Title

Transcendental Data: Toward a Cultural History and Aesthetics of the New Encoded Discourse

Journal

Critical Inquiry, 31(1)

ISSN

0093-1896

Author

Liu, Alan

Publication Date

2004-09-01

DOI

10.1086/427302

Peer reviewed

Transcendental Data: Toward a Cultural History and Aesthetics of the New Encoded Discourse

Author(s): Alan Liu

Source: *Critical Inquiry*, Vol. 31, No. 1 (Autumn 2004), pp. 49-84
Published by: The University of Chicago Press
Stable URL: http://www.jstor.org/stable/10.1086/427302
Accessed: 13-06-2016 05:25 UTC

Transcendental Data: Toward a Cultural History and Aesthetics of the New Encoded Discourse

Alan Liu

<preface type = "general">[1]

Whether one writes fiction or business reports, prepares lectures or sales presentations, publishes works stored in a library or a commercial database—whatever, in fact, one's domain of authoring might be—the chances are that one is already producing content that somewhere along the route of its transmission takes the form of a uniquely contemporary kind of discourse: encoded or structured discourse, in the technical sense of digital text encoding and structured markup.[2] At its most local, such encoding or markup shows up in the copyedited manuscripts that authors now see from publishers, which instead of notes to the designer in the old style of "18 pt. heading" (and so on) provide pure logical descriptors or "tags" keyed to house style—for example, <CT>Chapter Title</CT>.[3] At its most global,

1. Suiting style to theme, I have used an incomplete, minimal set of XML tags to mark out the sections of this paper.

2. I use *discourse* in this essay to refer elastically to digitally born, transmitted, and/or received information that is mediated through the combination of database- and XML-based technologies described below. While in its narrower sense *discourse* refers to language-based communication, the term is still apt in the age of multimedia. While a contemporary data stream may consist of digital image, video, or sound, for example, it is still discursive to the extent that its production, transmission, aggregation, and coordination—in a word, management—are increasingly controlled (in the database and XML system I outline) through such text-based standards as SVG and SMIL (XML-based standards applicable to multimedia).

3. Some academic presses are moving full bore into text encoding—for example, Cambridge University Press, which now encodes its books in XML to facilitate production (for example, in the indexing process). My thanks to Kevis Goodman for this information. At the time of this writing, Goodman's book from Cambridge University Press, *Georgic Modernity and British Romanticism: Poetry and the Mediation of History,* was being indexed.

Critical Inquiry 31 (Autumn 2004)

a bewildering variety of the world's documents and media have in the recent past been encoded in, or are managed by, standardized text-based markup schemes (especially XML, or Extensible Markup Language) that include descriptors for everything from textual or multimedia content to such metadata as author, date, section, and so on. Alternatively, such documents and media have been entered in databases that hold content in tables, records, and fields exportable into XML.

This entire collection of databases and text markup languages has so far remained largely hidden from individual writers and readers because it is first being implemented at the institutional level. An increasing number of businesses, publishers, booksellers, university libraries, and digital text archives now use databases and XML to manage the jostling, dynamic bundle of data objects we once called books, articles, reports, or songs. But now that XML is being integrated into standard enterprise and personal productivity software (including Microsoft's Office 2003 suite), ordinary authors and readers—especially those working in institutional settings—will be influenced as well. Authors and readers will join with their institutions to complete a new discursive circuit we might call, updating Friedrich Kittler's media analysis, discourse network 2000.[4]

4. See Friedrich A. Kittler, *Discourse Networks 1800/1900,* trans. Michael Metteer and Chris Cullens (Stanford, Calif., 1990). See also Kittler, *Gramophone, Film, Typewriter,* trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford, Calif., 1999). In his "Afterword to the Second Printing" in *Discourse Networks,* Kittler states:

> The term *discourse network* . . . can also designate the network of technologies and institutions that allow a given culture to select, store, and process relevant data. Technologies like that of book printing and the institutions coupled to it, such as literature and the university, thus constituted a historically very powerful formation. . . . Archeologies of the present must also take into account data storage, transmission, and calculation in technological media. [P. 369]

I discuss Kittler's work at the end of this essay.

In regard to knowledge work in institutional settings, Alan Liu, *Laws of Cool: Knowledge Work and the Culture of Information* (Chicago, 2004) studies the concept and its bearing on the contemporary humanities and arts. See especially the preface to part 1, chap. 1 on "The Idea of Knowledge Work," and the appendix on "Taxonomy of Knowledge Work."

Alan Liu is professor of English at the University of California, Santa Barbara, and author of *Laws of Cool: Knowledge Work and the Culture of Information* (2004) and *Wordsworth: The Sense of History* (1989). He is the creator of Voice of the Shuttle: Web Site for Humanities Research and director of the NEH-funded project "Transcriptions: Literary History and the Culture of Information." He is also a member of the board of directors of the Electronic Literature Organization (ELO) and chair of the Technology/Software Committee of the ELO's PAD initiative (Preservation/Archiving/Dissemination of Electronic Literature).

Though the problem of reading the new discourse—that is, browsing—is intriguing in its own right, I will concentrate in this essay on the originating end of the transmission act—authoring.[5] What will discourse network 2000 mean for the act of authoring?

A critical analysis of the new discourse will first require that we unfold its logic in its own terms, which is to say the technological terms of the postindustrial institutions led by knowledge work business. But it will also require that we view such technologic through the lens of other participating institutions that, while increasingly colonized by postindustrial principles, offer an alternative perspective. The specific institutional perspective I bring to bear is that of the humanities and arts in the academy, which have in their own way begun exploring discourse network 2000. Members of the Association for Computers and the Humanities (ACH) and the Text Encoding Initiative (TEI), for example, have long had a hand in developing or adapting text-encoding standards; and in the last decade major digital text and image archives at East Coast centers of humanities computing in the U.S. (such as Brown University and the University of Virginia) have proven the sophistication and robustness of text-encoding for literature.[6] In a logically similar move, some of the most advanced humanities computing projects on the U.S. West Coast—for example, those associated with the University of California Digital Cultures Project (headquartered at UC-Santa Barbara) and the University of California Digital Arts Research Network (DARnet)—have pursued the complementary paradigm of database technology.[7] Seen one way, such projects make the transmission of academic

5. The phenomenological, psychological, semiotic, political, and other facets of the "low-cognitive" modes of reading we currently call browsing solicit more attention from humanists at this point in the information age. My thanks to Kent Puckett at University of California, Berkeley, for helping me to begin thinking about the new digital reading practices.

6. Well-known examples of the digital text or image archives I refer to include the Brown Women Writers Project, the Rossetti Archive, and the William Blake Archive. See Brown Women Writers Project, dir. Julia Flanders, Brown University, http://www.wwp.brown.edu/; *The Complete Writings and Pictures of Dante Gabriel Rossetti: A Hypermedia Research Archive,* ed. Jerome J. McGann, Institute for Advanced Technology in the Humanities, University of Virginia, http://www.iath.virginia.edu/rossetti/; and William Blake Archive, ed. Morris Eaves, Robert Essick, and Joseph Viscomi, http://www.blakearchive.org/

7. See University of California Digital Cultures Project, http://dc-mrg.english.ucsb.edu/, and University of California Digital Arts Research Network (DARnet), http://ucdarnet.org. In such projects as the current version of Liu's Voice of the Shuttle: Web Site for Humanities Research (http://vos.ucsb.edu/) or Sharon Daniel and Mark Bartlett's collaborative systems for public activism (for example, Subtract the Sky, developed by Sharon Daniel, Mark Bartlett, and Puragra Guhathakurta, http://arts.ucsc.edu/sdaniel/new/subtract.html), content is entered in database tables and fields (rather than in markup tags), and it is the database that then drives the display of content on the web as well as advanced search and query functions. The special issue of *AI and Society* on "Database Aesthetics," including contributions from several UC DARnet members, is helpful in its introduction of the database approach to humanities and arts computing; see http://time.arts.ucla.edu/AI_Society/

knowledge more efficient and flexible and thus enroll the humanities and arts in the technologic of discourse network 2000. But, viewed differently, they also prepare the academy to refract such technologic through its own values, which are not always on the same page with the business master plan. After all, while the technological measure of the new discourse paradigm is postindustrial efficiency coupled with flexibility—that is, the ability to say anything to anyone quickly—the measure of academic knowledge is also historical, social, philosophical, artistic, and public (nonproprietary) diversity—for example, the ability to say anything to anyone fully, richly, openly, differently, kindly, or slowly.

Because one of the emphases in the humanities in the past two decades has been cultural studies, there is special interest at this juncture, I believe, in seeing what a cultural studies approach might tell us about the structured encoding of knowledge.[8] My first critical question will thus be: *What is the social logic that underlies the technologic of discourse network 2000?* With specific reference to authoring: *How is an author now a postindustrial producer?* But social history alone is not cultural for the humanities and arts unless it also treats representation, expression, and style, especially as these are now understood to extend beyond the canvas of form onto such subjective and/or material registers of experience as identity or body. My final critical question will thus open a preliminary speculation into aesthetic logic: *What are the aesthetics of encoded or structured discourse or, as I will term it, of postindustrial dematerialization?* And: *How is it possible for writers or artists to create in such a medium?*
</preface>

<preface type = "technical">

But, first, what exactly is encoded or structured discourse? Consider the problem of sending a poem over the internet to a distant computer without knowing exactly what program will receive it, the nature of the processing or display technologies at the other end, or even the remote user's purpose. The poem is as follows:

8. For my earlier reflections upon and critiques of cultural studies, see Liu, "The Power of Formalism: The New Historicism," *ELH* 56 (Winter 1989): 721–71, "Wordsworth and Subversion, 1793–1804: Trying Cultural Criticism," *Yale Journal of Criticism* 2 (Spring 1989): 55–100, "Local Transcendence: Cultural Criticism, Postmodernism, and the Romanticism of Detail," *Representations*, no. 32 (Fall 1990): 75–113, and "The New Historicism and the Work of Mourning," *Studies in Romanticism* 35 (Winter 1996): 553–62. At present, my critique is external rather than internal to the cultural history approach. I seek to bring cultural studies to bear on a problem external to academic method.

The SICK ROSE

O Rose thou art sick.
The invisible worm,
That flies in the night
In the howling storm:

Has found out thy bed
Of crimson joy:
And his dark secret love
Does thy life destroy.[9]

What is the best way for the author to send not just the content of the poem but also the exact instructions for processing that content? The general goal is to enable the greatest number of machinic idiot savants at the other end—by turns dumb and brilliant in ways the author cannot predict—not just to receive the poem but also to do something intelligent with it, whether reproducing the original or something else.

