Farewell to the Information Age

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> Paper is just an object that [some] information has been sprayed onto in the past… — Ted Nelson
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> So far we have placed all of our intellectual protection on the containers and not on the contents. 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
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> [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

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 here, 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 mutable are some of the categories of social life. What is most telling to us now about the *Popular Mechanics* picture is its presupposition is 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 involves 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 recent 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

[1] Cities like Brownsville, Texas, Waco, Texas, and Cheyenne, Wyoming now boast book "superstores" of between 25,000 and 50,000 square feet, which can offer readers from 30,000 to 60,000 distinct titles; stores in larger cities may offer as many as 150,000 titles.

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 moveable 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 Rafaele 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 temptered 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 is 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 geographical 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 *débordement* 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 by 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 *débordement* 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 a time thinking critically about what it means. As Philip Agre (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 (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 began 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 its is relation to the technical and ordinary-language uses of the word?

As a kind of propadeutic, then, we have to do a certain amount of philological reconstruction.

The Philolology of *Information*

The OED2 gives the word *information* only 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, p. 4)[4]

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[2] I'm ignoring most of the obsolete and legal uses of the word *information*, as well as the remnants of the use of the word as an action nominal, as in the phrase *for your information*.

[3] The OED2 actually gives two senses for this naturalistic use of the word, the second of them applying to information as a mathematically defined quantity, but it indicates that the two are probably descriptions of the same thing, and for the present purposes the difference needn't concern us.

[4] Weaver also acknowledged the "semantic problem" of information ("How precisely do the transmitted symbols convey the desired meaning?") and the "effectiveness problem" ("How

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 of *Business Week* 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. (*Business Week*, 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 *Business Week* 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

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effectively do the transmitted symbols affect conduct in the desired way?"). Neither of these has been addressed formally in the information-theoretic framework, though something like these problems have been taken up in recent years by philsophers like Fred Drestske and David Israel and John Perry. For the present purposes it is enough to observe that these have had virtually no effect on popular ways of talking about information, which is what I am concerned with here.

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 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.

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[5] A search in several databases of the Dialog Information Services turned up over 80 mentions of this claim in various magazines and newspapers, all of them uncritical. A number of these attribute it to a recent book called *Information Anxiety* by Richard Saul Wurman (Wurman 1989), which simply asserts the fact without offering a source or explantion. It is, in its own small way, a perfect example of information in the large.

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 or "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*
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> 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.*[6]

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[6] Austen sometimes plays on the ambiguity of the word, as in this conversation between Fanny and Edmund in *Mansfield Park*:

> "I speak what appears to me the general opinion; and where an opinion is general, it is usually correct. Though *I* have not seen much of the domestic lives of clergymen, it is seen by too many to leave any deficiency of information."
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> "Where any one body of educated men, of whatever denomination, are condemned indiscriminately, there must be a deficiency of information, or (smiling) of something else.…"

> 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"[7]

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 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 cast 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 assumption… of a public shaped by writing (verbal or iconic), but in both cases, a society that starts to

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Fanny uses the word here in its particularistic sense, to mean something like "intelligence, authoritative reports" whereas Edmund is using it to mean something more like "moral instruction."

[7]Cf also:

> But though the interest of the labourer is strictly connected with that of the society, he is incapable either of comprehending that interest or of understanding its connection with his own. His condition leaves him no time to receive the necessary information.… Adam Smith, *The Wealth of Nations*

> …it is well known that some of the most distinguished members of that Congress, who have been since tried and justly approved for patriotism and abilities, and who have grown old in

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." (Certeau 1990, p. 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 were 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 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?

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acquiring political information, were also members of this convention, and carried into it their accumulated knowledge and experience. Alexander Hamilton, *The Federalist Papers*, 14

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 1969 (1936), p. 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 (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.[8] Finally, there were the genres that exploited and inverted the informational mode of reading, particularly the modern novel, which as Benjamin suggests emerged directly out of the crisis created when information confronted the epic form. It is impossible to imagine Dickens, Twain, Galdós, or Zola in a world without newspapers or newspaper readers. There is very little in modern literature that is not either parasitic on information or in violent reaction against it.

These forms were closely mirrored by a new set of institutions and structures charged with representing the modern world. There were the public libraries, great and small, card catalogues, and the "library science" (now "information science") that grew

[8] See, on these, Yates (Yates 1989) and Beniger (Beniger 1986).

up along with them. There were the public art museums organized "thematically," by period and nation.[9] There were the museums of natural history that grew out of the eighteenth-century cabinet of curiosities, with rows of labeled exhibits that made them seem the material instantiation of the encyclopedic dictionary. There were the museums of science and industry and the international expositions that inscribed the Baedekers on urban spaces. There were department stores, which as Terdiman observes mirrored the organization of newspapers in their deliberate scattering of "articles" and the putative universality of their offerings. There was fiat money.

