describing nature of database provides a strong contrast with narrative, which always contains more than indicated by a table of contents or a list of chapter contents. Databases can, of course, also extend outward when they are linked and queried as a network—for example, in data-mining and text-mining techniques—but they do not lose the formal properties of closure that make them self-describing artifacts. Nevertheless, the technologies of linking databases have proved to be remarkably powerful, and the relations revealed by set-theoretic operations on networks of linked databases can have stunning implications. For example, data- and text-mining techniques allowed the epidemiology researchers Don Swanson and N. R. Smalheiser to hypothesize causes for rare diseases that hitherto had resisted analysis because they occurred infrequently at widely separated locales.¹ Even in this case, however, the mean-

ing of the relations posited by the database remains outside the realm of data techniques. What it means that Whitman, say, used a certain word 298 times in *Leaves of Grass* while using another word only three times requires interpretation—and interpretation, almost inevitably, invokes narrative to achieve dramatic impact and significance. Many data analysts and statisticians are keenly aware of this symbiosis between narrative and data. John W. Tukey, in his classic textbook *Exploratory Data Analysis*, for example, explains that the data analyst “has to learn . . . how to expose himself to what his data are willing—or even anxious—to tell him,” following up the lesson by later asking the student what story each dataset tells (21, 101).

Database and narrative, their interdependence notwithstanding, remain different species, like bird and water buffalo. Databases must parse information according to the logical categories that order and list the different data elements. Indeterminate data—data that are not known or that elude the boundaries of the preestablished categories—must either be represented through a null value or not be represented at all. Even though some relational databases allow for the entry of null values, such values work in set-theoretic operations as a contaminant, since any operation containing a null value will give the same as its result, as multiplying any number by zero yields zero. Null values can thus quickly spread through a database, rendering everything they touch indeterminate. Moreover, database operations say nothing about how data are to be collected or which data should qualify for collection, nor do they indicate how the data should be parsed and categorized. Such decisions greatly influence the viability, usefulness, and operational integrity of databases. Thomas Connolly and Carolyn Begg in *Database Systems* estimate that for corporate database software development projects, eighty to ninety percent do not meet their performance goals, eighty percent are delivered late and over budget, and

forty percent fail or are abandoned (270). Anticipating such problems, database textbooks routinely advise students to obscure suboptimal performance by keeping the database design confidential and confining discussions with the paying client to what the interface should look like and how it should work.

The indeterminacy that databases find difficult to tolerate marks another way in which narrative differs from database. Narratives gesture toward the inexplicable, the unspeakable, the ineffable, whereas databases rely on enumeration, requiring explicit articulation of attributes and data values.² While the concatenation of relations might be suggestive, as Folsom remarks in discussing the new kinds of knowledge that the Whitman databases can generate, databases in themselves can only speak that which can explicitly be spoken. Narratives, by contrast, invite in the unknown, taking us to the brink signified by Henry James's figure in the carpet, Kurtz's “The horror, the horror,” Gatsby's green light at pier's end, Kerouac's beatitude, Pynchon's crying of lot 49. Alan Liu, discussing the possibilities for this kind of gesture in a post-industrial, information-intensive era, connects it with “the ethos of the unknown” and finds it expressed in selected artworks as a “data pour,” an overflowing, uncontainable excess that he links with transcendence (esp. 81).

Whereas database reflects the computer's ontology and operates with optimum efficiency in set-theoretic operations based on formal logic, narrative is an ancient linguistic technology almost as old as the human species. As such, narrative modes are deeply influenced by the evolutionary needs of human beings negotiating unpredictable three-dimensional environments populated by diverse autonomous agents. As Mark Turner has argued in *The Literary Mind: The Origins of Thought and Language*, stories are central in the development of human cognition. Whereas database allows large amounts of information to be sorted, cataloged, and queried, narrative models how

minds think and how the world works, projects in which temporality and inference play rich and complex roles. Extending Paul Ricoeur's work on temporality and Gérard Genette's on narrative modalities, Mieke Bal analyzes narrative as requiring, at a minimum, an actor and narrator and consisting of three distinct levels, text, story, and fabula, each with its own chronology (6). To this we can add Brian Richardson's emphasis in *Unlikely Stories: Causality and the Nature of Modern Narrative* on causality and inference in narrative.³

Why should narrative emphasize these aspects rather than others? Bound to the linearity of language, narrative complicates it through temporal enfoldings of story (or, as Genette prefers to call it, discourse) and fabula, reflecting the complexities of acting when knowledge is incomplete and the true situation may be revealed in an order different from the one logical reconstruction requires. Narrator and actor inscribe the situation of a subject constantly negotiating with agents who have their own agendas and desires, while causality and inference represent the reasoning required to suture different temporal trajectories, motives, and actions into an explanatory frame. These structures imply that the primary purpose of narrative is to search for meaning, making narrative an essential technology for human beings, who can arguably be defined as meaning-seeking animals.