A poor solution, it turns out, is to transmit procedures. A procedural instruction for the display of the poem, for example, might say in essence: "display the first line beginning at screen position 400 pixels on the x-axis, 500 pixels on the y-axis." Such instructions tell the machine exactly what to do, but for that reason are not readily adaptable when circumstances vary. (What would a small cell phone screen, for example, do with a line of text offset 400 pixels to the right?). Procedural instructions also allow for little use of intelligence by the receiving machine to adapt the content to local needs—for instance, to the needs of a hypothetical poem aggregator that looks only for poetry related to disease or written in quatrains (analogous to one of the RSS news aggregator sites that use XML to pull together syndicated news articles from all over the web).[10] The procedural approach, in other words, addresses only the idiot, not the potential savant that is inhumanly good at filtering, searching, aggregating, transforming, or otherwise processing communication for its own (sometimes unforeseen) purposes.[11]

9. This poem by William Blake is the first example in one of the best known explanations of XML for an academic audience, TEI's "A Gentle Introduction to XML" (C. M. Sperberg-McQueen and Lou Burnard, "A Gentle Introduction to XML," http://www.tei-c.org/P4X/SG.html). While I borrow the example, I have improvised my own, even gentler explanation of XML for this essay, whose audience will in most cases be less involved in technology or the digitization of texts than TEI's community.

10. For an introduction to RSS, see Mark Nottingham, RSS Tutorial for Content Publishers and Webmasters, http://www.mnot.net/rss/tutorial/, and the RSS-DEV Working Group's RDF Site Summary (RSS) 1.0 page, http://web.resource.org/rss/1.0/. RSS has been understood variously to stand for Rich Site Summary or RDF Site Summary.

11. Of course, there are some occasions when it is desirable to use a procedural approach to make a page, for example, match up as closely as possible on the sending and received ends of an internet transmission.

A better solution, then, is to break the circuit of transmission and reception into two independent parts assisted in their mating by a common standard. On the transmission end, the author can use a logically descriptive rather than procedural approach to define the elements of the poem—for example, line and stanza—so that they fit within an overall conceptual structure for the parts of a poem. The structure is either implied in a common discursive standard (a set of specifications) that all participants in the discourse network understand or, for customized needs, can be stated explicitly as a set of subordinate, extended standards to be sent along with the content in definitional statements. At the receiving end, the particular program then allows the standard to guide it in using its own procedures for processing or display. A single description of content at the source can thus be molded in typically postindustrial fashion to a decentralized variety of consuming programs, formats, and usages.

One common implementation of such an approach is the database solution I previously mentioned. A modern relational and SQL (Structured Query Language) database holds its content descriptively in tables, records, and fields.[12] For example, a set of interrelated tables might contain information about a poem in fields labeled title, author, publication date, line number, and (for the actual content of a particular verse) line. Such a database could be "queried" (through a search for *Blake* together with *rose,* for instance) so as to produce a nicely formatted version of "The Sick Rose." The pure database approach works best when both the sending and receiving computers run the same database program, sharing a common discursive standard built into the workings of the software itself. But for wider compatibility, databases can also present their content on the web (more precisely, through the web's HTTP transmission protocol) by means of middleware programming or scripting that shuttles content into HTML (Hypertext Markup Language) or, as we will see below, XML. The rules of HTML or XML, established by the World Wide Web Consortium (W3C), then serve as the common standard that the browser or other program uses to process the material. A distributed network of users connected by the web can thus access database content and use web forms to search or edit that content.

The other major implementation (used by itself or, as suggested above, with databases) is text encoding or markup, whose most current common standard is XML. Developed by the W3C beginning in 1996 as a subset of

12. For a helpful explanation and history of relational databases intended for a general audience, see "The Rise of Relational Databases," chap. 6 of the National Research Council's *Funding a Revolution: Government Support for Computing Research* (Washington, D.C., 1999). The book is also online at National Academy Press, http://www.nap.edu/readingroom/books/far/

the older SGML (Standard Generalized Markup Language), XML is designed to be far more capable than HTML (the previous subset of SGML) at sharing information over the internet in a manner at once uniform and customizable (extensible).[13] XML is human-readable in the sense that its descriptive code consists of plain-text tags in angle brackets residing at the same level as the content they encode (that is, in the same document). These tags, which thus accompany the content wherever it goes, serve the same descriptive function as fields in a database. In XML, for example, our poem might be marked up:

```
<anthology>
    <poem><title>The SICK ROSE</title>
      <stanza>
        <line>O Rose thou art sick.</line>
        <line>The invisible worm,</line>
        <line>That flies in the night</line>
        <line>In the howling storm:</line>
      </stanza>
      <stanza>
        <line>Has found out thy bed</line>
        <line>Of crimson joy:</line>
```

13. For the official documentation and specifications of XML (as well as related specifications), see the W3C site, http://www.w3.org/, esp. the pages Extensible Markup Language (XML), http://www.w3.org/XML/, and XML Core Working Group Public Page, http://www.w3.org/XML/Core/. In my own amateur experimentation with creating XML documents, schemas, and XSLT style sheets, I was initially assisted by the two following books, which include sections for a general audience explaining the nature of XML: Michael J. Young, *XML Step By Step* (Redmond, Wa., 2002), and Andrew H. Watt, *Sams Teach Yourself XML in 10 Minutes* (Indianapolis, 2003). Also helpful for general explanations of such affiliated XML specifications or concepts as DTDs, schemas, validity, and so on, is the O'Reilly XML.com site, http://www.xml.com/

One historical difference between the text-encoding and database approaches is that the former followed open standards from the first, while the latter has often relied on proprietary database programs. (More recently, developers have begun to use the open-source database MySQL, frequently with PHP scripting to move content back and forth to the web.) But another difference tended to compensate for the above disadvantage: databases were designed from the first to be reversible in data flow. By contrast with most text-encoded digital archives in the past, therefore, a database-to-web system was also easily configurable as a web-to-database system, accommodating two-way, real time interaction with the user (for example, users could enter or revise content in a database through a web form).

Despite these past differences, however, the trend is now clearly toward convergence between text encoding and databases. Just as SGML text encoding is moving toward XML (the encoding standard designed to make some of the logical rigor and power of SGML available in a fully distributed, networked, and display-oriented environment), so databases are now developing the ability to communicate transparently (export/import) in XML. (Reciprocally, XML is developing native XML databases and an XML Query language allowing it to act in a manner akin to relational databases.) XML is the glue or splice between the text-encoding and database worlds.

```
        <line>And his dark secret love</line>
        <line>Does thy life destroy.</line>
      </stanza>
    </poem>
  </anthology>
```

[14]

Each pair of open and close tags (for example, <stanza> </stanza>) describes its enclosed content as an element of the discourse (sometimes supplemented by an attribute or more precise specification of that element). The logical consistency of the whole set of descriptions is guaranteed by a common set of XML rules specified by the W3C such that, to take a simple example, each open tag must be followed by a matching close tag. In addition, the descriptive vocabulary for a particular kind of document—poem, prose, business card, and so on—can be specified in an accompanying Document Type Declaration (DTD) or, better, XML schema that explicitly defines, for instance, <line> and <stanza> so that the former can be nested validly within the latter, but not vice versa. The computer receiving the transmission would then use an XML processor program working in league with a server application (for example, a database) or user application (for example, a browser) to handle the poem appropriately according to the standards.[15]

The overall morphology of discourse network 2000 may thus be outlined as three functionally independent strata, each comprising a set of functions enacted by a variable assemblage of machines, programs, people, and institutional support structures:[16]

(1) *Content Management.* This stratum of discursive activity feeds content into a database or XML source document in structured form, where *structured* means a format able to differentiate and relate such logical units as paragraph, quotation, or title.

(2) *Transmission Management.* This discursive layer exports or sends content over the internet in the intervening form of XML (together with such supporting standards governing the manipulation or sending of XML as XSLT, SOAP, and so on). Underlying this layer of discourse are the in-

14. Again, I am borrowing this example from Sperberg-McQueen and Burnard, "A Gentle Introduction to XML."

15. To facilitate the match between the discourse as it was structured on the originating machine and the processing or display formats on the receiving machine, moreover, XML documents are often also attended by an XSLT style sheet designed to transform XML markup intelligently from one format into another. For display purposes, for example, a style sheet can transform XML into XHTML, or XML-compliant HTML for web browsers. See n. 13 for reference guides to these and other technical terms related to XML.

16. See n. 4 for Kittler's definition of discourse networks as including "technologies and institutions."

ternet's TCP/IP and related protocols, responsible for transmitting not documents per se but their constituent files and data packets.

(3) *Consumption Management.* Consumption management is the stratum of discursive activity that receives the XML transmission and absorbs, reformats, filters, edits, or otherwise *actively* consumes it for local purposes. To use Alvin Toffler's term in his description of postindustrialism, it is productive consumption or "prosumption."[17]

</preface>

<argument title = "technologic" subtitle = "the blind spot on the page">

On the early world "wild" web, one corporation's or library's idiosyncratic database might not have been able to send its contents to any other database or end-user program through equally idiosyncratic HTML code. And the gap between ordinary word processing and the web—let alone the so-called deep web of underlying databases—was even wider. But now thick, pliant strands of XML are girding the wilderness (and even tying in word processor documents) to enable a new order of knowledge. Discourse network 2000 is a step in the direction of what Tim Berners-Lee, the web's founder, has envisioned as a future "Semantic Web"—a web that will understand something about the nature of the discourse it is being asked to communicate and thus be able to process that discourse more intelligently and automatically.[18]

The technologic that informs this vision may be stated in the form of three powerful needs that have converged in contemporary business and other institutions that value the efficient and flexible, which is to say postindustrial, transmission of information. One is the need to make discourse as *transformable* as possible between varying technological and social conventions so that identical content might flow just as easily, for example, to a printed page, web page, or cell phone display. A second is to make discourse *autonomously mobile* in a way that updates Claude Shannon's

17. Alvin Toffler, *The Third Wave* (New York, 1980), pp. 185, 273–75.

18. "The Semantic Web is . . . an extension of the current [web], in which information is given well-defined meaning, better enabling computers and people to work in cooperation" (Tim Berners-Lee, James Hendler, and Ora Lassila, "The Semantic Web," *Scientific American,* 17 May 2001, http://www.scientificamerican.com). The World Wide Web Consortium overview page on the Semantic Web quotes this sentence. As the W3C defines it, "the Semantic Web is the representation of data on the World Wide Web. It is a collaborative effort led by W3C with participation from a large number of researchers and industrial partners. It is based on the Resource Description Framework (RDF), which integrates a variety of applications using XML for syntax and URIs for naming" (Semantic Web home page, version 1.168, 11 Oct. 2003, http://www.w3.org/2001/sw/).

transmission model of communication (with fixed points of sender and receiver separate from the logic of the message itself). Just as data packets in the internet's TCP/IP protocol are atomistic parts of a file each with just enough micro-intelligence about source, destination, and position in the overall file to fly solo like a carrier pigeon and reassemble in proper order with its flock, so in loosely analogous fashion XML elements such as <line> or <stanza> are what might be called document packets with just enough logical autonomy—assisted by the common XML standard—to know where and how it should be processed relative to the document as a whole. It's like writing a novel on index cards and throwing them out of an airplane at 30,000 feet. When the cards land, somehow they line up in the right order, or—even more uncannily—in someone else's searched, sampled, remixed, summarized, and aggregated order. The third need is to *automate* such discourse so that a proliferating population of machinic servers, databases, and client programs can participate as cyborgian agents and concatenated web services facilitating the processing and reprocessing of knowledge.[19] In the case of an RSS news aggregator, for example, humans no longer need to take many of the intervening steps necessary to find and filter articles residing on different servers and databases. They become just the last of many agents automatically negotiating with each other on the web to perform the transaction of reading, or browsing, for us.

