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FAREWELL TO THE INFORMATION AGE

Paper is just an object that [some] information has been sprayed onto in the past...
(Ted Nelson)

And one of the side effects of digital technology is that it makes those containers irrelevant. Books, CDs, filmstrips whatever don't need to exist anymore in order to get ideas out. So whereas we thought we had been in the wine business, suddenly we realized that all along we've been in the bottling business. (John Perry Barlow)

[In cyberspace, communication will be] redeemed from all the inefficiencies, pollutions, and corruptions attendant to the process of moving information attached to *things*. (Michael Benedikt)

1. Introduction: The word turned upside-down

Nothing betrays the spirit of an age so precisely as the way it represents the future. Take the picture that appeared in *Popular Mechanics* magazine in 1950 in an article on "The Home of the Future." It shows a woman in an apron in the middle of a living room full of furniture with the rounded "futuristic" forms of the period, which she is spraying with a garden hose. The caption reads, "Because all her furniture is waterproof, the housewife of the year 2000 can do her cleaning with a hose." Like most such representations, it gives itself away in two complementary misapprehensions. The first and most obvious comes of taking some recent innovation at the steepest point of its curve and projecting it linearly to a point where it has swept all its predecessors aside. No one makes provision for the inevitable banalization of the new, or for the reactions that it invokes – what Régis Debray describes in his essay here as "neolithic backlash" (though "neolignic backlash" might be more appropriate, if you'll excuse the etymological blend). And indeed, just twenty years later the hippies were using "plastic" as a general term of disdain for the artificiality of modern culture.

The second misapprehension is the opposite of the first. It comes from a failure to appreciate, not how durable some features of the material setting will turn out to be, but rather how contingent and mut-

able are some of the categories of social life. What is most telling to us now about the *Popular Mechanics* picture is its presupposition that in the year 2000 the household cleaning will still be woman's work and indeed the function of the picture, wittingly or unwittingly, is to naturalize that assumption. This is a much harder kind of misconception to avoid, because it rests on the unspoken presuppositions of a discourse, and as such is more difficult to bring to consciousness. Or to put it another way: the first sort of error is in seeing the future as being insufficiently like the present, and that is relatively easy to correct for; you just imagine the future furnished like the room you are in, whereas the second sort of error involves seeing the future as insufficiently different from the present, and this we can correct for only by a determined act of imagination: forty-five years from now gender roles will be different. . . how?

Discussions of the future of the book involve both kinds of misapprehensions. For the thematization of material change, we have the picture of electronic media driving the printed book and the institutions of print culture to the margins of discourse. (To paraphrase the closing line of the mad scientist in the movie *Back to the Future*, "Books? Where we're going we don't need books.") For the present it's enough to observe that there is nothing in the economics of publishing as a whole or the body of practice surrounding the use of the printed book that militates for its disappearance, even over the long term. And while it is certain that many forms and genres will migrate in part or in whole to an electronic mode of existence over the coming years, there are numerous other printed genres that stand to benefit from the new technologies, whether in the form of electronic text preparation, demand printing, Web advertising, or, what may be most important, the computerized inventory systems that have made possible new types of retail distribution that have vastly extended general public access to texts over the past five years in ways that are arguably more significant than the effects of electronic media.¹ There will be a digital revolution, but the printed book will be an important participant in it. And by the same token, there is no reason to expect the digital library to replace the brick-and-mortar library, even less so once we can make a physical replica of any book in the collection of the Gregorian University and put it on the shelves of a university library in Iowa or Lyon at the same time we make it available over the Web in digital form. In all of this we are likely to be seriously misled by analogies to technologies like

movable type, which established a privative opposition between two kinds of artifacts. There never was a technology less amenable to determinist arguments than this one.