The Properties of "Information"

Each after its fashion, these forms impose a particular registration on their content, with characteristic syntax and semantics, which in turn elicits a particular mode of reading from its consumers. What I want to show in this section is how all the properties we ascribe to information — its metaphysical haeceity or "thereness," its transferability, its quantized and extended substance, its interpretive transparency or autonomy — are simply the reifications of the various principles of interpretation that we bring to bear in reading these forms.

Materially, we talk about information as a uniform and morselized substance. By saying that information is uniform I mean that it is held to be indifferent not just to the medium it resides in but also to the kind of representation it embodies; for example *Business Week* speaks of "the computer's ability to reduce all conventional information forms into one big digital stew," so that "a stream of digital bits can be engineered to represent a complex expression of text, calculations, sound, moving pictures, real-time simulations…." In this sense information is as I suggested a noble substance. It doesn't change its nature according either to the medium it is stored in or the way it is represented — in principle, we needn't alter the informational content of a table when we transform it to a bar graph, of a novel when we convert it to a comic book. These are all matters of information "visualization," "presentation," or "access," which stand to the right of information on the added-value chain. All of this is an important element in the commoditization of information, since it seems to allow us to establish the quantitative parities among its various manifestations that ensure its general fungibility; if we think

[9] Jean Clair observed that the museum and the railway station were the nineteenth century's only original forms of public building, the one a representation of the colonization of time, the other of the colonization of space.

exclusively in terms of column inches or disk space, we can set precise equivalencies among pictures and words.

The complement of the uniformity of information is its morselization or quantization, which seems to make possible its measurement. Unlike knowledge, which we often regard holistically, information is essentially corpuscular, like sand or succotash. It consists of little atoms of content — propositions, sentences, bits, infons, *morceaux* — each independently detachable, manipulable, and tabulable. These atoms are spread about in broad regions that correspond to subject-matter domains — there is medical information, sports information, information about the French revolution, and so forth. But this is a question of geography rather than structure; we can break off pieces of information and ship them around while at the same time preserving their value. This understanding of the substance of information is implicit in all the images that people invoke nowadays when they talk about large accumulations of information. It's a cosmos punctuated by celestial bodies, an unbroken landscape crossed by highways, a vast body of water dotted with archipelagoes. Or sometimes it is several of these in a single passage:

> Cyberspace: A new universe, a parallel universe created and sustained by the world's computers and communications lines… A territory swarming with data and lies, with mind stuff and memories of nature… The realm of pure information, filling like a lake…(Benedikt 1991)

In each case information is a continuous domain in which more or less homogeneous atoms of content are dispersed. It's significant that infospace is rarely depicted by comparison to anything more structured, like a city.

These impressions grow directly out of the material organization of the informational genres. The newspaper, for example, imposes both a temporal and physical corpuscularity on its content. All historical processes have to be rendered as events of immediate daily significance, each occurring in a single place; universalities or generalities can be presented only in the context of their particular manifestations as "news." And as Terdiman observes, descriptions of these events appear on the page alongside of descriptions of other, wholly unrelated events presented in exactly the same physical form, which answers only to the topographical requirements of layout — "a disposition of space whose logic, ultimately, is commercial." The effect is all the more marked because the content of the newspaper is so varied: reports of political events and natural disasters, gossip, *faits divers*, editorials, letters to the editor, stock prices, advice columns, reviews, personal announcements, and display advertising (a heterogeneity mirrored in the organization of any TV news hour). Moreover, as Habermas has pointed

out, the newspaper has tended to efface the stylistic distinctions between these genres: reportage and editorial material "assumes the guise of narrative from its format down to stylistic detail" and is increasingly "dressed up with all the accouterments of entertainment literature," whereas "on the other hand the belletristic contributions aim for the strictly 'realistic' reduplication of reality 'as it is… and thus, in turn, erase the line between fiction and report" (Habermas 1989, p. 150) (again, think of televsion, and the blurring of genres on "infotainment" shows and the like). As a result of all this, content tends to lose its individual character, even as the presentation suggests the absence of any connections among its atoms. It becomes a matter of column inches; its exchange value comes to dominate its use value.

Other forms and genres achieve the same effect through different means. As Agre (Agre to appear) observes, the structure of a card catalogue serves to "flatten" the contents of a collection and obscure the historically constituted organizations of texts that are implicit when we speak of "literatures." In one way or another, this flattening of internal structure is inherent in the principles of organization of most informational genres. Travel guides scatter observations about history, religion, art, architecture, biography, and geology according to the locations of the physical objects they are more-or-less accidentally associated with, just as dictionaries and most encyclopedias organize their entries according to the accidental properties of their orthographies. It isn't a particularly essential property of Raphael's "La Muta" that it is located in the Ducal Palace of Urbino, no more than it is an essential property of Raphael that his name begins with an *r*, but in each case that's what determines where the reference is listed in the relevant reference work.