These cardinal needs of transformability, autonomous mobility, and automation resolve at a more general level into what may be identified as the governing ideology of discourse network 2000: *the separation of content from material instantiation or formal presentation.* Endorsed explicitly or implicitly by the standards-setting bodies (for example, the TEI, which declares, "XML focuses on the meaning of data, not its presentation"), the ideology of the separation of content from material or formal presentation is the deep logic behind the discursive morphology outlined above in which the intervening layer of transmission management serves as something like a secret agent cutout allowing content management at the source and consumption management at the terminus to be double-blind to each other.[20] From

19. *Web services* refers to the concatenation of software and specifications that allow businesses (and other institutions) to create automated, end-to-end as well as round-trip flows of information across varying hardware and software platforms so that databases or other applications can in effect serve each other in the process of serving end users. For example, the act of purchasing a product online could trigger a whole set of cross-firm and cross-system transaction events (one database seeking another to check for product availability, shipping schedules, customer credit information, and so on). Web services require the ability for one database to send information to others in XML so that it can be machine-processed at the other end. For an introduction to web services, see Robert P. Lipschutz, "Brave New Apps: The Web Services Tools," *PC Magazine,* 1 Oct. 2003, pp. 116–25.

20. See Sperberg-McQueen and Burnard, "A Gentle Introduction to XML."

the author's viewpoint, therefore, a poem can now be written free of commitment to, or even knowledge of, the formal or material conventions for receiving the poem.[21] Just as striking is the inverse of the double-blind relationship: an author can now create the formal or material conventions for receiving a poem (epitomized in what we now call interface design) free of any specific knowledge about what actual source content will be delivered into that frame.

Witness, therefore, the phenomenon of the so-called data island now apparent to web authors and, with the new generation of XML-based word processing systems, soon likely to influence the psychology even of mainstream authoring in institutional contexts. Data islands, or more generally what I will call data pours, are places on a page—whether a web page or a word processing page connected live to an institutional database or XML repository—where an author in effect surrenders the act of writing to that of parameterization.[22] In these topoi, the author designates a zone where content of unknown quantity and quality—except as parameterized in such commands as "twenty items at a time" or "only items containing 'sick rose'"—pours into the manifest work from databases or XML sources hidden in the deep background. Content, in other words, becomes semiotically transcendental (in the sense of what Derrida called the "transcendental signified" in "Structure, Sign, and Play in the Discourse of the Human Sciences").[23] The transcendental signified of discourse network 2000 is content

21. The phenomenology of writing I indicate is subtly different from that of writing for most print publications, where it is only apparently true that authors need not know anything about how the content they create will be formatted or set. Relevant here is Johanna Drucker's argument about the unmarked style of typography (grey, graphically neutral blocks of text on a page), which she identifies with traditional, high literature (most canonically, the Bible); see Johanna Drucker, *The Visible Word: Experimental Typography and Modern Art, 1909–1923* (Chicago, 1994), pp. 94–95. In such typography, neutrality of presentation is really a testament of assumed uniformity of belief, seriousness, reading habits, and so on in the consuming audience. An author in effect knows that he or she is writing for that authoritative look. In contrast, the publication medium at the other end of an internet transmission is more of a black box (unless it is a venue designed specifically to mimic print, as in the case of many newspaper sites or, more extreme, sites serving their content in the Adobe pdf format).

22. For an explanation of the term *data island,* see Edmond Woychowsky, "XML Data Islands Offer a Useful Mechanism to Display Web Form Data," 25 Feb. 2003, http://builder.com.com. *Data island* usually refers only to XML code embedded in a Web page that can be bound to HTML objects on that page. I coin the phrase *data pour* to generalize the phenomenon. In my usage, a data pour is code embedded in a web page that is bound to (transfers information to or from) any data repository located *elsewhere*—whether XML data elsewhere on the web page itself, XML data in separate documents and on separate servers, or database content. In the source code of a web page, data islands or pours commonly appear as a congested, opaque concentration of non-HTML code or scripting (or non-HTML grafted onto or interwoven with HTML). Functionally, however, the opacity of the code is really transparency (like looking through an aperture or window) to content located elsewhere.

23. Jacques Derrida, "Structure, Sign, and Play in the Discourse of the Human Sciences," in *Writing and Difference,* trans. Alan Bass (Chicago, 1978), pp. 280–81.

that is both the center of discourse and—precisely due to its status as essence—outside the normal play or (as we now say) networking of discourse.

Here are two examples of data islands or data pours from my own recent online projects.[24] The first is code from a web page that draws its content dynamically from a relatively simple database to create a gallery of images for a course on romantic landscape art (Code Excerpt 1).[25] The page initially establishes a connection with the database (liu-images.mdb) and then uses SQL (Structured Query Language) to select all fields from a particular table in that database (the table called *Artists*). Subsequent code on the page requests the content of specific database fields/records and displays it in HTML format for the web. Records are poured automatically from the database onto the web page one at a time, but because the data pour is nested within a repeat statement (which can be variously parameterized), the operation generates a cumulative list or table containing all relevant items in the database even though the author may not know what is in the database or may have ceded control of the database to someone else. The second example represents a data pour implemented through a simple XML document that I created for pedagogical purposes to manage a work of web-based fiction (Edward Falco's powerful but technically simple *Self-Portrait as Child with Father*), together with an associated XSLT style sheet (which transforms XML content into some other format, in this case HTML for the web). As seen in the XSLT style sheet, content moves from the XML document to the web through "select" statements roughly analogous to the select statements used to query SQL databases (Code Excerpt 2).[26]

24. *Data island* is commonly used to describe the practice of embedding XML-coded data "inside HTML pages," as Microsoft's MSDN Library for programmers puts it (http://msdn.microsoft.com/library/en-us/xmlsdk/html/xmconxmldataislands.asp). However, I will prefer the neologism *data pour* because I think it is more descriptive of the function of such embedded code, which is not to be isolated but instead to flood the foreground reading space with volumes of dynamic content originating in background automated sources seeming to the end user—and often also to the web author—inexhaustible, unpredictable, and not fully controllable.

25. This is a database in Microsoft's Access program that I created to house an image gallery for a graduate seminar I taught on "Romantic Landscape" in 2001. Though my own database work is based on proprietary programs (and also the .ASP scripting language used to create the middleware layer that transfers content to and from the web), examples could also be drawn from open-source databases and scripting.

26. This is code from a simple application of XML called Tracker (Hypertext Fiction Tracker) I created in 2002 to illustrate how XML might facilitate teaching and scholarly research in the field of electronic literature; see Liu, Hypertext Fiction Tracker: Conceptual Demo of XML Application, http://www.english.ucsb.edu/faculty/ayliu/test/xml/tracker.html.In particular, Tracker was intended to illustrate how XML could help a teacher navigate works of lexia-based hypertext fiction in the classroom (where such works can be difficult to navigate or point to in real time without interrupting the flow of class for an extended hunt-and-explore). The concept has since been superseded by the Electronic Literature Organization's PAD (Preservation/Archiving/Dissemination) initiative, in which I served as head of the Technology/Software Committee; see http://www.eliterature.org/pad/. PAD seeks to establish the protocols and technologies for the

As a result of such data pours, the interface of the contemporary web increasingly differs from that of first-generation web work, where most substantive content was there on the page together with formatting code and other elements under the direct, often idiosyncratic control of the author. Now web pages increasingly surrender their soul to data pours that throw transcendental information onto the page from database or XML sources reposed far in the background, yet in a manner manifestly different from the thrownness (in Heidegger's phrase) or, more simply, rendered thereness of the rest of the page. I refer to the complex phenomenology of dissonance that appears most visibly, for example, in the telltale way that data pour pages eschew "cool" web design in favor of regular, minimalist, or modernist page layouts with simple geometries (what Lev Manovich calls the Bauhaus filter that is surprisingly prevalent in contemporary information aesthetics).[27] It is only a simpler list or table structure on a web page, for instance, that can easily receive the serial repetition of an unpredictable number of structurally similar items—that is, the kind of items thrown forth automatically from databases or XML documents that are like volcanoes able to hurl forth only identically shaped rocks.[28] A commercial example would be an RSS news aggregator site or any of the streaming music or internet radio sites (such as MusicMatch), where a request for an artist or a kind of music produces a page with a geometrically simple list. In the academic domain, my own Voice of the Shuttle throws forth the content of its underlying database in list structures.[29]

preservation and scholarly manipulation not just of lexia-based hypertext but also other forms of interactive, multimedia, and algorithmically generated literature.

Edward Falco's work is online; see Edward Falco, "Self-Portrait as Child with Father," Iowa Review Web, 26 Mar. 1999, http://www.uiowa.edu/~iareview/mainpages/tirwebhome.htm

27. Lev Manovich, "From Cultural Interfaces to Info-Aesthetics (Or: from Myst to OS X)," paper presented at The Digital Cultures Project/Microcosms "Interfacing Knowledges" conference, University of California, Santa Barbara, 10 Mar. 2002. See also Manovich, "Avant-Garde as Software" (1999), http://www.manovich.net/

In developing this line of argument about the phenomenality of transcendental data sources, I am indebted to Jennifer Jones for an incisive question at an early point in my writing: How do end users, as opposed to the originating designers or programmers who work with the underlying source code, *perceive* such transcendence as differentiated from any other content that is rendered on a web page? The presence of a data island, after all, is not explicit unless one looks at the source code; and in the case of database-driven web pages even the source or underlying HTML code that a user might see by using the View Source command in a browser is screened from view. (The apparent HTML code that produces the web page a user sees is generated on the fly by the real code in the background, which includes scripting or other algorithmic processes designed to write content into HTML.)

28. More complex interface designs would be possible for data pour pages, but are uncommon because they are difficult to create. Complicated graphical design also tends to constrain the kind or quantity of information pulled out of the underyling content source (database or XML repository). My thanks to an anonymous reader of this essay for this qualification.

29. For an example of web pages created by a RSS news aggregator program, see the pages generated on the fly on a user's local machine by a free, downloadable aggregator program like

In sum, data pours open the prospect of a new model of authoring predicated on technologies enforcing ever more immaculate separation of content from presentation. Or, rather, the term *technology*—along with its whole complement of undecidably objective/social complements (technique, procedure, protocol, routine, practice)—is too narrow. What is at stake is indeed what I called an ideology of strict division between content and presentation—the very religion, as it were, of text encoding and databases. Indeed, while I earlier constrained transcendence to semiosis, it would not be inappropriate to inflate semiosis (in the manner of Derrida himself in his discussion of the transcendental signified) to the scale of metaphysics and, in the limit case, religion. Discourse network 2000 is a *belief*.[30] According to its dogma, true content abides in a transcendental logic, reason, or noumen so completely structured and described that it is in and of itself inutterable in any mere material or instantiated form. Content may be revealed only through an intermediary presentation that is purely interfacial rather than, as it were, sacramental—that is, *not* consubstantial with the noumenal. Unless content is hacked, therefore (which is how our most extreme protestant reformers of information technology today attempt to transcend the interfacial to experience direct revelation), it is to be rendered only through GUIs (graphical user interfaces) that are defined as ipso facto superficial rather than—in the original Orthodox rather than Apple or Microsoft sense—iconic.[31] Unlike an Orthodox icon that embodies inextricably in its beaten gold the very particles of transcendence, in other words, our interfaces today are ever more transparently just what are termed skins or, put technically, templates, schemas, style sheets, and so on, designed to *be* extricable.