For the indefinite future, then, there will be printed books, just as surely as there will be wooden shelves and coffee tables to put them on. But none of this should be taken as depreciating the cultural effects of electronic media. Enthusiasts of the new technologies are right to point out that the introduction of these media is bound to be accompanied by sweeping changes in all the features of the modern literary system, to use Carla Hesse's phrase, including the relation between author and reader, the nature of the public, the conception of intellectual property, and the nature of the text itself. It is true, as writers like Jay Bolter and Raffaele Simone point out here, that many of these changes have been prefigured by tendencies in modern print publications, to an extent that visionaries are slow to acknowledge. But the effects of the new media will be profound.

The difficulties, both conceptual and practical, come when we try to spell out the effects of the new technologies in detail. And here, for all the revolutionary talk of the enthusiasts, there is a persistent tendency to yield to the second kind of misapprehension that representations of the future are liable to, where we naturalize contingent features of the current order of things. Indeed, the revolutionary rhetoric of the enthusiasts makes them especially susceptible to this presupposition, because the goal of making the material advantages of the new media sound inviting and exciting requires us to assume a continuity of communicative needs and interests. It is not the brief of visionaries to make the New Jerusalem sound like an alien place (the enthusiasm of *Popular Mechanics* readers for the new chemistry might have been more tempered if the designer of that picture had had the prescience to put the hose in the hand of a man).

The tendency is pervasive. When theorists talk about the power of the new media to make everyone an author, for example, or to provide everyone with universal access to potential audiences of millions of readers, they invoke a notion of authorship and a model of access that are more appropriate to traditional print media than to electronic communication. What is an author, after all, if the new media no longer support the legal status or institutional privileges that have traditionally defined that role? And what real increase is there in the ability of the average citizen to affect public opinion if anyone who wants to gain the

attention of a mass audience has to compete for attention with millions of other “authors”? There was a telling example of this sort of difficulty not long ago in a story in an academic newsletter about an assistant professor at a Southern university who had posted on a news list a bibliography of sources on the uses of virtual reality in education and was sedulously keeping a record of all the electronic queries that she had received about her work from all over the world, in the hope of being able to demonstrate to her tenure committee that her work had “an international reputation.” But the assumption implicit in that phrase that the magnitude or breadth of someone’s reputation is proportional to its farthest geographic extension – has no relevance in the electronic world, where it takes no greater investment of resources to make a text available to distant readers than to local ones. Electronic publication implies a new calculus of reputation, which I think no one has yet come to grips with.

One other example. Enthusiasts of the media have sometimes said that a medium like the Web makes it possible to actualize intertextuality to the point of eradicating all of the boundaries and divisions between texts, so that we arrive, finally, at a perfect Derridean *de’bordement* of meaning – a text, as George Landow has put it, that cannot shut out other texts. The implication is that digital technology makes it possible for literature to do in the light of day what it has up to now been able to do only furtively. It is true that we can have something of this feeling when we are moving amongst Web documents, where there need be no material difference, say, between the link that takes us to the subsequent chapter of a text and the link that takes us to one of its predecessors or to a commentary on it, even if these are stored at different sites. But there is a difficulty even in speaking of “intertextuality” when the individuation of texts themselves becomes so problematic: what could *de’bordement* signify when there are no *bords* in the first place? Ultimately, this sort of argument rests on an anachronistic sense of the text that is carried over from our experience of print. Whereas what electronic media really give us, in the end, is something stranger than that: a domain where there can be intertextuality without transgression.

It’s understandable, of course, that it should take a while to accommodate the conceptual consequences of any technologies whose effects are so pervasive we have to rethink not just obviously print-based categories like “publication” and “authorship,” but also notions

like “reputation,” with all the temporal and spatial presuppositions it trails in its wake. Perhaps the most basic and least well examined of these, though, is the notion of content itself. The quotations that I began this essay with are typical of virtually all the manifestos issued on behalf of the new technologies in their assumption that content is a noble substance that is indifferent to the transformation of its vehicles. In the print world it was attached to things or contained in them, but now it can be liberated and manipulated as a kind of pure essence: we can break the bottles and have the wine. In this essay, I want to show that these metaphors play false to the truth: we are rather in the situation, as Paul Duguid puts it, of breaking the banks and hoping still to have the river.