Bound to the linear order of language through syntax, narrative is a temporal technology, as the complex syncopations between story and fabula demonstrate. The order in which events are narrated is crucial, and temporal considerations are central to narratology, as Ricoeur's work, among others', illustrates. Datasets and databases, by contrast, lend themselves readily to spatial displays, from the two-dimensional tables typical of relational databases to the more complex n-dimensional arrays and spatial forms that statisticians and data analysts use to understand the stories that data tell.

Manovich touches on this contrast when he perceptively observes that for narrative, the syntagmatic order of linear unfolding is actually present on the page, while the paradigmatic possibilities of alternative word choices are only virtually present. For databases, the reverse is true: the paradigmatic possibilities are actually present in the columns and the rows, while the syntagmatic progress of choices concatenated into linear sequences by SQL commands is only virtually present. I would add to this observation that time and space, the qualities Kant identified as intrinsic to human sensory-cognitive faculties, inevitably coexist. While one may momentarily be dominant in a given situation, the other is always implicit, a natural symbiont whose existence is inextricably entwined with that of its partner. It should be no surprise, then, that narrative and database align themselves with these partners or that they too exist in symbiosis with each other.

Given this entwinement, is it plausible to imagine, as Manovich and Folsom imply at various points, that database will replace narrative to the extent that narrative fades from the scene? A wealth of evidence points in the other direction: narrative is essential to the human lifeworld. Jerome Bruner, in his book significantly entitled *Acts of Meaning*, cites studies indicating that mothers tell their children some form of narrative several times each hour to guide their actions and explain how the world works (81–84). We take narrative in with mother's milk and practice it many times every day of our lives—and not only in high-culture forms such as print novels. Newspapers, gossip, math story problems, television dramas, radio talk shows, and a host of other communications are permeated by narrative. Wherever one looks, narratives surface, as ubiquitous in everyday culture as dust mites.

What has changed in the informative-intensive milieu of the twenty-first century is the position narrative occupies in the culture. Whereas in the classical Greek and Roman

era narrative was accepted as an adequate explanation for large-scale events—the creation of the world, the dynamics of wind and fire, of earth and water—global explanations are now typically rooted in data analysis. If we want to understand the effects of global warming or whether the economy is headed for a recession, we likely would not be content with anecdotes about buttercups appearing earlier than usual in the backyard or Aunt Agnes's son not finding a job. Data, the databases that collect, parse, and store them, and the database-management systems that concatenate and query them are essential for understanding large-scale phenomena. At the global level, databases are essential. However, narrative enters even in the interpretation of the relations revealed by database queries. When Alan Greenspan testified before Congress, he typically did not recount data alone. Rather, he told a story, and it was the story, not the data by themselves, that propagated through the news media because it encapsulated in easily comprehensible form the meaning exposed by data collection and analysis.

In contrast to global dynamics, narrative at the local level remains pervasive, albeit increasingly infused by data. As Folsom indicates, in the face of the overwhelming quantities of data that database-management systems now put at our fingertips, no one narrative is likely to dominate as *the* explanation, for the interpretive possibilities proliferate exponentially as databases increase. In this respect, the advent of the Internet, especially the World Wide Web, has been decisive. Never before in the history of the human species has so much information been so easily available to so many. The constant expansion of new data accounts for an important advantage that relational databases have over narratives, for new data elements can be added to existing databases without disrupting their order. Unlike older computer database models in which memory pointers were attached directly to data elements, relational databases

allow the order of the rows and columns to vary without affecting the system's ability to locate the proper elements in memory. This flexibility allows databases to expand without limitation (subject, of course, to the amount of memory storage allocated to the database). Narrative in this respect operates quite differently. Sensitively dependent on the order in which information is revealed, narrative cannot in general accommodate the addition of new elements without, in effect, telling a different story. Databases tend toward inclusivity, narratives toward selectivity. Harry Mathews explores this property of narrative in *The Journalist: A Novel*, where the unnamed protagonist, intent on making a list of everything that happens in his life, thinks of more and more items, with the predictable result that the list quickly tends toward chaos as the interpolations proliferate. The story of this character's life cannot stabilize, because the information that constitutes it continues to grow exponentially, until both list and subject collapse.