Second, for the boundedness of information. As we saw earlier, (abstract) information is not just quantized but quantifiable in the large, in the sense that people imagine they can determine just how much of it there is in the world, usually in the interest of making alarmed observations about its rate of growth. And this in turn implies that information has a public character, a determinate if fuzzy collective extension. But here again the impression is simply a reflex of the properties of the informational genres. For one thing, as published documents they have a fixed public presence that enables us to index, catalogue, and count them and that reinforces the conception of them as public places or loci. (As Benedict Anderson has observed, it is in virtue of this public extension that forms like the newspaper could play a central part in delimiting "imagined communities" like the class and the nation, by offering manifest evidence of a uniform and universal national experience.) No less important, each of these forms offers iself as the exhaustive representations of its domain. The *New York Times* promises to give us

"all the news that's fit to print," a claim that is credible even as hyperbole only if we take "the news" to be a circumscribed public quantity whose relevance is uniform for everyone in the community. Analogously, the dictionary is expected to give us all (and only) the words that are appropriate to the language of public discourse, whatever the demurrals of "descriptive" lexicographers. It accomplishes this through a studied spatialization of the language, a process described in a famous passage from Murray's "General Explanation" to the OED:

> That vast aggregate of words and phrases which constitutes the Vocabulary of English-speaking men presents, to the mind that endeavours to grasp it as a definite whole, the aspect of one of those nebulous masses familiar to the astronomer, in which a clear and unmistakable nucleus shades off on all sides, through zones of decreasing brightness, to a dim marginal film that seems to end nowhere, but to lose itself imperceptibly in the surrounding darkness.…

The same process is recapitulated, with appropriate differences, in the travel guide that offers us an exhaustive enumeration of all the points worth visiting in a region, in the "universal" exposition, or in the national libraries charged with conserving the entirety of the literary patrimony of the nation. These claims to inclusiveness in turn permit us to attach a significance to exclusion — to an event that doesn't appearing in the newspaper, a word that doesn't appear in the dictionary, a historic site or restaurant that doesn't appearing in a travel guide, and so on. But of course this kind of claim is only possible when the boundaries of a document or building impose a manifest physical limit on the amount of material it can contain.

The material properties of information, then — its morselization, its uniformity, its quantifiability — are the reifications material properties of the documents that inscribe it — their layout, their boundedness, the collective presence that establishes them as fixed places. By contrast the semantic properties that we ascribe to information — its objectivity and autonomy — are the reflexes of the institutions and practices that surround the use of these documents. "Objectivity" is a complex notion here. It refers, first, to a kind of perspectival objectivity, the impression that information gives us its content in the "view from nowhere," without reference to private states or privileged points of view. This perspective-neutrality is the feature of information that gives it a more-or-less uniform exchange value, so that a piece of information that I give you can in principle be as comprehensible or as useful to you as it is to me.

The impression of objectivity rests first on the stylistic apparatus of "journalistic objectivity": the suppression of self-reference, personal voice and obviously subjective terms in favor of the "neutral" presentation of observable fact that represents itself as

mere "reporting." Behind this there is another suppression of the point of view of the reader. Reportage doesn't simply presumes a community of interest among its readers; it also presumes that the relevant interests are universal and themselves objective, or rather, that information is not an interest-relative term at all. That is, it suppresses not just the "I" but the "we." This is implicit, for example, in Murray's comparison of the lexicographer to an astronomer gazing at a distant nebula, rather than to an observer on Earth looking at the Milky Way, which would have come closer to the truth of the matter — obviously there nothing in the structure of the language itself which implies such an organization or which commends any particular region of speech as a "clear and unmistakable nucleus."

The suppression of the subject in the language of information corresponds to the suppression of explicit authorship in the document, in both its phenomenal and institutional guises. With the emergence of the informational genres, the writer of a news story no longer appears either as one of its characters or, increasingly, in the by-line; it is the institution or the form itself that speaks. Historically, this sort of shift in authority accompanied the emergence and development of the informational genres. The progression is nicely marked in the shift from Webster (Noah) to Webster's (the publishing house in Springfield, Mass.) and finally to *Webster's* as a synonym for "the dictionary," a generic name that has in fact been in the public domain for a number of years.

It is the perspectival objectivity of information and its detachment from individual speech acts, too, that establishes information as a metaphysically objective quantity, something which can be stored in a neutral medium and can exist in the absence of a subject. (As Fred Dretske has put it, "it was here before we were" [Dretske, 1983 #29]). This is one of the important ways in which information differs from knowledge, which always requires a knowing subject — an individual, a collectivity, or at the limit a text, which serves as a proxy for its author. (The difference is particularly clear when we prefix adjectives to the two words. We speak of "human knowledge," for example, when we want to identify a certain kind of knowledge by identifying the subjects who possess it, but we don't ordinarily speak of "human information" — you don't identify information in terms of its possessors. By the same token, we use a phrase like "medical knowledge" to refer to the body of knowledge that is accumulated in the medical community, whereas "medical information" refers simply to information about medicine, wherever it happens to reside.)