Of course writers like these do not usually talk about content as such, of course, but rather as “information,” a term that incorporates assumptions of nobility and transferability in its meaning, so that it seems foregone that content will be preserved intact when its material and social supports are stripped away. But considering how much work we ask the word “information” to do, we don’t spend time thinking critically about what it means. As Philip Agre (to appear) has put the point: “. . . the term ‘information’ rarely evokes the deep and troubling questions of epistemology that are usually associated with terms like ‘knowledge’ and ‘belief.’ One can be a skeptic about knowledge but not about information. Information, in short, is a strikingly bland substance.” The reason for this, Agre argues, is that information is a category shaped by professional ideologies and, like most ideological terms, is invested with a “pregiven” character that makes it impervious to interrogation. This is surely right, but it doesn’t justify our discounting information as a notion whose interest is exhausted once we’ve dispelled the forms of semantical false consciousness that it embodies. Agre is certainly right, for example, to say that part of the work that “information” does for librarians is to flatten and obscure the subjective social topographies of content that are implicit when we speak of the holdings of a library in terms of “literatures.” And from a different point of view, Dan Schiller (1994) has argued that as used by postindustrial theorists like Daniel Bell, the word “information” “. . . both covers and covers up much of what was referenced by the anthropological sense of ‘culture.’” But even granting all this, it doesn’t follow that we can simply drop the word “information” from our vocabularies in

favor of “literatures,” “culture,” “knowledge,” or whatever other items it seems to be standing in for.

One simple reason for this is that once we begin the purge we might not know where to stop. Like many of the words that do important ideological work, “information” is anchored in unexceptionable ordinary usage. It goes without saying that “information” is not simply a substitute for “culture” or the rest when we say something like “Can you give me some information about vacation rentals?” Nor for that matter do we have any right to complain about the technical uses of the word as such, for example when somebody talks about the amount of information in a particular television signal or in the genetic code. But where and how do we draw the distinction, and what kind of distinction is it? Is the suspect use of “information” merely a “loose” use of the word or a separate sense? And in either case, what is its relation to the technical and ordinary-language uses of the word? As a kind of propaedeutic, then, we have to do a certain amount of philological reconstruction.

2. The philology of “information”

The OED2 gives the word “information” only two relevant current senses.² The first is of these is what we can think of as the particularistic sense of the word, the sense it has in an ordinary sentence like “I’m looking for a book with information about guinea pigs,” where it means, as the OED2 puts it:

Knowledge communicated concerning some particular fact, subject, or event; that of which one is apprised or told; intelligence, news. spec. contrasted with data.

(This definition isn’t quite as precise or as complete as we might like, but it will do for now.) The second sense given by the OED2 is what we can think of as the naturalistic sense, which arose in the twentieth century when the word was made a term of art in fields like cybernetics and information theory. The OED explains this sense as follows:

Separated from, or without the implication of, reference to a person informed: that which inheres in one of two or more alternative sequences, arrangements, etc., that produce different responses in something, and which is capable of being stored in, transferred by, and communicated to inanimate things.³

The OED makes this second sense a subsense of the first, with the implication that it is really a kind of reconstruction or elaboration of the ordinary use of the word. As it happens, William Weaver explicitly rejected this interpretation of the theory that he and Shannon had developed:

The word “information,” in this theory, is used in a special sense that must not be confused with its ordinary usage. In particular, information must not be confused with meaning. In fact, two messages, one of which is heavily loaded with meaning and the other of which is pure nonsense, can be exactly equivalent, from the present viewpoint, as regards information. (Weaver 1964: 4)⁴

Weaver’s reservations are warranted, though of course if he and Shannon had really wanted to avoid confusion they would have done better to refer to their enterprise as “entropy theory” or “signal theory” (both of which were seriously considered for a time), or at least as “informativeness theory,” which would have more closely captured the notion of information as a property of a signal relative to an interpreter. In any case these reservations did not stop postwar social scientists from trying to put the theory to use in their accounts of human communication. More generally, people have come to assume that the “information” that figures in computer science – the stuff of bits and bandwidths – is the same use of the word that figures in its ordinary usage. As *BusinessWeek* put it in a special number on “The Information Revolution”:

We can glean it from the pages of a book or the morning newspaper and from the glowing phosphors of a video screen. Scientists find it stored in our genes and in the lush complexity of the rain forest. And it’s always in the air where people come together, whether to work, play, or just gab. (BusinessWeek, 1994)

One effect of this is to create the retrospective anachronism that is implicit in that “contrasted with *data*” clause in the OED2 definition, which suggests that the “information” that we contrast with “data” is the same sort of stuff that Lydgate was talking about when he used the word in the fifteenth century, two hundred years before the word *data* entered the language. This trope is ubiquitous in writing about the cultural implications of the new technologies. For example the *BusinessWeek* article goes on to say: “... all technologies that ‘process information’ (although they were never described in

those terms in the predigital era) affect deeply the societies that use them. Johannes Gutenberg's printing press eventually helped reformers to erode the Catholic Church's political power...". The trope is crucial to the claims of enthusiasts of the technology that it will usher in a new and epochal discursive order. We have to believe, that is, that the substance that computers traffic in, "information" in the technical sense of the term, is the same sort of stuff that led to the Reformation and the French Revolution, whether or not contemporaries talked about it in those terms.

But the fact is that the use of "information" that people have in mind when they talk about "the information age" or say that information brought about the Reformation is not quite what the OED is describing in its definition of the ordinary particularistic sense of the word - what we get when we call an airline to find out about flight times. They are thinking rather of what I will call the "abstract" sense of the word, where it refers not to "knowledge... concerning some particular fact, subject, or event," but rather to a kind of intentional substance that is present in the world, a sense that is no longer closely connected to the use of the verb "inform," anchored in particular speech acts. This is the sense of the word which bears the ideological burden in discussions of the new technologies.

The distinction between the particularistic and abstract senses is not immediately evident, particularly in English - after all, it escaped the attention even of the redoubtable compilers of the OED. And indeed, our first temptation is to say that "information" in this abstract sense is really the same sort of thing as "information" in the particularistic sense, only taken in the aggregate; it merely denotes the sum of all the bits of information about particulars that are at large in the world. In this way these general uses of "information" might be compared to the general uses of a word like "gossip." When we say something like "gossip is unreliable," for example, we are simply taking "gossip" as a universal that comprises all the instances of particular gossip - gossip about the Smiths, gossip about the new boss, gossip about movie stars, and so on.

It is true that the particularistic sense of "information" can have something like this aggregate use. When we say that such-and-such a book contains much useful information, for example, we mean that it has numerous bits of useful information about particular things. In the end, though, the story doesn't quite explain the use of the word we are

interested in. One way of making this point is to consider how we translate these various phrases into other European languages, where the particularistic sense of "information" is rendered by count nouns, usually in the plural - French *informations* or *renseignements*, Italian *informazioni*, Modern Greek *plirofories*, and so on. (English too permitted such a usage until the mid-nineteenth century.) So we would translate a sentence like "The book contains a lot of useful information" into French as *Le livre contient beaucoup de renseignements* (or *informations*) *utiles*. But we would not use the plural to translate a sentence like "The world is overwhelmed by information," or a phrase like "the information age" - uses like these are generally translated using either a mass term (as in *l'age d'information*) or sometimes by using an unrelated word like *connaissance*. Of course the fact that French has two words where English has one does not necessarily mean that the English word is ambiguous (they have two words for "river," after all), but it does suggest that there is a principled distinction to be made.

There is another bit of circumstantial evidence that is relevant to the distinction, which may help to explain why the first edition of the OED did not record it: this abstract sense of the word did not appear in English (or in any other language) until the mid-nineteenth century. Before this period you could not really speak of information in an abstract way. There is a revealing example in *Gulliver's Travels*: "For he argued thus: that the use of speech was to make us understand one another, and to receive information of facts...". It's notable that Swift could not say simply that the use of speech was "to receive information" *tout court*, but could only refer to an aggregation of particular propositions (this sentence would be translated into French using a plural). He had no way, that is, to speak of information as a kind of abstract stuff present in the world, disconnected from the situations that it is *about*.