That novels like *The Journalist* should be written in the late twentieth century speaks to the challenges that database poses to narrative in the age of information. No doubt phenomena like this explain why Manovich would characterize database and narrative as "natural enemies" and why thoughtful scholars like Folsom would propagate the metaphor. Nevertheless, the same dynamic also explains why the expansion of database is a powerful force constantly spawning new narratives. The flip side of narrative's inability to tell *the* story is the proliferation of narratives as they transform to accommodate new data and mutate to probe what lies beyond the expanding infosphere. No longer singular, narratives remain the necessary others to database's ontology, the perspectives that invest the formal logic of database operations with human meanings and that gesture toward the unknown hovering beyond the brink of what can be classified and enumerated.

NOTES

1. See, for example, Swanson and Smalheiser, "Interactive System" and "Assessing."
2. The exception is the null value, which has its own problems, as discussed above.
3. Discussing narrative, Bruner also emphasizes the importance of causality, identifying crucial components as agency, sequential order, sensitivity to the canonical (or context), and narrative perspective (77).

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Reply

ED FOLSOM

AH, THE POWER OF METAPHORS INDEED! TO describe the relation between narrative and database, N. Katherine Hayles offers an astute alternative to Lev Manovich's "natural enemies" metaphor: she suggests "natural symbionts," a metaphor I plan to appropriate and use from now on. Her claim that "database catalyzes and indeed demands narrative's reappearance as soon as meaning and interpretation are required" incisively articulates what she calls the "dance" of narrative and database. I've thought of the relation as an endless battle (once narrative begins to win, database rallies, and vice versa), but Hayles's metaphor more efficaciously captures what she rightly characterizes as "the complex ecology" of these two modes of organizing and accessing the represented world.

And, as Hayles makes clear, the metaphors are essential. The term *database* itself is a metaphor, a base onto which we put things that are given (data). The word is less than fifty years old and has mutated in meaning over the decades. Few of us (certainly not I) can approach a database without an array of metaphoric terms that make it seem something it is not. Years ago, when I used to hit a key on my old typewriter, I could follow and even explain the mechanical process that struck an inked ribbon with a typebar to impress a letter on a page. Now, when I hit a key on my computer keyboard, my knowledge of the process that makes a letter appear on my screen is hazy, to say the least, not to mention the process that transfers it to paper. How this sentence I'm writing gets preserved on my USB stick and in what form is a mystery to me. Without the metaphoric apparatus that

allows us to save, open, cut, paste, and create files that can be read by other computers, this world of data entry and retrieval would be inaccessible to most of us. It's no accident that the term *user-friendly* followed *database* by a decade or so and that we all now depend on user interfaces, where many of our most useful metaphors reside.

So when Jerome McGann complains that my referring to *The Walt Whitman Archive* as a database is "seriously misleading—more accurately, it is metaphoric," I accept his second (more accurate) characterization. But when he says the archive "is not—in any sense that a person meaning to be precise would use—a database at all," I have to disagree. Of course it's a database. It is, in fact, several databases—the thousands of bibliographic entries are stored in one, the photographic images in another, and so on. A database, as defined in *The Oxford English Dictionary*, is "a structured collection of data held in computer storage; esp. one that incorporates software to make it accessible in a variety of ways." McGann's insistence that "[n]o database can function without a user interface" that "embeds . . . many kinds of hierarchical and narrativized organizations" is certainly true, because, for most of us, that's what a database is: a vast vault of unseen data that are retrieved and organized by our metaphoric commands, which, as Hayles explains, prompt a database-management system to employ "set-theoretic notation to query the database and manipulate the response through SQL and related languages. . . ." My interest in database as an emerging genre, however, has more to do with the wild and unpredictable intersections of the data that the interface allows us to generate, what Wai Chee Dimock in her introduction to this issue calls "[t]he links and pathways that open up [and] suggest that knowledge is generative rather than singular, with many outlets, ripples, and cascades, randomized by cross-references rather than locked into any one-to-one correspondence."