Behold, then: there is now a great blind spot on the page that authors, artists, and designers of the interface no longer directly control but can only

---

AmphetaDesk, http://www.disobey.com/amphetadesk/. For an example of a streaming music site, see Shoutcast, http://www.shoutcast.com/

30. For reasons indicated below, I do not develop the relation of religion to computing as more than an analogy. However, such an approach is possible. Steven Johnson, for example, discusses the computer interface as contemporary "'infinity made imaginable,'" and compares such interfaces to Gothic cathedrals (Steven Johnson, *Interface Culture: How New Technology Transforms the Way We Create and Communicate* [San Francisco, 1997], p. 42). See also Carl Mitcham, "Computers: From Ethos and Ethics to Mythos and Religion: Notes on the New Frontier between Computers and Philosophy," *Technology in Society* 8, no. 3 (1986): 171–201.

31. My generic use of the term *protestant* refers to both lineages in the genealogy of computer hackers: the older and still prevalent tribe of programmers who legitimately jigger systems to create novel, ingenious, or workaround solutions and the newer tribe of transgressive hackers. *Protestant* in my secularized usage alludes to the complex blend of belief in direct data access (rather than priestly mediation) and maverick action that both tribes share. For a fuller discussion of the dual, but uncannily overlapping, heritage of hackers, see Liu, appendix on "'Ethical Hacking' and Art," *Laws of Cool*.

parameterize. (Much of the early debate in hypertext theory about the reversal of roles between the author and newly empowered reader now seems obsolete precisely because *both* the author and reader are disempowered. Authors and readers become operators of black box machinery who select criteria for prescripted actions.) In an earlier time, this blind spot through which data floods from transcendental sources might have been called the sublime. Even earlier in the history of transcendence, it was God.[32] But now we pray in SQL or XML. *Not* "Our Father, who art in heaven. . . . Give us this day our daily bread," but instead the select statement that is the soul of data islands—for example, in SQL, "SELECT * FROM Artists ORDER BY LastName, FirstName, Dates, Nation" or in XML, "<xsl:value-of select = "LEXIA_TITLE"/>."[33] Not "give us," in other words, but "select from." Not the Lord's Prayer, but our great contemporary prayer, the query.
</argument>

<argument title = "sociologic" subtitle = "rifles, bricks, and forms">

Of course, the religious analogy *is* inappropriate to the extent that it misdirects us from the particular church now spreading the discursive Word: postindustrialism. If the principles of transformability, autonomous mobility, and automation that separate content from presentation—and thus the juggernaut of databases and XML—currently seems to go without question, then such fatefulness is symptomatic of the exquisitely tight, even supple fit between this rationale and the combined values of industrial efficiency and postindustrial flexibility now responsible for managing our new world order.[34] Such a fit did not arise from above or, what amounts to the same thing, as an entelechy unfolding as progress from the universal reason of humanity. Rather, a cultural studies approach might show that the alignment of the new discourse with our new economy is the result of a historical process of *making* things fit. That process we now call management, the modern theory of civilization. God begat Enlightenment reason, which begat industrial scientific management, which in turn begat postindustrial management theories that synonymize the progress of civilization and management without any remainder. In the words of Peter Drucker, the scholar who helped found man-

32. A fuller genealogy of the belief structures underlying discourse network 2000 would also need to add alongside the postdivine paradigm of the transcendental sublime the romantic sense of immanental nature (and, as Kittler argues in his discussion of discourse network 1800, of the Mother)—all sources of an original, ulterior, or transcendental source of meaning. For Kittler on the mother's mouth, see *Discourse Networks 1800/1900,* pp. 25–69.

33. As noted earlier, the latter statement is actually XSLT, a specification for style sheets that transform XML documents into some other form.

34. Liu, *Laws of Cool* is a fuller meditation on the condition of postindustrialism.

agement studies in the U.S., "management . . . converts a mob into an organization, and human efforts into performance."[35]

My thesis is that the postindustrial technologic of encoded or structured discourse dates back—with a signal difference I will indicate later—to nineteenth- and early twentieth-century industrialism. In particular, the mold was set by John Hall and Frederick Taylor. In regard to Hall, first of all, I am influenced by Wendell Piez, a professional XML developer, theorist of markup languages, and humanist who participates in the Association for Computers and the Humanities.[36] Piez argues that Hall's now famous interchangeable part manufacturing process of the 1820s and 1830s (at the U.S. armory in Harpers Ferry, Virginia) was the predecessor to the logic of separating content from presentation that ultimately triggered, not so much databases and XML, as the exact social, economic, and technical *need* for databases and XML. We can set the scene by witnessing the increasing complexity of gun manufacture prior to Hall as the Harpers Ferry armory ramped up production to meet new, industrial age demands. As described in Merritt Roe Smith's detailed historical study, guns at the armory were still being manufactured as late as 1807 in a pure artisan system. Each craftsman performed all six types of work needed to create what Smith terms the composite product: "barrel making, lock forging, lock filing, brazing, stocking, and finishing."[37] But when in 1808 the U.S. government dramatically increased its demand to 15,000 muskets annually, Harpers Ferry could not muster the necessary number of skilled craftsmen. It thus modified the artisan system by decomposing gun manufacture into separate tasks (soon numbering fifty-five for muskets), each of which could be assigned to a lesser-skilled workman needing only to know, for example, how to make a barrel as opposed to a stock (see *HF*, pp. 79–82). The composite product was thus dispersed among a network of occupations. Still, the new system left intact the original artisanal method of allowing each worker, no matter how much his task had been simplified, to craft his own gun part. While production numbers went up, therefore, the new system did nothing to

35. Peter F. Drucker, *Managing in Turbulent Times* (New York, 1980), p. 226. I also cite this passage from Drucker in Liu, *Laws of Cool,* where I discuss postindustrial business theory at length in chap. 1 and preface to part 1.

36. Piez is now working in the private sector as a consultant and developer of electronic text systems. My thanks to Piez for extensive, generous correspondence on Hall and XML following our meeting at the 2001 Association for Computers and the Humanities conference at New York University, where I gave a keynote address from *Laws of Cool* in which I speculated in an early, sketchy way on the connection between Taylor and text encoding. In the following discussion, I draw on correspondence with Piez, supplemented by further research into Hall's manufacturing process.

37. Merritt Roe Smith, *Harpers Ferry Armory and the New Technology: The Challenge of Change* (Ithaca, N.Y., 1977), p. 79; hereafter abbreviated *HF*.

prepare for the next demand from the U.S. Ordnance Department in 1815: that musket parts be uniform enough so that individual guns could be repaired in the field with parts from other guns made by that same armory, and even by the other government armory in Springfield, Massachusetts. Two years of effort dedicated to solving the standardization problem failed to redress what the Ordnance Department called "a total disagreement" between muskets at the two U.S. armories (*HF*, p. 108).

It is into this situation that Hall stepped in 1819 when he was appointed director of a new, semi-independent unit at Harpers Ferry called the Rifle Works, designed to manufacture his superior, breech-loading rifle.[38] Importantly, Hall was not just an inventor of the rifle but an indefatigable innovator of the machines, tools, and work processes needed to build rifles. Hall's renovation of the overall system of manufacture ultimately made the difference in the armament industry and U.S. manufacturing as a whole. "At his Rifle Works," Piez observes,

> Hall developed a system by which guns could be made without the hand-crafting traditionally required of them. . . . Instead, the parts were all made to more-than-humanly possible close tolerances by machine, and then assembled not by piece, but by type. That is, any barrel could fit on any stock, with any receiver, any lock, etc. This required a rigid adherence to standards, enforced by the use of machine tools fitted with jigs, and by a careful regimen of testing with gauges.[39]

These "gauges," in fact, were the essence of Hall's new system. Enabling a rigorous method of parts inspection, Hall's case-hardened gauges—distributed in duplicate sets to workmen and to inspectors—soon far outnumbered the inspection devices used for traditional muskets (over sixty-three gauges for one of Hall's breech-loader models, for example) (see *HF*, pp. 225–26). As Piez argues, in other words, the real proof of quality in Hall's manufacture of a gun was not that the gun fired but that its parts—tested separately in disassembled form—fit against the gauges, which thus became the "Platonic form" of the gun. In the language of XML rather than of Plato, the gauges were the equivalent of a DTD (Document Type Definition) or, better, schema used to validate the particular instance of an XML document against strict standards of complete, consistent, and lawful data structure.[40] "Shades of text-encoding, anyone?" Piez asks.

38. On Hall's appointment, see *HF*, pp. 155–56.

39. Piez, email to the author, 20 Jun. 2001. Subsequent quotations from Piez are from this letter.

40. Validation refers to the process of checking the encoded content of a document marked up according to XML against the DTD or schema for that document.

The crucial point to be made is not that there are particular technical analogies between Hall's rifle manufacture and discourse network 2000, though there are a surprising number of such correspondences—for example, Hall's use of "bearing points" on each rifle part to determine "its relative position for all subsequent machining operations," which might be likened logically to XML namespaces and XPATH nodes that determine, respectively, the bearing of XML tag vocabularies relative to a specific vocabulary set and of the branches of an XML document relative to nodal points in the document structure.[41] The deeper correspondence lies at the level of the overall system of standardization that Hall introduced.[42] While different in the way it creates composite products, postindustrialism starts upon the same fundamental requirement of standardization, only its standards are housed not in gauges but in an ever more fulsome complement of standards, specifications, DTDs, schemas, and the like.