From the interpretive point of view, though, the most important consequence of the objectivity of information arises when we take it together with the morselization of its substance. If bits of information are to retain their value even when they are detached

from their context and moved about from one place to another, there has to be some way of ascertaining their value independent of both the context of their production and the larger textual context they are drawn from. This is the notion that Walter Benjamin was getting at in a passage in "The Storyteller" about the emergence of the popular press in the early nineteenth century, where he contrasted information with intelligence:

> The intelligence that came from afar — whether the spatial kind from foreign countries or the temporal kind of tradition — possessed an authority which gave it validity, even when it was not subject to certification. Information, however, lays claim to prompt verifiability. The prime requirement is that it appear 'understandable in itself….' It is indispensable for information to sound plausible.

"Sounding plausible" is perhaps too narrow a characterization, but it gets at the phenomenal autonomy of information in its abstract sense.

It's important to distinguish between autonomy and other notions more closely connected to truth. Philosophers often talk about information as a veridical notion, but it is not, in either of its senses.[10] When we talk about *information* particularistically — as information about such-and-such — we can modify it using qualifiers like *reliable* or *unreliable*, *correct* or *incorrect*, and so on. It's true that there is a marked statistical preference for the negative items here, which suggests that, unlike a word like *report* or *account,* say, *information* carries with it a presumption of confidence.[11] When we speak of someone's giving us information about the date of the exam or the price of a stock, that is, we usually imply that the source is authoritative and reliable and represents the content as being true (for this reason we don't often modify *information* using words like

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[10] Dretske (Dretske 1983, p. 57), who claims to be giving a reconstruction of *information* "as it is ordinarily understood," says: "False information, misinformation, and (grimace) disinformation are not varieties of information — any more than a decoy duck is a kind of duck." This would be simply wrong, if Dretske's account were taken as a rational reconstruction of the common-sense notion. But if we ignore Dretske's claims about the relation of his naturalistic notion and the notion that figures in ordinary discourse, I don't think the critique I've offered here offers any real philosophical challenges to his view. It does however underscore the dangers of arguing from intuitions about the "ordinary uses" of words that are so laden with cultural meaning.

[11] A computer search of articles in the very large newspaper database of Dialog Information Services (if not there, where?) turned up just under 2 million instances of the word *information*, of which 8281 were prefixed by the word *false* and 9568 by the word *incorrect*. There were also 163 instances of *true information* and 1773 of *correct information*, a discrepancy that attests both to the presumption of truth and to its suspendabilty.

wild, the way we might describe an account or report.) Indeed, *information* in the particularistic sense of the term is better thought of as an evidential as opposed to an epistemological notion.

But if particularistic information is not veridical, it is clearly propositional — its content is the sort of thing that can be true or false. Whereas the qualifiers that we ordinarily apply to particularistic information sit uneasily with the abstract use of the term. This may be easiest to see if we look at the French translations of the word. You can speak, for example, of *les informations correctes* or *les informations fiables*, but you can't say *l'infomation correcte* or *l'information fiable* (unless, in an unrelated way, you are talking about a particular definite report). And we can see the same thing in English, even if there the distinction between the two senses is not morphologically marked. Someone might say, for example, "This is not simply the age of information, but the age of reliable information," but you would have the sense that the word was being used in the second phrase in a different and more restricted way — it no longer refers to the whole ensemble of representations that computers or knowledge workers trade in, but only to propositional representations like market reports, news stories, and the like.

The characteristic semantic feature of abstract information, rather, is autonomy, by which I mean that the authorizing context is folded into the form of the document itself. It is true that autonomy often carries with it a strong presumption of veridicality. You get into a rental car in a strange city, turn on the radio, and hear an announcer saying that the Giants have been eliminated from the division race on the last day of the season; you accept what you hear without interrogating it, or without having to know anything more about the speaker, the program, or the radio station. You accept it, that is, in virtue of the form of language that expresses it and the kind of document that presents it. And it is important to bear in mind that this is a phenomenal experience that Adam Smith or Condorcet could never have had. They knew only information in its older sense — what I'll call "intelligence" from here on in — and would not have thought of accepting the truth of a text on the basis of its form alone, in the absence of any knowledge of its source.

But autonomy doesn't always imply veridicality. As sophisticated readers we are all far too intelligent to take everything we read in the paper as true; the transparency of information starts to cloud over when we move from the sports pages or the stock columns to the political news on the front page. The fact is, as everybody knows, that newspapers tell us the truth about the things that are important to us so they can get away with misrepresenting the things that are important to them. But the fundamental principle of information is not altered by observations like these. News reports are information for

us skeptical readers no less than for the credible readers who take everything they read in the papers at face value (if such people exist outside of the fantasies of early critical theorists.) The crucial point is that even for us, the interpretation of such documents is shaped by their syntax and their material form, rather than by any more-or-less conscious reconstruction of the relationship between ourselves and its producers. This is what I mean when I say that information is a mode of reading — or "a form of communication," as Benjamin called it, which may be pretty much the same thing.