Discussing the standard markup approaches used for encoding textual data, McGann admits that the "TEI and XML do not adequately address the problem of knowledge representation that is the core issue here—that is, how do we design and build digital simulations that meet our needs for studying works like Whitman's?" and, again, I agree. All our careful tagging and markup (further suggestive metaphors) of the texts on the Whitman archive reveal more and more features that our tagging codes cannot adequately describe. That's the wild excess, and it's one reason we have insisted on including in the archive high-quality scans of the material that we enter into the database as tagged text, so that users can test and challenge our embedded hierarchies and interpretive decisions. On every page of manuscript that we transcribe, there are features that we either name as an instance of some category or ignore. For some user sometime, what we ignored will turn out to be important; what we tagged as one thing will seem to be something else. The images linked to the tagged text (it's all data; it's all on the base at once) serve as checks. Already, as I mention in my essay, some users of the archive have been able to piece together manuscripts that had been physically separated and scattered among different archives; they have done so by examining the untagged details (glue marks, needle holes, small tears) on scans of the pages. There's a great deal in this database, in other words, that escapes the editorial markup and yet is still retrievable and valuable for users who wish to explore instead of simply searching for results.

What is true for the myriad bewildering markings on one of Whitman's manuscript pages is also the case in his printed texts. Take the first edition of *Leaves of Grass*: virtually all students of Whitman know (because they've been told so many times) that the twelve poems in that edition are untitled. But when we prepared to tag the text of the first edition, we were confronted with the

jarring typographic fact that, while the final six poems have no titles, the first six *do*. Each of the first six poems is entitled "Leaves of Grass." Now, *Leaves of Grass* is the book's title, so most readers, editors, and critics have apparently assumed this repeated title must be some kind of running head, even though it clearly occupies the position of a title. The New York University Press's three-volume variorum edition ignores these titles, as do most reprintings of the book, like the Library of America edition. But in tagging this material to enter it into a database, we needed to describe this stubborn printed phrase. Since in later editions of *Leaves of Grass* Whitman would again use repeated titles, including "Leaves of Grass," it seemed reasonable to conclude that he had started this practice with his first edition. And since in the 1860 edition Whitman includes a cluster of twenty-four numbered poems called "Leaves of Grass," is it also reasonable to conclude that the final seven short poems in the first edition are actually his first cluster, all contained under the sixth "Leaves of Grass" title? Or, in his desire to fit everything into twelve eight-page signatures, did he begin to drop this title to save space? We editors have to make a hierarchical decision in cases like this, but the scanned pages of each edition stand in the database as visual checks on every tagging decision we make. Our decision in this case will affect title searches, but no matter what we call a particular feature, the image scans of each page will continue to portray the feature in its raw, untagged, wild state.

When McGann says, then, that "databases and all digital instruments require the most severe kinds of categorical forms" and that the "power of database—of digital instruments in general—rests in its ability to draw sharp, disambiguated distinctions," he's right (tagging requires it), but for me the real power of database rests in its equal ability to generate the materials that allow users to question each sharply drawn distinction.

Jonathan Freedman, like McGann, worries that "to celebrate database as a kind of autonomous form" is "to downplay the inclusions, exclusions, choices that have gone into the making of databases and hence to occlude the possibilities for questioning those choices." But this points, once more, to the endless battle between—the symbiosis of—narrative and database. It is possible to try to build a database toward inclusiveness rather than exclusiveness, and the more we do so, the better the users' chances of questioning and challenging whatever narrative the creators have attempted to tag onto the data.

I've learned a great deal of what I know about textuality from Jerome McGann (that's truly Folsom praise), and I take to heart his cautions about how database is but one step in an endless process of mediation and remediation. I am optimistic about the possibilities of electronic editions, but, as a frequent dweller in physical archives, I am also viscerally aware of what does not get translated into the virtual archive. I've held that little notebook where Whitman first teases out the voice (and the attitude) that would generate *Leaves of Grass*, where you can see something like the DNA of his future work: there's an endless amount of information in the feel of the pages, the stubs of the cut-out leaves, in the way the book rests in the palm of the hand, not to mention in the story of how it sat in an attic for half a century after it was stolen from the Library of Congress. By examining the binding and signature construction of the first edition of *Leaves of Grass* in multiple physical archives, I've learned many things about its making that I never could have discovered on the virtual archive. But I love the challenge of trying to figure out how we can now remediate as much of that information as possible onto the Whitman archive, to try to grow the database so that the surprises of searching and juxtaposing will become richer and more frequent.