My own addition to Piez's argument extends the thesis with variation to Taylor, who at the beginning of the twentieth century added to Hall's standardized production the management model that takes us a step closer to postindustrialism and what I called content, transmission, and consumption management. We might take our example from any of Taylor's case studies of pig-iron handling, shoveling, the manufacture of bicycle bearings, and so on.[43] But perhaps the clearest exemplum is bricklaying as it was studied and reformed by another member of the American Society of Mechanical Engineers, Frank B. Gilbreth, whose work Taylor discusses at length in his *Principles of Scientific Management.* Prior to Gilbreth, bricklayers had built walls in a style akin to that of the traditional armorers we saw making muskets at Harpers Ferry: they decided ad hoc or by custom how many bricks to cart over, how close to place the pile, how many bricks to lift at one time, how to tamp the bricks down, and so on. But, after reengineering bricklaying (including, for example, formulating "the exact position which

41. On Hall's use of bearing points, see *HF*, p. 227.

42. Smith sums up Hall's contribution to industrial manufacture in a way that chimes with my emphasis here on the systemic nature of Hall's innovation as embodied in machine tools and gauges:

> What was so startlingly new about the Harpers Ferry experiment was the extent to which Hall had mechanized his operations and the impressive results he had actually achieved. . . . Much of the excitement generated [by observers at the time] can be traced directly to Hall's success in combining men, machines, and precision-measurement methods into a *practical* system of production. [*HF*, p. 249]

43. See Frederick Winslow Taylor, *The Principles of Scientific Management,* in *Scientific Management: Comprising "Shop Management," "The Principles of Scientific Management," "Testimony before the Special House Committee"* (1947; Westport, Conn., 1972), pp. 40–48, 65–71, 86–97.

each of the feet of the bricklayer should occupy with relation to the wall, the mortar box, and the pile of bricks"), Gilbreth reduced the motions required to lay each brick from eighteen "to five, and even in one case to as low as two motions."[44] Bricklaying was standardized for efficiency.

Or, rather, standardization was just one of the principles necessary to efficiency in Taylor's system.[45] New in Taylorism was the additional principle that decisions had to be extracted from the embodied work of the laborer and described on instruction cards as procedures that could be optimized, reprogrammed, distributed, and otherwise mediated. The instruction card, Taylor explains in *Shop Management,* specifies (for instance) "the general and detail drawing to refer to, the piece number and the cost order number to charge the work to, the special jigs, fixtures, or tools to use, where to start each cut, the exact depth of each cut, and how many cuts to take, the speed and feed to be used for each cut, and the time within which each operation must be finished" (*SM*, pp. 102–3). With the introduction of the instruction card (and the Taylorist planning departments that stood behind them), work became the structured, modular, and algorithmically manageable process by which—again translating prophetically into XML—each individual element <BRICK> was nested within the larger element <WALL>. That is, each node or field in the work process (in XML-speak and database-speak, respectively) became part of a programmatic description of wall-building that allowed the content (actual bricks lifted by embodied workers) to be separated from the presentation of the wall. Though only superficially akin to modern database forms or XML documents, Taylor's instruction cards might thus be said to be the first economically and socially significant form of programming—of a piece both logically and chronologically with Herman Hollerith's tabulator punch cards.

The mediation of work was in turn the platform for another principle of efficiency that became Taylor's greatest contribution to industrial history: modern management. In this light, twentieth-century management may be parsed into two correlative ideas. One is that management is management of, and through, media. It is management as document processing or, as JoAnne Yates calls it in the title of her 1989 study of document management

44. Ibid., pp. 77, 79.

45. "In the type of management advocated by the writer, this complete standardization of all details and methods is not only desirable but absolutely indispensable as a preliminary to specifying the time in which each operation shall be done, and then insisting that it shall be done within the time allowed" (Taylor, *Shop Management,* in *Scientific Management,* p. 123; hereafter abbreviated *SM*). The insistence on standardization despite objections based on the apparent uniqueness of tasks or workers was also explicit in William Henry Leffingwell's books; see, for example, William Henry Leffingwell and Edwin Marshall Robinson, *Textbook of Office Management* (1932; New York, 1943), pp. 392–95.

in the era of Taylor and other systematizers, "control through communication."[46] Once all work decisions were extracted from the laborer and mediated through instruction cards, planning-room diagrams, time-study charts, and all the other paper apparatuses of Taylor's system, manufacturing could be controlled as if through the revision and rearrangement of documentation alone. The other management idea to emerge in step with mediation is distributed management or what Taylor called functional foremanship. When manufacturing could be charted out on paper as an interlocking sequence of operations, operators, locations, and resources, then responsibility for the entire plan could be distributed piecemeal to an organization chart of managers that broke the gang-boss mold of management, according to which individual managers directly oversaw platoons of workers. Managers matched up instead with discrete, transposable, and reprogrammable functions that bore no necessary relation to individual workers or work group formations, which in turn could be restructured piecemeal as needed. Workers, in other words, no longer had a boss per se; they were minded instead by a buzzing hive of "order of work and route clerks," "instruction card clerks," "time and cost clerks," "shop disciplinarians," "speed bosses," "inspectors," "repair bosses," and so on who bossed them by bossing around pieces of paper (*SM*, pp. 102–4). Freed of the need to be directly bossy, indeed, managers in Taylor's argument could even be "friendly," or what we might today call user-friendly systems of management.[47] In short, Taylor's functional foremanship was the origin of today's professional-managerial or professional-technical-managerial new class.[48] Or perhaps the real new class to come will not need human managers at all to back up their user-friendly systems. It is symptomatic that the software client program through which one today administrates a Microsoft SQL Server database is named Enterprise Manager while similar interfaces in the Oracle*9i* database are called Management Server, Enterprise Management Console, Change Manager, Performance Manager, and so on.[49]

46. See JoAnne Yates, *Control through Communication: The Rise of System in American Management* (Baltimore, 1989). She is careful to situate Taylor as only part of a more general phenomenon of "systematic management"; see pp. 9–11. I am grateful to John Guillory for sending me a manuscript version of his essay "The Memo and Modernity," which first pointed me to Yates's book. See pp. 108–32 of this issue for Guillory's essay.

47. See Liu, *Laws of Cool,* chaps. 2–4 for a discussion of work from industrialism to postindustrialism that focuses in part on the connection between Taylor's "friendly" management and today's user-friendly computing interfaces.

48. On the new class, see, for example, Barbara and John Ehrenreich, "The Professional-Managerial Class," in *Between Labor and Capital,* ed. Pat Walker (Boston, 1979), pp. 5–45. For a fuller discussion of the theory of the New Class, see Liu, *Laws of Cool,* chap. 1.

49. See Timothy Dyck, "Clash of the Titans: SQL Databases," *PC Magazine,* 26 Mar. 2002, pp. 122–38.

Databases and XML are now our ultimate functional managers. They are the automatic mediators of the work of contemporary knowledge.

The missing link between Taylor's paper-pushing managers on the factory floor and today's dedicated document handlers (a.k.a. knowledge workers) in the office may then be found in the books of the Taylorist missionary of clerical and white-collar work, William Henry Leffingwell—for example, *Scientific Office Management* (1917) or, with Edwin Marshall Robinson, *Textbook of Office Management* (1932).[50] Leffingwell's time-motion approach to tasks performed upon particular kinds of office equipment or in variable lighting and ventilation environments might provide many examples.[51] But the most telling phenomenon is Leffingwell's codification of Taylor's instruction card into the modern "form" (and such related document genres, as Yates calls them, as tables and reports). Near the beginning of their *Textbook of Office Management,* Leffingwell and Robinson compare forms to jigs to show how well-designed documents facilitate the factory-like standardization of office work:

> The preparation of a form, for example, was in reality nothing more than the devising of a standard way of recording information. A form, properly designed, enabled the office manager of that day to get the de-

50. See Leffingwell, *Scientific Office Management* (Chicago, 1917), and Leffingwell and Robinson, *Textbook of Office Management.*

51. Especially interesting are the innovations in office equipment or practices recommended by Leffingwell that eerily anticipate what I have called discourse network 2000. Modular unit bins, modular desks, and colored ink systems for facilitating document-based work, for example, might be approximated to later hardware and software invented to sort documents in modular and flexible ways; see Leffingwell, *Scientific Office Management,* pp. 22, 25, 20. The most striking premonition is to be found in Leffingwell's codification of improvements in letter-writing—that is, document content creation (for example, writing, typewriting), document transmission (for example, through mechanical conveyance systems in the office), and managed document consumption (for example, ways of sorting, filing, and copying letters from the public). His approach to office correspondence produces lists of standard paragraphs (or variants of standard paragraphs) that can be prewritten, classified in a hierarchical classification of paragraph types and topics (not unlike an XML DTD or schema), and then assembled into actual letters to the public or other businesses by selecting, shuffling, and concatenating indexical paragraph numbers. "I have seen a system consisting of over 600 paragraphs easily handled by high-school girls who glibly discussed the relative merits of a letter consisting of paragraphs 'A2, B14, J26' as compared with 'A12, B22, J26," he says (ibid., p. 94). For a typical hierarchy of standard correspondence paragraphs, see ibid., p. 93. See also Yates, *Control through Communication,* pp. 70–71, on the use of standard letter greetings and headings in internal office communications or memos. Yates's work is especially useful in its analysis of the internal office communication as a separate field of discourse. Such correspondence systems in Leffingwell even came complete with what amounts to XML-like stylesheets (XSLT), as in the case of the style guide he reproduces at one point in *Scientific Office Management* that begins, "As we desire uniformity of style in the arrangement of all letters leaving our office, you will please use this letter as a model for future correspondence. . . . Begin the letter addressing the customer one space beneath the dot on the upper left hand side" (Leffingwell, *Scientific Office Management,* p. 137).

> sired information recorded exactly in the shape he wanted it and without the use of personal instructions. Such a form might be regarded as analogous to the "jig" used in factories, which enabled a "machine hand" to perform work which otherwise could have been done only by a skilled mechanic.[52]

But the use of standard forms also reinforced the specifically Taylorist innovation of mediated management. As Yates points out, printed forms and tables—especially when they began to converge on a company-wide "'general logical rule for all forms'"—"facilitated the comparisons of data so critical to systematic managers."[53] Leffingwell thus says in a passage quoted by Yates, "all reports made by one office should follow certain rules devised for that office . . . to the end that all who have occasion to work upon or with the reports, or who use them, may contract uniform and desirable habits of work and thought in relation to this activity."[54] When columns, rows, and fields in one form or table lined up visually with those in other forms, in other words, then not only could information be managed across time and organizational space (for example, comparing last year's accounting figures against this year's sales figures) but information management became ipso facto worker management as well—a discipline of management powerful enough to be interiorized as a kind of bureaucratic conscience within the psychology of work ("uniform and desirable habits of thought," Leffingwell says). As Yates observes, organizational communication at the time circulated in a general, upward and downward system of information that helped sustain managerial oversight.[55] Such synoptic management mediated by forms would culminate in the computer era when, as Shoshana Zuboff studies in *In the Age of the Smart Machine,* the first instinct of both managers and workers upon exposure to a firm's computer system was a phenomenology of super-vision. The computer lets them "see" it all.[56]

52. Leffingwell and Robinson, *Textbook of Office Management,* p. 19. A recent IBM ad for its open standards approach to business information services makes an interestingly similar comparison to the era of manufacturing—specifically, to manufacturing in the wake of Hall's interchangeable parts philosophy. The ad copy begins, "In 1864, a bolt or screw made in one machine shop wouldn't fit a nut made in another machine shop . . . . Until William Sellers proposed a standard, uniform screw. So one part could be made down the street, and another made across town, and assembly could happen anywhere. Everything worked together. Apply the same logic to IT and you arrive at open standards like LINUX" (*Business Week,* 22 Sept. 2003, p. 101).