The Future of Information

Since its inception, information has managed to colonize every new form of public representation. If you think of communication primarily in terms of its mode — via texts or via sounds and images — then you will see an abrupt break between print and the broadcast media. But the emergence of a form like television seems less consequential from the informational point of view. All the features that sustain the impression of information in print are realized here as well: the blurring of genres; the fragmentation of content into "bites," segments, programs, and regular editions; the circumscription of a public discourse; and a phenomenal autonomy even more marked than in print, in the sense that the identities of the responsible agents (stations, networks, producers, writers) are almost wholly obscure and irrelevant to the way we interpret what we see.

So it isn't surprising that electronic forms have been informationalized as well. The World Wide Web teems with particularistic information (stock prices, course schedules, the texts of nineteenth-century novels you can search for tokens of the word *information*).[12] And the print and broadcast media that mediate the impression of abstract

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[12] It is difficult to make any interesting generalizations about the full range of electronic media, given both the welter of emergent forms (CD-ROM, hypertext, multimedia, virtual reality, MUDs and MOOs and so on) and the increasing difficulty of separating print and electronic documents now that "traditional" print documents can be electronically distributed and printed locally on demand. For the present purposes I will take the World Wide Web (or more broadly, the Net) as a model. For one thing the Web has already established itself as a means of distributing journalistic, scholarly, commercial, and institutional documents. As of this writing (in August of 1995) there are some 60,000 Web servers, a figure that has increased eightfold over the last year. (This figure is available at http://webcrawler.com/WebCrawler/Facts/
Facts.htmlhttp: //webcrawler.com/.) I will also assume only the functionalities currently available — that is, the possibility of reading, writing, and interacting in simple ways with hypertextually

information have already established important beachheads here: you can call up *Time Magazine*, *Webster's Tenth Collegiate*, university catalogues, and the *Encyclopedia Britannica*.

On the face of things, in fact, electronic documents like those on the Web seem not only to preserve the impression of information but to reinforce it. They are highly modular, amenable to extraction and reorganization, and are much easier to dislodge and decontextualize than print documents are, features that support the sense of corpuscularity and transferability. They can be reformatted and reformulated — you can change the visual presentation or cause a table to be reformulated as a bar graph — which supports the conception of their content as a kind of fungible abstract substance. And the ease with which we can move from one document to another leads to the conception of content as a kind of extended substance, the conception that underlies the metaphors of "infospace" and the rest.

But while the content of the documents we find on the Web has a lot of the syntactic and formal properties that we ascribe to information, it is less well adapted to supporting the semantic properties that the informational mode of reading requires, particularly the impressions of objectivity and autonomy. The problem, as I suggested at the outset, is that these media don't preserve the social and material boundaries that the informational mode of reading requires. On the one hand, they disrupt the constellation of properties embodied in the notion of "publishing" — the connections, that is, between accessibility, diffusion, and "publicity," in the older sense of the term. On the other, they efface the material and phenomenal boundaries of and between both documents and collections.

It's true that neither of these has much effect on the way we interpret the on-line versions of informational publications that are well established in print, which we read, essentially, as transcriptions. But it creates difficulties for the development of new, autochthonous forms of electronic communication. And for various reasons, the Web makes it more difficult to marginalize these forms than has been historically possible,

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organized documents which may include audio or video, and which contain active links to other sites. It's clear that within a short period there will be basically nothing you can do on a workstation or local server that you can't do remotely over the Web — you will be able to edit your documents or OCR a text-image using software available on a remote server, for example — but while the implications of this increased functionality are considerable, I won't discuss them here.

say, in the world of print. Information may be able to colonize the Web, then, but I think it will not be possible for it to establish its imperium there.

Information on the Web

First, for the notion of "publishing." To a certain extent, the particularities of the Web in this regard are purely quantitative. A signal virtue of electronic technologies is to remove the capital and institutional impediments to the production and circulation of documents. As we're often reminded, "anyone" can produce a document and make it accessible to thousands or millions of readers.[13] And indeed, this is exactly what anyone has been doing in increasing numbers. (You think of what someone said about Greenwich Village in the 1950's, that it was home to 50,000 people who had a great letter to the editor in them.) In a certain sense, this could seem to be merely the continuation of a tendency that has been in progress for a long time. Walter Benjamin observed sixty years ago that with the extension of the press and the multiplication of organs, "an increasing number of readers became writers. …[T]oday there is hardly a gainfully employed European who could not, in principle, find an opportunity to publish somewhere or other comments on his work, grievances, documentary reports, or that sort of thing." [Benjamin, 1969 (1936) #40, p. 232] And we can find reports to the same effect in Carlyle in the nineteenth century and Johnson in the eighteenth. But while the absolute number of writers and documents has been steadily growing, the *proportion* of writers to readers has remained relatively constant or may even have declined over the centuries, along with the circulation of the average published document. The average first printing of a novel in 1780 was around 1250, and is perhaps 5000 or 7500 today, but most or all of this increase is explained by the fact that a far larger proportion of the eighteenth-century editions would have gone to circulating libraries and book clubs, and by an increase in the number of books that individual readers buy.[14]

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[13] I'm going to assume here that the Web will remain resistent to the kind of monopolization that would make this sort of communication too costly for individual users. This is a big assumption, of course, but I think that even if the Web were bought a few large commercial interests, it would be difficult or counter-productive to impose a commercial model that limited the accessibility of certain documents, or that militated against the continuing use of distribution lists and similar fora.