This "presence" of abstract information is one of the crucial properties that distinguishes it from particularistic information. This is what makes it possible to talk about it as a measurable quantity, particularly in the claims about the "information explosion" that people like to make with extravagant exactitude. For example, there is a widely repeated claim to the effect that a daily issue of the *New York Times* contains more information than the average seventeenth-century Englishman came across in a lifetime.⁵ Now whatever writers have in

mind when they make such claims (not a great deal, you suspect), it's clear that they are not talking simply about the sum of individual propositions that are communicated from one agent to another. That seventeenth-century Englishman was doubtless informed of any number of things over the course of his life - relatives wrote to tell him when they were coming to visit, a gardener told him that the peaches would be particularly sweet this year. But clearly these things were of no account to whoever made the estimate, since it would be absurd to suppose you could calculate their number. Nor do people who try to quantify information have in mind the naturalistic sort of information that inheres, say, in the markings on a mushroom that indicate it is poisonous or in the darkening sky that announces the imminence of a rainstorm. Clearly there is no way to estimate how much of *that* sort of information there is in the world, nor is it possible or for that matter interesting to know whether there is more of it now than there was a few centuries ago.

When people refer to the amount of information that the average seventeenth-century Englishman came across in a lifetime or say that the amount of information is doubling every five (or twenty, or fifty) years, they are talking about the information in published documents, in the broad sense of the term - documents, that is, that have been made available for unknown others to refer to, whether by circulating them or putting them in files or archives. And this way of talking rests on two assumptions. First, they assume a correlation between the size of a text (as measured in characters, bytes, column inches, or whatever) and the amount of content it conveys - a step that implies the commoditization of content that is central to the cultural role we ask information to play. And at the same time they privilege this content communicated in this way at the expense of content communicated privately or irreproducibly.

And indeed, this sense of "information" was privileged from its inception. As it happens this use of the word is probably not directly derived from the ordinary particularistic sense, but rather from the now-obsolete use of "information" to mean "formation or moulding of the mind or character, instruction," a sense that's equivalent to the German *Bildung*. The OED2 has nothing to say about this development (as we saw, it doesn't even recognize the abstract sense at all), but the point is clear enough when we look at early nineteenth-century uses of the

word to mean "instruction" and note how often we are tempted to interpret it in the modern way. The misreading is particularly easy to make when the context involves talk of "having," "acquiring" or "receiving" information, or in phrases like "man of information." For example:

'Mr. Martin, I suppose, is not a man of information beyond the line of his own business? He does not read?' (Jane Austen, *Emma*)

Susan was growing very fond of her, and though without any of the early delight in books which had been so strong in Fanny, with a disposition much less inclined to sedentary pursuits, or to information for information's sake, she had so strong a desire of not appearing ignorant... (Jane Austen, *Mansfield Park*)³

I would not be hurried by any love of system, by any exaggeration of instincts, to underrate the Book... [G]reat and heroic men have existed, who had almost no other information than by the printed page. I only would say, that it needs a strong head to bear that diet. One must be an inventor to read well... (Ralph Waldo Emerson, *The American Scholar*)⁴

Austen would not have considered it admirable in Fanny to have been interested in "information for information's sake" if the word for her had entailed no more than knowing the names and dates of all the kings of England. And it would be wholly alien to Emerson's thought in this passage to assume that the "information" that heroic men might derive from books was merely a matter of knowledge of facts. At the same time, though, each of the uses *could* be misread, with just the slightest change in understanding, so that "information" was taken to denote not the instruction derived from books, but the content of books from which instruction is derived - the same kind of "cause for effect" metonymy that has left us with "mystery" and "horror" as the names of genres. And this, I suggest, is exactly what contemporaries did in creating the new sense of the word.