53. Yates, *Control through Communication,* pp. 81, 80. The phrase "general logical rule for all forms" is from the language of one office systematizer that Yates quotes, p. 81.

54. Quoted in ibid., p. 94.

55. See ibid., esp. pp. 6–8.

56. See Shoshana Zuboff, *In the Age of the Smart Machine: The Future of Work and Power* (New York, 1988). For a discussion of synopticism and the "vision" trope in Zuboff's interviews with information workers, see Liu, *Laws of Cool,* chap. 3.

The upshot of such a social history of databases and XML is that the common presumption of business writers, technologists, and others that there was a sharp break between industrialism and postindustrialism is historically too shallow.[57] There was indeed a break, but its distinctive nature cannot be appreciated without first recovering archaeologically the surprising bandwidth of connection between the two epochs. In the light of the capitalism underlying both, after all, the separation of content from presentation now being mandated by business-oriented information technology is a profound euphemism. From a historical perspective, knowledge (the great value of postindustrialism) is being separated or extracted from what presentation really means: labor. What Marx called surplus labor value is in the post-Marxist, postindustrial world nothing other than the programmability of work—a programmability that can be "functionally" managed, extracted, mediated, optimized, and distributed (for example, licensed to other companies or the end user) for what, in a classically Marxist view, is excess gain.[58]

Premonitions of database- or XML-like features in industrialism are one clue to this congruence between the past and present. But they are not important in themselves. My historical argument is not one of linear evolution or typological anticipation. Rather, I would deploy a reversed-time variant of the idea of the skeuomorph that N. Katherine Hayles uses to explain the history of technological change in *How We Became Posthuman.* Hayles borrows the term *skeuomorph* from archaeological anthropology to describe retrofeatures of the present (like simulated stitching in vinyl molded plastic

57. Not only does almost all the prolific business literature of workplace 2000, workforce 2000, the virtual corporation, and so on emphasize such a break but so, too, does much scholarly theory of postindustrialism or postmodernism. The focus has been on the difference between industrialism (with its assembly lines, vertically integrated companies, hierarchical management, and so forth) and postindustrial chaos management, flat or networked companies, team management, and knowledge-work industries. For a critical survey of contemporary business literature in its bestseller mode, see John Micklethwait and Adrian Wooldridge, *The Witch Doctors: Making Sense of the Management Gurus* (New York, 1996). See also my discussion of such works in Liu, *Laws of Cool,* preface to pt. 1 and chap. 1.

58. Of course, Marx on the alienation of work (especially in those sketchy, early manuscripts) cannot be taken as our final word. There is also the entire contemporary infrastructure and superstructure of *net*working to consider, according to which decentralized processes of data circulation morph the concept of alienation (and the early industrial context of commodification that Marx addressed) into what Manuel Castells calls networked society and Michael Hardt and Antonio Negri simply call Empire, where distributed, incommensurable, and sometimes contradictory modes of data production and consumption extend the theory of work into uncharted territory; see Manuel Castells, *The Information Age: Economy, Society, and Culture,* 3 vols. (Malden, Mass., 1996–98), and Michael Hardt and Antonio Negri, *Empire* (Cambridge, Mass., 2000). To survey this territory would require the assistance not just of established class theory but also of more recent new class theory in combination with even newer frameworks of analysis (such as global studies).

or, in my context, document forms akin to jigs) that negotiate a comfort zone between the past and present.[59] Reversing the time arrow, we can say that the database- or XML-like features we have noticed in the past are a kind of prophetic relic or reverse skeuomorph. In their own time, they were proposed as instrumental to the progress of industrialism. But seen from our perspective, they are epistemological rather than instrumental stitches between past and present. They are an index or placeholder (rather than cause or antecedent) of the future. If such devices as Taylor's instruction cards or Leffingwell's forms (and many other devices that now seem to us merely odd or quaint) did not exactly carry forward to the future, then something else would have been invented to do so—that is, databases and XML.

Only by understanding the deep connection between industrialism and postindustrialism are we now prepared to discern the great difference of the latter. Both epochs, as we have seen, share the projects of standardization and management. But only postindustrialism saw these projects through to their radical conclusion, which might be called metastandardization and metamanagement. When Hall standardized the modern rifle, we note, he did so by creating or implementing a host of one-off, stand-alone, ingenious second-order machines for making rifles that were themselves anything but standard. Craft, we might say, merely retreated to the artisanship of Hall himself as the standardizer of craft. So, too, when Taylor and Leffingwell brought scientific management to bricklaying or form writing, they only partly regularized the processes of standardization and management themselves. Some actual human being—much more unpredictable than a machine in aptitudes, skills, and personality—still had to fill the role of the professional-technical manager creating the instruction cards, forms, and so on.[60] The insight of postindustrialism is that there can be metastandards for making standards. XML, for example, is technically not a standard but a metastandard, a family of standards that governs the extensible creation of specific standards of XML tags or schemas. Similarly, as shown in the massive purge of middle managers in the last few business cycles, postindustrialism is all about the metamanagement of management—the flattening of management layers and concomittant increase in managerial spans of control made possible by information technologies that transume man-

59. See N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago, 1999), p. 17. See also Nicholas Gessler, "Skeuomorphs and Cultural Algorithms" (1998), http://www.sscnet.ucla.edu/geog/gessler/cv-pubs/

60. Taylor and Leffingwell were most successful at standardizing and managing the managerial art of time-motion study, the lower-order function of scientific management. Both, for example, give elaborate instructions in their works on how to use a stopwatch to study work and chart or analyze the results.

agement through common standards for the transformation, autonomous mobility, and automatism of knowledge work. A better name for postindustrialism, we may say, is metaindustrialism.

The main point is that a historically deep investigation of discourse network 2000 would inquire into not just what data-driven documents are for (standardization, flexibility, speed, interactivity, collaboration, and so on) but the purpose of that purpose: the foundations of the programmability that today facilitates networked production and consumption. In the context of my specific inquiry, authors are indeed postindustrial producers.

Where in the world of rifles, brick walls, and office forms might there still be room for a poem about a sick rose printed in a nonstandard manner and then hand-watercolored by a poet and his wife?
</argument>

<argument title = "aesthetics" subtitle = "data sublime">

Finally, then, what are the aesthetics of discourse network 2000? New media arts and new media studies are currently still young disciplines. First-generation primary and secondary works in individual areas of digital new media (for example, experiments in hypertext fiction or computer art) have recently succeeded to second-generation works of much higher generality and/or revisionary insight—for example, Manovich's *Language of New Media* (currently the canonical theoretical text in the field) and Matthew Kirschenbaum's in-progress *Mechanisms: New Media and the New Textuality* or Rita Raley's in-progress, provisionally titled *eEmpires: Neoliberal Globalization and the Digital Humanities* (two critical works I cite among many others that could be mentioned because they seek to rethink the role of textual discourse in particular amid new media). Surveys and readers have also been produced—for example, Noah Wardrip-Fruin and Nick Montfort's important *New Media Reader,* Stephen Wilson's *Information Arts,* or Christiane Paul's *Digital Art.*[61] In these works, there are many principles, axioms, and paradigms to get us started. But the field is probably too new to commit to any one analysis (or even strongly react against such an analysis). Such commitments will likely need to await traditions of critical reception as well as of metacritical reflection on the interrelationship of

61. See Manovich, *The Language of New Media* (Cambridge, Mass., 2001); Matthew G. Kirschenbaum, *Mechanisms: New Media and the New Textuality,* book in progress (my thanks to the author for manuscripts of several chapters); Rita Raley, *eEmpires: Neoliberal Globalization and the Digital Humanities,* book in progress (my thanks to the author for manuscripts of several chapters); *The New Media Reader,* ed. Noah Wardrip-Fruin and Nick Montfort (Cambridge, Mass., 2003); Stephen Wilson, *Information Arts: Intersections of Art, Science, and Technology* (Cambridge, Mass., 2002); and Christiane Paul, *Digital Art* (New York, 2003).

those traditions. In lieu of any programmatic statement at the end of this essay, therefore, I will close simply by mounting a show of past and present art that bears on the theme of data transcendence (what Julian Stallabrass calls the data sublime) and its impact on the relation between content and presentation.[62] After all, if postindustrial ideology mandates the separation of content from formal presentation or material instantiation, then the arts offer a uniquely critical perspective on this ideology because in their practice such separation—however possible as a goal (as demonstrated by some conceptual, digital, or network art)—never goes without saying. The tight, tense marriage between content and materiality/form that the arts witness is at least as powerful as the tight fit between encoded discourse and postindustrialism that divorces content from presentation.

The following is a small gallery of artistic data pours, past and present.

The first instance is a late painting by J. M. W. Turner, *Light and Colour: The Morning after the Deluge* (1843), in which Turner's characteristic vortex of energies, focused upon a potent blank spot or white mythology on the canvas, marks a romantic prefiguration of the data pour (fig. 1). Out of this data pour emerges what seems to be the first record of a transcendental database: an image of Moses writing the Pentateuch. Yet what necessary quantum of aesthetic experience, we may ask, is added by Turner's distinctively formal and material signatures—his rough yet limpid handling of oils and his very imposition of the vortex form?

The second instance is a passage from William Gibson's *Neuromancer* depicting the indescribable, shifting needle of the Kuang virus at the climax of the novel:

> Something dark was forming at the core of the Chinese program. The density of information overwhelmed the fabric of the matrix, triggering hypnagogic images. Faint kaleidoscopic angles centered in to a silver-black focal point. Case watched childhood symbols of evil and bad luck tumble out along translucent planes: swastikas, skulls and crossbones, dice flashing snake eyes. If he looked directly at that null point, no outline would form. It took a dozen, quick, peripheral takes before he had it, a shark thing, gleaming like obsidian, the black mirrors of its flanks reflecting faint distant lights that bore no relationship to the matrix around it.[63]

The "null point" of hypnogogic imagery here is the injection point of Gibson's neuromantic rather than romantic data pour (with strong intimations

62. See Julian Stallabrass, "The Aesthetics of Net Art," paper presented at University of California, Berkeley, 30 Sept. 2003. My thanks to Stallabrass for correspondence and conversation on digital art.

63. William Gibson, *Neuromancer* (New York, 1984), pp. 180–81.

FIGURE 1. J. M. W. Turner, *Light and Colour: The Morning after the Deluge* (1843).

of Thomas Pynchon in the background).[64] Yet what material and formal instincts—coded if not in the reptile brain then at levels of culture far deeper

64. The following passage in Thomas Pynchon's *Crying of Lot 49* (1966; New York, 1999), p. 76, speaks eloquently of a transcendental data pour whose revelation is never immediately available to consciousness lived on the interface:

> She [Oedipa Maas] could, at this stage of things, recognize signals like that, as the epileptic is said to—an odor, color, pure piercing grace note announcing his seizure. Afterward it is only this signal, really dross, this secular announcement, and never what is revealed during the attack, that he remembers. Oedipa wondered whether, at the end of this (if it were supposed to end), she too might not be left with only compiled memories of clues, announcements, intimations, but never the central truth itself, which must somehow each time be too bright for her memory to hold; which must always blaze out, destroying its own message irreversibly, leaving an overexposed blank when the ordinary world came back.