[14] Over the past century the number of titles published has probably grown at something like two or three times the rate of growth of the reading public itself. In 1945 there were about 7000 titles published in the US; by 1990 this figure was about 50,000. Over the same period the reading

This still means, of course, that every generation has had a larger number of documents to cope with. But the consequences for the individual reader have not been as severe as we might be led to believe by the complaints about "information overload" that seem to come up in every age (though of course that particular way of putting things is recent). Up to now, each successive stage of increase has been met by a corresponding institutionalization and specialization of discourses, which constrain readers' expectations of themselves. A modern graduate student in physics is sure to feel overwhelmed by the volume of material she is responsible for, but not to any greater degree than her nineteenth-century predecessor did. There has always been too much to read.

But electronic discourse promises to disrupt this process. In the first place it sharply increases the proportion of writers to readers. (We might paraphrase Benjamin by saying that "today there is hardly a gainfully employed European or American who *has* not published somewhere or other comments on his work, grievances, documentary reports, or that sort of thing" — provided we make access to a computer and modem a precondition to "gainful employment.") The increase in the number of documents that any reader has to sort through is for this reason genuinely unprecedented. It could be argued, of course, that the difficulty is partially offset by an increased ease of access that makes it possible for readers to look at many more documents than previously. But the effect of this is chiefly to enable people to go through more documents in search of those that might be interesting or useful — and in the course of things, to waste more time checking out large numbers of documents that are neither. Ease of access tends to exacerbate the impression of overload, rather than relieving it.

The purely quantitative difficulties are exacerbated by qualitative ones. Media like the Web tend to resist attempts to impose the sort of solutions that enable us to manage (even imperfectly) the steady increase in the number of print documents — the ramification of discourses and forms of publication, the imposition of systems of

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public probably no more than trebled (assuming a doubling of the population and an increase of fifty percent in the proportion of the population that buys books), though the the difficulty of finding comparable statistics and of assessing what we mean by the "reading public" makes all such estimates highly speculative. As vague as they are, though, the figures suggest that the proportion of writers to readers has remained constant within an order of magnitude. Figures from earlier periods conform to this principle. Richardson's best-selling novels in the 1740's achieved sales of around 6500; seventy years later, when the reading public (as measured by newspaper sales) had increased roughly four times, Scott's *Marmion* and *Roy Roy* sold around 11,000 each (See Williams (Williams 1961)).

screening or refereeing, the restriction of the right to speak to "qualified" participants. And at the same time the new forms of circulation can disrupt the long historical development of cataloguing and classification systems that Roger Chartier describes in *The Order of Books*, through which emerged "[the] operations thanks to which it became possible to order the world of texts" (Chartier 1991, p. 7).

For one thing, there are almost no barriers to posting a document on the Web, not even the minimal requirements that have to be satisfied before you can publish your "comments on work, grievances, documentary reports" in some print organ or another. Many Net discussion groups have moderators, it's true, but their responsibilities are usually limited to screening out blatant incivilities. On the Net, there is no strong material or economic incentive to rule out prolixity or to winnow redundant postings, and the breadth and openness of the discussions and the interest in quick turnaround militate against screening for accuracy. The discussions are ruled by the sort of principle that Henry Oldenbourg offered when he began the publication of the *Philosophical Transactions of the Royal Society* in 1665: *sit penes authorem* [sic] *fides*, "let it be on the author's head." And of course there is no need even to the submit to the judgment of moderators. Any undergraduate is free to post her night thoughts on Mary Shelley or the Klingon verb to a "potential audience" of millions (a quick search of the Web turns up numerous examples of both), and there will be nothing in its mode of circulation to distinguish it from communications from better-qualified contributors. Nor, for that matter, is the material form of a document very informative here. If I am willing to make even a small investment of time, I can produce a Web home page that is every bit the graphical equal of the home pages of *Time Magazine* or Sun Microsystems.

One effect of all of this is to undercut the autonomy of documents that is essential to the impression of "information" in the print world. You do a search over the Web on the words "Alfred Hitchcock," for example, and you come up with twenty or thirty hits, most of them "professional-looking" pages. Some of them announce their provenance — there is an essay by someone in the English department at the University of Maryland and an undergraduate's senior thesis (at an unnamed university) on *Rear Window*. But there are no material or external clues to help you evaluate the three filmographies, one apparently prepared by a Hitchcock buff in Poitiers, another in Cardiff, and a third, which looks on internal evidence the most authoritative, from someone's site in Mexico.