Like most of the misreadings that underlie such shifts of meaning, this one was highly strategic. On the one hand, it resituated the agency of instruction in the text and its producers, and reduced the reader to the role of a passive consumer of content, far from Emerson's "inventor." Michel de Certeau talks about this process in *The Invention of Everyday Life* under the heading, "The Ideology of 'Information' through Books" (the title plays on a similar polysemy in the French word). He casts it as a stage in the progressive evolution of the Enlightenment belief in a society produced by a textual system [*système* "scripturaire"], which "always had as its corollary the assump-

tion... of a public shaped by writing (verbal or iconic), but in both cases, a society that starts to resemble that which it takes in, to the point where it is, *so to say, imprinted* by and in the image of the text that is stamped upon it” (de Certeau 1990: 241).

At the same time the shift in the denotation of “information” from effect to cause facilitated another, no less strategic confusion between abstract and particularistic information, which was conflated under the assumption that the production of “informed” public consciousness was to be achieved chiefly through the production and dissemination of “objective” propositional content – the “information,” that is, on whose free exchange the functioning of democratic society, the free marketplace, and the rest are routinely held to depend. And by way of response, the older, particularistic use of information came increasingly to be restricted to the sorts of things you might learn from a book or from an official or institutional source. When your six-year-old daughter tells you that she doesn’t like vegetables, for example, you wouldn’t ordinarily describe her as having provided you with information about her tastes (not that you’d be lying if you did, but you would open yourself to a charge of archness). We can no longer use the word the way Emily Brontë could in *Wuthering Heights*, to refer to a casual communication about immediate experience:

“A letter from your old acquaintance, the housekeeper at the Grange,” I answered... She would gladly have gathered it up at this information, but Hareton beat her.

This development has contributed to the confusion between the two senses, as particularistic information has come to be treated increasingly as a subtype of abstract information – the particles of propositional content derived from public sources that make up information in the mass.

The modern public sense of “information,” then, has arisen through a conceptual creolization, first of the *Bildung* and particularistic senses, and subsequently of these two with the naturalistic sense provided by information theory. In this sort of situation, any effort to try to extract a coherent conceptual structure for the notion would be not just futile but false to its phenomenology: “information” is able to perform the work it does precisely because it fuzzes the boundaries between several genetically distinct categories of experience. Ultimately, then, the question we want to ask is phenomenological rather than lexicographical: not, What does “information” mean? but

rather, How is the impression of “information” constituted out of certain practices of reading and the particular representations that support them?

3. The phenomenology of information

In “The Storyteller,” Walter Benjamin described information (by which we should understand abstract information) as a “form of communication” that emerged with “the full control of the middle class, which has the press as one of its most important instruments in fully developed capitalism” (Benjamin 1936/1969a: 88). The description nicely encapsulates the two kinds of conditions that the phenomenon of information rests on. The first are social: the rise of industrial capitalism and all the apparatus that accompanies it. The second are the particular forms of expression and representation that served as what Benjamin calls the “instruments” of these social forces, what we can think of as the informational genres. Both Benjamin and Richard Terdiman (1985) lay particular emphasis on the appearance of the modern mass newspaper – ostensibly apolitical, eclectic in content, and sold to a vast readership for a low price on a copy-by-copy basis. The newspaper was, as Terdiman has observed, the first disposable consumer commodity, and it brought with it a new, commercialized conception of content. It was characterized by “journalistic” objectification and depersonalization of voice; it spoke with (literally) everyday matter-of-factness. But while the modern conception of “the news” (*les informations* in French) is in many ways the prototype for information in the large, a number of other forms of publication contributed to the same effect. The archetype of these is the modern “reference work” (a phrase first used in its modern sense in English in 1859, and in French in 1870) – the “national” dictionaries and encyclopedias of Brockhaus, Webster, and Larousse, the travel guides of Karl Baedeker and John Murray, and the census reports and other government publications that introduced into public discourse the notion of “statistics” in the original sense of the term. In the private sector, too, the growth of managerial organizations was accompanied by the emergence of printed schedules, work rules, and forms.* Finally, there were the genres that exploited and inverted the informational mode of reading, particularly the modern novel, which as Benjamin suggests emerged