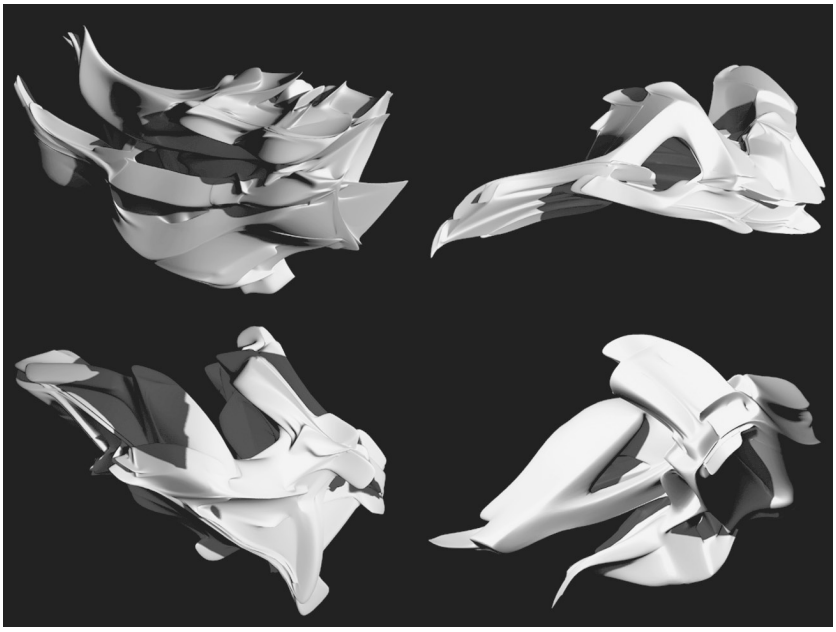

FIGURE 2. Marcos Novak, four views of a four-dimensional transarchitectural shape (2001). Reproduced by permission of the artist.

than today's knowledge work—imagine this null point specifically as swastikas, skulls and crossbones, dice flashing snake eyes, and shark thing?

The third instance is an image by Marcos Novak representative of his transarchitecture and liquid architecture (fig. 2). Among his other projects, Novak programs four-dimensional, algorithmic architectural shapes that mutate in time, then extracts from the unimaginable four-dimensional matrix three- or two-dimensional snapshots (through 3D rapid prototyping or 2D imaging). The result is a reduced-dimension data pour from a higher-dimensional reality designed to elicit what Novak terms allogenetic, truly alien aesthetics beyond the ken even of neoromantic notions of transcendence.[65] Yet what instinct compels Novak to materialize and form his unimaginable 4D shapes in 3D or 2D at all? Why is that stepping down of the dimensional plenum necessary? Moreover, what criteria motivated this *specific* presentation of the unimaginable out of all the algorithmic possibilities? Why choose this image as especially interesting?

65. For an introduction to Novak's transarchitecture, see Marcos Novak, "Liquid˜, Trans˜, Invisible˜: The Ascent and Speciation of the Digital in Architecture: A Story," Digital/Real Exhibition (2001), http://www.a-matter.de/digital-real. Novak discussed his notion of allogenesis at a talk in the Digital Media Arts Lecture Series, University of California, Santa Barbara, 4 Mar. 2002.

The fourth instance is a now already classic work of net art by Lisa Jevbratt that is perhaps the epitome of the data sublime. Titled *1:1,* the work consists of a net crawler programmed by Jevbratt to access IP addresses on the internet, a database to hold the addresses together with information about their status (for example, accessible, inaccessible, returning a server error), and a set of graphical interfaces to display the results while maintaining live, clickable interactivity with the sites behind the IP numbers. The Every IP interface, for example, represents each address on the internet in 1999 and then again in 2001 (fig. 3).[66] In an astonishing enactment of a data pour, it is a portrait of the internet in toto (actually, a reduced sampling generated by the crawler) done on a 1:1 scale of correspondence. Yet why did Jevbratt, who started out as a painter, arbitrarily choose particular colors to represent particular aspects of the IP information so as to create a postphotographic interface, as the prologue to the project calls it, that may also be appreciated as a recurrence of such painterly postphotographisms as abstract art?[67] Morever, why did she also make such alternative interfaces for *1:1* as Migration (using different colors to track the drift of live addresses on the internet between 1999 and 2001) that have an even stronger resemblance not just to the media-specific form of abstract expressionism but—anticipating new work of hers in progress—also the embodied form of DNA gene sets (fig. 4)?[68]

Finally, the fifth, metainstance is the well-known theoretical prescription from Lyotard's "What Is Postmodernism?" on the postmodern sublime:

> The postmodern would be that which, in the modern, puts forward the unpresentable in presentation itself; that which denies itself the solace of good forms, the consensus of a taste which would make it possible to share collectively the nostalgia for the unattainable; that which searches for new presentations, not in order to enjoy them but in order to impart a stronger sense of the unpresentable.[69]

66. See Lisa Jevbratt, *1:1,* Every IP interface, http://128.111.69.4/~jevbratt/1_to_1/interface_ii/index.html

67. Jevbratt explains the color scheme in the Every IP interface as follows: "The color of a pixel in the 'every: IP' interface is generated by using the second octet (200. **93.**167.214) for its red value, the third for its green (200.93.**167.**214), and the fourth for its blue value (200.93.167.**214**)" (ibid.). The term *postphotographic* occurs in Jan Ekenberg's prologue to the project, http://128.111.69.4/~jevbratt/1_to_1/jan.html

68. See Jevbratt, *1:1,* Migration interface, http://128.111.69.4/~jevbratt/1_to_1/interface_a/index_s.html. My discussion of Jevbratt's painter background and her interfaces for *1:1* benefit from Jevbratt's own comments about her work in talks she has given at University of California, Santa Barbara, including including her talks on 14 Jan. and 17 Apr. 2002.

69. Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge,* trans. Geoff Bennington and Brian Massumi (Minneapolis, 1984), p. 81.

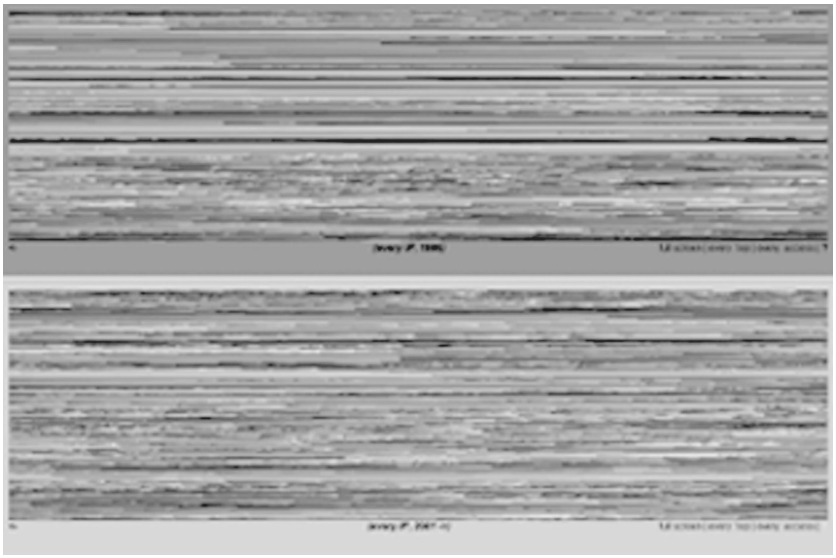

FIGURE 3. Lisa Jevbratt, *1:1*, "Every IP" interface. Reproduced by permission of the artist.

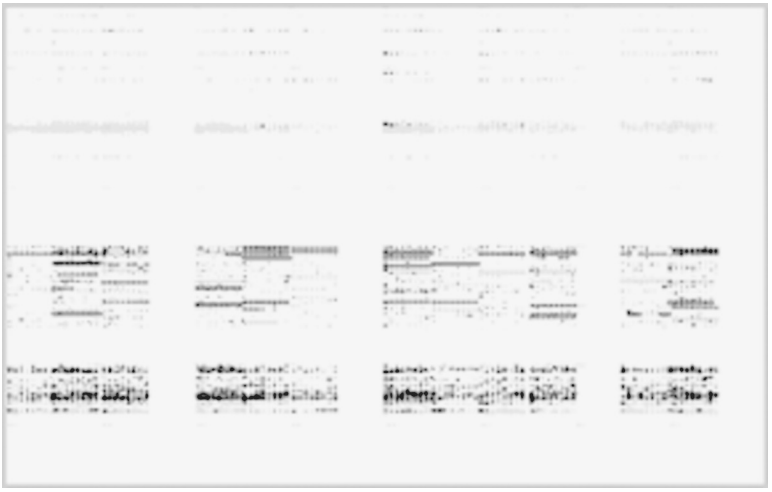

FIGURE 4. Lisa Jevbratt, *1:1*, "Migration" interface. Reproduced by permission of the artist.

The questions we may ask Lyotard in the present context are why "new presentations" are necessary at all, and what forms such presentations should take. What is it that makes certain presentations, if not "good," then what Lyotard elsewhere in *The Postmodern Condition* calls paralogically interesting?

In the early years of the web, when data transcendence was presented in piecemeal ways that could still be manually supervised and activated (for example, hypertext links invoking CGI scripts) or in automated ways that were still relatively crude (for example, so-called push processes), cool was the dominant aesthetic of the interface.[70] Cool as rendered in HTML, we may say, was the archaic barbarian in the church of the separation of content from presentation. It was the secret adherent of nonstandard, proprietary, hand-coded, and other clearly infidel (or, what is the same in industrial history, artisanal) practices of embodying content inextricably *in* presentation (for example, through pages with so-called dynamic HTML layers that work only in a particular browser or pages with fixed-width tables sized exactly to match a particular graphic image). But in today's world of massive, automatic data pours through untouchable data islands embedded within retro-Bauhaus rather than cool formalisms (that is, the regularism of the lists and tables mentioned earlier), what can still be cool?

Here is a first attempt at an analytic of the aesthetics of data transcendence in the age of discourse network 2000. Modern art and literature at the beginning of the twentieth century apprehended the spirit of industrialism in the formalist credo that form is integral with content or, transmuted into the new idiom of process, function. The avant-garde of the time could be famously perverse or obtuse in implementing that formula—offering up everything from art as a Duchamp ready-made to a New Critical verbal icon. Indeed, as I and others have argued, cool in its earlier, Jazz Age usage arose precisely in an orthogonal relation to technological and other functionality.[71] But the avant-garde conviction that there *was* a necessary relation between form and content was nevertheless a reflection of industrial standardization and management. Modernists had their gauges, too; in their unforgiving manifestos they were faux managers akin to Taylor's

70. For a fuller description of cool as a style on the web, see Liu, *Laws of Cool,* chap. 6. CGI, or Common Gateway Interface, allows programs or scripts running on a web server (often written in Perl) to be activated by, or transfer information to, web pages; though still common, CGI scripts are no longer as dominant (such scripting languages as ASP and PHP are increasingly prevalent for mediating between the web and programs running on a server). *Push* refers to a method by which a web server could send fresh content to a user's browser without the user needing to refresh the page.