On the Web, that is, you can never have here the kind of experience that you can have with the informational genres of print, the experience of interpreting a text simply *as* a newspaper or encyclopedia article without attending to its author, its publisher, or the reliability of its recommender. We read Web documents, that is, not as information but as

intelligence, which requires an explicit warrant of one form or another. Sometimes this is provided by a masthead that announces that the document has been produced by a well-known organization or print publication, in which case the content of the document does indeed constitute a kind of derivative information. With primary electronic documents, though, the warrant more often comes, as with the intelligence of old, from sources whose reliability we can judge from personal experience. One of the most striking things about the Web is the secondary traffic in *trouvailles* that it encourages, either in the form of the mail messages that users exchange when they locate an interesting or useful URL (a universal resource locator, the address of a Web page) or of the active links to other sites that users embed in their own Web pages. From these in turn have sprung various electronic reviews, information services, and clearinghouses, most run by enthusiasts but with an increasing number of commercial efforts. And you can find hot tips, too, in print publications from *Wired* to the *New York Times,* and in the Silicon Valley, even on highway billboards. It is a phenomenon reminiscent of the response to the multiplication of print forms in the early eighteenth century, when Pope described in the *Dunciad* the pullulation of "Miscellanies… Journals, Medleys, Merc'ries, Magazines," most of them produced by booksellers to publicize the increasing output of print titles.

Over the course of time, services like these will help to address some of the evidential problems that come up when we want to use the Web as source of reliable information in the particularistic sense. But we should bear in mind that they are not really the equivalents of the informational genres of print, which offer themselves as compendia of a circumscribed body of public knowledge — the news, the lexis, the library collection. In the electronic world, this goal of circumscription is chimerical, in the absence of phenomenal boundaries between documents, genres, and discourses. The implications are nicely summed up in an old joke about the *New York Times* to the effect that its slogan "All the news that's fit to print" would be more appropriately rephrased as "all the news that fits." But it is not a joke you could make about a truly electronic newspaper. It isn't just that there are no longer any relevant material limits to the capacity of a document — that we can "fit" into a newspaper as much content as we like — but that the boundaries of "news" fall away at the same time. There is no event so trivial or particular that someone might not find it useful, no piece of background that has to be left out for reasons of space. And in the same way there no word so obscure or technical or slangy that some user mightn't want to find it in a dictionary. This might seem to pose intimidating challenges for the compilers, except that "compilation" is a different matter when the boundaries between documents are themselves so problematic. A dictionary can be linked to an encyclopedia, for example (the distinction between the two has always

been as much a matter of two kinds of books as of two modularities of knowledge). Or an encyclopedia can take us directly into the primary literature (likewise).

At the limit we may want to think of these forms on the model of the new news services and clearinghouses: not as static compendia but rather as dynamic interfaces to an open-ended discourse. They are forms of automated intelligence, that is, rather than informational genres in themselves. So the true electronic "dictionary" (already taking shape in research projects) might be a tool that pairs a word in an on-line text with a body of citations that match and clarify the sense relevant to its context, without having to pass through the lexicographical processes of distillation and abstraction, with their attendant implication of a distinction between language and speech. And the "digital library" is analogous. Once the notion of a collection is no longer a materially constrained, it tends naturally to extend indefinitely. Of course it includes a lot of what most readers will find trivial and ephemeral; when you take down the walls of the library you shouldn't be surprised to find the reading room filling up with street people. But the solution is not to try to close off the collection in some arbitrary way, but to provide benign Medeas (both automatic and flesh-and-blood) who can help users thread their way through the maze. The electronic news service, newspaper, dictionary, and library are still tools for "information access" in the particularistic sense of the word. But there are no longer the kinds of determinate public limits that are implicit when we talk about "information" in the abstract sense, and no way to talk about how much of it there is in a copy of the electronic *New York Times.*

After Information

But from a cultural if not commercial point of view, the importance of the Net and the Web is not as a convenient if sometimes leaky alternative to the informational functions of print. Rather it lies in the forms of discourse that are emerging in all those Web sites and discussion groups that the electronic referral services are helping us to avoid wasting our time on. One of the most pervasive features of these media is how closely they seem to reproduce the conditions of discourse of the late seventeenth and eighteenth centuries, when the sense of the public was mediated through a series of transitive personal relationships — the friends of one's friends, and so on — and anchored in the immediate connections of clubs, coffee-houses, salons and the rest. The social aggregations that assemble themselves on the Net may be virtual, but they are in no wise "imagined" in Benedict Anderson's sense — they aren't groups, that is, whose "fellow members…will never know most of their fellow-members, meet them, or even hear of them, yet in [whose minds] lives the image of their communion." (Anderson

1983, p. 15) It may be true that most participants in Net colloquy will never actually meet each other individually, or even have direct electronic contact, but unlike the members of nations, social classes, or even ethnicities, each of them is immediately and personally accessible to any other.