Freedman teams me up with the "Googleizers": if *The Walt Whitman Archive* had only

a fraction of one percent of Google's resources, we could grow our holdings quickly and make the archive more like the vast and inclusive database that I fantasize about in my essay and that Meredith McGill would understandably like to see more of now. McGill finds the archive "not a transformation but a 'remediation' of archives." Here we come back again to the metaphor of the symbionts: database cannot remediate archives without in some key sense transforming them (as McGann's comments on markup make clear), but there is no doubt that a vital part of the *The Walt Whitman Archive* is the collection of scans of books, manuscripts, and photographs, which, taken by themselves, are a remediation (and a combining) of archives. I'm not sure, though, why McGill believes that "[d]igitizing archives makes it harder to see the partial nature of the printed record, the limited reach of print at any moment in history, and the supersession of one edition by another." We will soon be including in the archive the results of the first complete census of extant copies of the first edition of *Leaves of Grass*, including their known original owners and the variations from copy to copy. Even now, users can for the first time put side by side on their screen the same poem as it appears in each edition of *Leaves of Grass*, creating a visual image of "supersession" of editions unlike anything possible before, short of opening actual original copies of all the editions.

McGill makes the valid point that, in its current stage of development, the archive reproduces "mass culture's reductive treatment of genre" by offering all the poetry and little of the prose. But, as she accurately notes at the end of her response, "[t]hese are still early days for the digital humanities." Yes indeed. Kenneth Price and I initially thought we'd be done with this project in five or six years; now, more than a decade later, we realize that if we can keep it supported it will continue to grow long after we're gone, because database does not handle completion well—it is voracious

and thrives on revision, addition, and supplementation. McGill's exciting suggestion of how "'rhizomorphous' connections . . . might have been encouraged by providing hyperlinks to Whitman's editorials in the *Brooklyn Daily Eagle*" sounds like the continual discussion among archive staff members about how we need to include a history of translations of Whitman's work from around the world, scans of the issues of the periodicals in which he published, all the biographies of him, the letters he wrote and all known letters to him. . . . The list is endless.

And database can handle it all. What are needed are time, energy, resources, talented scholars, and the inevitable improvement in software and hardware that has made so much digital scholarship thinkable today that was unthinkable ten or even five years ago and that will make the unthinkable today doable a decade from now. Freedman notes, for example, that "[t]he creators and maintainers of *The Walt Whitman Archive* don't include much contemporary criticism (largely, one assumes, because of copyright rather than predilection) but link extensively to Whitman-era responses; the result is to institutionalize certain versions of Whitman while effacing others." That was true when he wrote his response, but it is less true now, because the University of Iowa Press generously agreed to let us put online the entire Iowa Whitman Series (currently fifteen books of criticism from 1989 to the present, three of which are already available), and we are working with authors and presses to arrange for more copyrighted material to appear. If my rhetoric is, as Freedman suggests, "utopian," my experience in working on the archive is anything but utopian. It's slow and frustrating work, but database invites big imagining, and, as more and more humanities scholarship becomes digitally based, the possibilities will grow exponentially.

Database is a genre that the next generation of humanists will take for granted. Universities that haven't yet adjusted their

scholarship and research expectations to allow for and encourage digital scholarship will soon do so. Digital research requires collaborative enterprise of the sort that has been rare in humanities scholarship. As with any emerging genre, it's anybody's guess where it will go and what range of effects it will have. As Peter Stallybrass notes, however, already "millions of people who cannot or do not want to go to the archives are accessing them in digital form. And digital information has profoundly undermined an academic elite's control over the circulation of knowledge." Just as my work with an electronic archive has helped me discern in Whitman's work aspects of what I think of as database, so has Stallybrass found "Shakespeare consciously practic[ing] his own form of database." He goes on to point out how "some of the most powerful modern databases draw on the development of a massive range of finding aids and databases in the Middle Ages and Renaissance." Stallybrass reveals how database has fundamentally altered his pedagogical approach, since our scholarly competitors are "no longer just our colleagues; in the age of database, they are also the students whom we claim to be teaching." This overturning of "proprietary authorship" is one of many emerging realizations of the still-dawning age of database.

Like Stallybrass, I believe this age of database has a long, precomputer history,

stretching back to the first epics. Like Hayles, I believe that narrative is "an essential technology for human beings," but I also believe that database is the equally essential counter-technology, the innate desire to pile up and absorb experiences and ideas and material things that don't sort themselves immediately into narrative—items we can access later as pieces of a narrative if and when they fit the story, history, or syntax of meaning we are seeking to construct. Keeping a commonplace book edges toward database; keeping a journal, toward narrative. Our greatest and most evocative narratives, including the novels we teach, paradoxically become database when we write our interpretive narratives about them, using bits of the data to construct a meaning that is always exceeded by the data that do not fit the narrative we construct. The hermeneutical enterprise finds databases everywhere—even in narratives—and accesses them to create meaning. Database, in an age of computers, provides increasingly quick access to increasingly vast realms of thought, language, facts, and works.

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