71. See Liu, *Laws of Cool,* esp. chap. 2. See also Joel Dinerstein, *Swinging the Machine: Modernity, Technology, and African American Culture between the World Wars* (Amherst, Mass., 2003).

shop disciplinarians. Jan Tschichold on the new typography, for instance, twisted Leffingwellian office forms along the diagonal to stress asymmetry; but the very rigor of his twisted symmetry betrayed that he was still filling out a form (a method later extended into what post-Bauhaus typography called grid design).[72]

Postindustrialism, however, shows that there was a third term in the modernist equation of form and content that had not been expressed and that the mere deletion of this term made possible the most far-reaching efficiency-cum-flexibility. That third term is materiality, the implicit substrate of a New Typography poster, imagist poem, or artifact of Bauhaus architecture or furniture design that absolutely fixed the relation between form and content for any one mass-production run. While modernism was the era that first lived with telemedia (telegraphy, telephony, radio), it nevertheless did not grasp the full implications of telepresence. In adapting itself to distributed presence on the internet, postindustrialism removed the substrate of materiality to allow form and content to be equated in the oxymoronic relationship of standard variation or uniform flexibility. When the material substrate was removed to allow for internet transmission, that is, *variable* methods of standardization—for example, XML documents governed by a common standard but adaptable to undetermined kinds of hardware, software, and usages—could suddenly be imagined. Material embodiment—in the substrate of a work and the bodily practices of the artisanal artist both—was now immaterial to the full, independent expression of content and form.

Is the writer or artist any longer an author in such circumstances, let alone a creative one? Earlier I said that I would concentrate on authoring in discourse network 2000 as the originating end of the transmission act. The key to the problem of the status of the author, perhaps, lies in the very limitations of that formulation. The origin of transmission in discourse network 2000 is not at the cursor position of the author. Indeed, the heart of the problem of authorship in the age of networked reproduction is that there is no cursor point. We might put the case by updating Kittler's argument about the difference between the 1800 and 1900 discourse networks in the following fashion. In the romantic era circa 1800, Kittler observes, the hermeneutic discourse network began when a source of meaning located in Nature or the Mother called to poets to transmit its transcendental essence through language conceived as a mere channel of translatability. In

72. See Jan Tschichold, *The New Typography: A Handbook for Modern Designers,* trans. Ruari McLean (Berkeley, 1995). On grid design, see Hans Kung, "The Grid System," in *Graphic Arts Manual,* ed. Janet N. Field et al. (New York, 1980), pp. 39–42.

the modernist era circa 1900, by contrast, mother nature was a faint echo. The true source of the signal, Kittler argues by recounting psychophysical nonsense reading and speaking experiments of the time, was an apparently random, senseless, automatic, untranslatable, and thus nonhermeneutic noise inherent in the channel of transmission itself—like tuning your radio to a Pychonesque channel of revelation indistinguishable from utter static.[73]

The distinctive signal of 2000, by contrast, synthesizes 1800 and 1900. In 2000, the channel is just as seemingly senseless, random, and automatic as in 1900. (Take a cross-section of a document transmission over the internet at any moment, for example, and witness a dispersion of atomistic file packets and molar document elements.) But the source point of the transmission is phase-shifted so that phenomenally senseless automatism follows from a precursor act of sense making in the databases and XML repositories outside the direct control of the author. Where the author was once presumed to be the originating transmitter of a discourse next sent for management to the editor, publisher, and so on through all the other positions in the discursive circuit, now the author is in a mediating position as just one among all those other managers looking upstream to previous originating transmitters—database or XML schema designers, software designers, and even clerical information workers (who input data into the database or XML source document). Random and senseless those precursor transmissions may seem (in the way we often feel that overwhelming data is meaningless), and yet—in a curious reversion to 1800—that content held in databases and XML now sets the very standard for an ultrastructured and ultradescribed rationality purer than any limiting instantiation of the *Ding an Sich.* And so what Kittler calls the mother tongue—now the discourse of the motherboard, of the matrix itself—seems to return. Only it is alienated from the romantic-era voice of inspiration issuing from the unstructured life that Wordsworth or Blake called childhood.

Such a reflection on aesthetics 2000, I think, is the harbinger of a new, but also very old, front for the humanities and arts. The core problem is what I have in my *Laws of Cool* called the ethos of the unknown—of the unencoded, unstructured, unmanaged—in human experience. In our current age of knowledge work and total information, what experience of the structurally unknowable can still be conveyed in structured media of knowledge (databases, XML, and so on)? Perhaps the arts—if they can just crack the code of ordinary cool and make it flower—know.

</argument>

73. See Kittler, *Discourse Networks 1800/1900,* esp. the section titled "The Great Lalulā."

For online versions of these code excerpts, see http://english.ucsb.edu/faculty/ayliu/polaris/ transcendental_data/code_excerpts.html

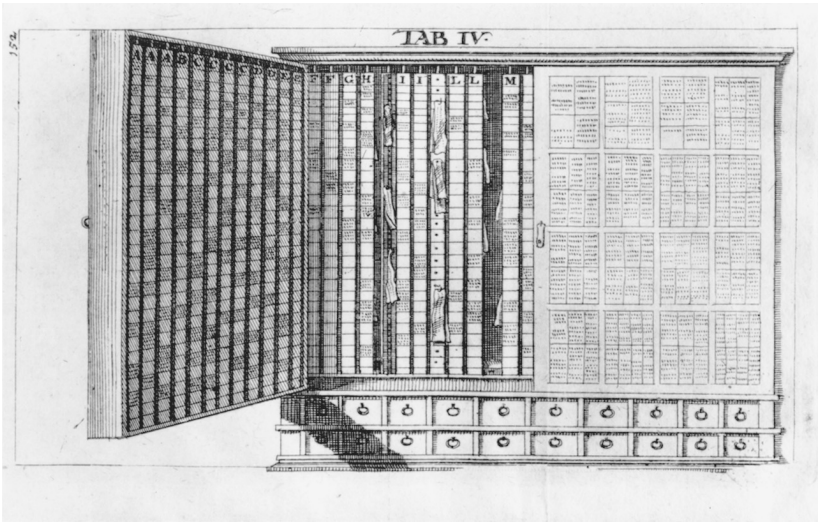

FIGURE 5

Code Excerpt 2

Code for the XSLT stylesheet "Hypertext_Fiction.xsl" (from my "Hypertext Fiction Tracker" demo) showing the method by which a Web page calls for content from an underlying XML document. (Highlights indicate code discussed above.)

```
// Called by the XML document "falco_instance.xml" to transform XML into HTML for Web;
// Uses <SPAN> tags to format for HTML the content found in "nodes" in the XML document;
// Note the analogy between the XPATH language "select" statement that locates nodes (e.g.
// "select="REGISTER/WORK" and the SQL "select" statement

<?xml version="1.0"?>
<!-- File Name: Hypertext_Fiction.xsl -->
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform">

<xsl:template match="/">

<HTML>
   <HEAD>
      <TITLE>Hypertext Fiction Tracker</TITLE>
   </HEAD>
   <BODY>
      <SPAN STYLE="font-family:arial, Helvetica, sans-serif; font-size:14px">
      <DIV align="center">
         <FONT size="+4">Hypertext Fiction Tracker</FONT><BR/>
         <FONT size="+3">Conceptual Demo of XML Application</FONT><BR/>
         <FONT size="+2">(Alan Liu; last rev. Feb. 18, 2002)</FONT>
      </DIV><BR/>

   <xsl:for-each select="REGISTER/WORK">

      <SPAN STYLE="font-size:130%; font-weight:900">
         Title of Work:
      </SPAN>
      <SPAN STYLE="font-size:130%; font-weight:900; color:red">
         "<xsl:value-of select="WORK_TITLE"/>"
      </SPAN><BR/>
      <SPAN STYLE="font-size:130%;font-weight:900">
         Author:
      </SPAN>
      <SPAN STYLE="font-size:130%; font-weight:900; color:red">
         <xsl:value-of select="AUTHOR"/>
      </SPAN><BR/>
      <SPAN STYLE="font-size:130%;font-weight:900">
         Date of Publication:
      </SPAN>
      <SPAN STYLE="font-size:130%; color:red">
         <xsl:value-of select="DATE"/>
      </SPAN><BR/>
      <SPAN STYLE="font-size:130%;font-weight:900">
         Media Format:
      </SPAN>
      <SPAN STYLE="font-size:130%; color:red">
         <xsl:value-of select="MEDIA"/>
      </SPAN><BR/>
      <SPAN STYLE="font-size:130%;font-weight:900">
         URL:
      </SPAN>
      <SPAN STYLE="color:red">
         <A><xsl:attribute name="href">
            <xsl:value-of select="WORK_URL"/>
            </xsl:attribute>
            <xsl:value-of select="WORK_URL"/>
         </A><BR/>
      </SPAN><BR/><BR/><HR/>
      <SPAN STYLE="font-size:130%; font-weight:900; color:red">
         Plot Strands:
      </SPAN><HR/><BR/>
```

FIGURE 6

```
<xsl:for-each select="/REGISTER/WORK/PLOT/STRAND">

   <SPAN STYLE="font-size:130%; font-weight:900; color:blue">
      <xsl:value-of select="STRAND_TITLE"/>
   </SPAN><BR/><BR/>

<xsl:for-each select="LEXIA">

<TABLE width="80%" border="1" align="center" bordercolordark="FFFFFF" bordercolor="#999999">
<TR>
   <TD width="15%"><SPAN STYLE="font-weight:800; color:blue">Lexia Title: </SPAN></TD>
   <TD><SPAN STYLE="font-weight:800; color:blue">
      <xsl:value-of select="LEXIA_TITLE"/></SPAN></TD>
   </TR>
   <TR>
      <TD><SPAN STYLE="font-weight:800">Characters: </SPAN></TD>
      <TD><xsl:value-of select="CHARACTERS"/></TD>
   </TR>
   <TR>
      <TD><SPAN STYLE="font-weight:800">Mode: </SPAN></TD>
      <TD><xsl:value-of select="MODE"/></TD>
   </TR>
   <TR>
      <TD><SPAN STYLE="font-weight:800">Description or Keywords: </SPAN></TD>
      <TD><xsl:value-of select="KEYWORDS"/></TD>
   </TR>
   <TR>
      <TD><SPAN STYLE="font-weight:800">Lexia URL: </SPAN></TD>
      <TD><A>
         <xsl:attribute name="href"><xsl:value-of select="LEXIA_URL"/></xsl:attribute>
         <xsl:attribute name="target">"2"</xsl:attribute>
         <xsl:value-of select="LEXIA_URL"/>
      </A></TD>
</TR>
</TABLE><BR/><BR/>

   </xsl:for-each>
   <HR/>
   </xsl:for-each>
   </xsl:for-each>
   </SPAN>
</BODY>
</HTML>
</xsl:template>
</xsl:stylesheet>
```

FIGURE 6, continued.