Perhaps not surprisingly, the forms of discourse that emerge tend to mirror those of the pre-information age. One place where this is very much in evidence is in the professional discussion groups of linguists, historians, literary historians, and the rest, which fall somewhere between the refereed electronic journals (a genre that has so far been slow to take form) and the freewheeling conversations of net news groups (which can sometimes be rebarbatively brusque). The participants are usually familiar enough with the forms of "official" communication, if not always in the field that the list is given over to. But their exchanges here don't have the character of the print journals of the modern ages.

There is, first, the opening up of the right to speak. The lists reverse the effects of nineteenth-century immurement and professionalization of the disciplines that Raymond Williams described as a transition from the republic of letters to the bureaucracy of letters, where a writer can no longer speak as himself, but "must continually declare his style and department, and submit to an examination of his purpose and credentials at the frontier to every field." (Williams, 1983, p.121). It's is not just that the lists permit the participation of interested amateurs (the "virtuosi" of the age of Pepys and Wren). They also remove the burden of professionalism that was imposed in the nineteenth century to limit the published discourse of the sciences to descriptions of its "subject matter" and purge it of critical self-consideration. The amateur epistemologizing and sociologizing, the pedagogical and technical lore, the gossip and the professional politics, the anecdotal observations about curiosities that lie outside the realm of current theory — all these come bubbling back up into public view from of the orality where they have been repressed for the past two hundred years. The effect is something like that of reading an early number of the *Philosophical Transactions*, which might mix the serious contributions of Boyle or Leeuwenhoeck with a report from a gentleman in Suffolk about a curious sand-flood or the birth of a monstrous calf. (You wonder whether the more scholarly readers of the *Transactions* tended to skip over the contributions that came in from anyone with an "Esq." at the end of his name, the way some readers of scholarly lists give short shrift to postings from anyone whose email address ends with "compuserve.com.")

Of course it can be a risky matter to read all this informationally. It often happens that a query will elicit several contradictory answers, leaving the person who posed it in

something of a quandary, especially if he is not adept enough in the discourse to be able to sort out the dross either on internal grounds or on the basis of some knowledge of the qualifications of his respondents. (To take an extreme example, someone wrote to the Linguist List not long ago asking for the source of the quotation "Homo sum; homini nihil a me alienum puto." The answers offered included Cicero, Horace, Plautus, and Virgil, and while Terence did get the most votes, you have the feeling that serious scholarship ought to require some standard more rigorous than mere majority rule.) Predictably, as elsewhere in the electronic sphere, there are frequent complaints about the unevenness and copiousness of the discussions, in tones reminiscent of those of the 1756 critic who taxed the editors of the *Philosophical Transactions* for publishing too many "crude essays that cannot appear with propriety among the works of the learned." And with these come attempts to restrict access or fragment the lists into new, more exclusionary discourses.[15] But while it's reasonable enough to look to these discussions to answer certain informational needs, once again it's futile to suppose they can be circumscribed and regimented in the way print discourse can. They are too porous to the personal.

Derrida (Derrida 1995, p. 35) makes a point along these lines in *Mal d'Archive* about the effects of electronic mail (which seems to include for him the broader range of Net communication):

> …electronic mail is now even more than the fax in the process of transforming all the public and private space of humanity, and first of all the limit between the private, the secret (whether private or public) and the public or phenomenal.

This personalism is the feature that most sharply distinguishes net discussions from the formal discourses of print. It is implicit in the forms of language, as people speak, not as authors to an anonymous public, but rather in the form of a colloquial conversation between participants who are co-present in the act of speaking. Contributors often address one another directly, a style alien to the letters column of a magazine journal, where antagonists always refer to each other in the third person. And the style of argument admits the personal, the anecdotal, the subjective. If you are willing to make allowances (rather a lot of them), the tone recalls the early eighteenth-century periodicals and the first stirrings of the modern critical spirit. It is a capacity, as Terry Eagleton puts it, that is "incurably amateur," which draws together "writer and reader, critic and citizen, multiple literary modes and dispersed modes of inquiry," and whose goal, as Eagleton

[15] Quoted in Kronick (Kronick 1991, p.161).

quotes T. H. Green as saying, "consists of talking to the public about itself." (Eagleton 1984, p. 22)

We shouldn't try to make too much of this, as some of its enthusiasts have tried to do (one describes electronic mail as the "fourth revolution in the production of human knowledge, the first three having been language, writing, and print.) The discussion is very often banal and can on occasion be uncivil; certainly no one would be tempted to say of the language of the net discussion groups, as Eagleton does of the language of the *Spectator*, that it is "mannerly and pellucid." Of course it could be argued that unevenness and a lowering of quality is inevitable whenever participation is so wide (and indeed, there are analogous complaints about the decline in standards whenever participation in public discourse seems to be broadened, which go back to Addision and Swift and before).[16] There is some truth to this, though claims about the increased breadth of participation on the Web are greatly exaggerated, just like Defoe's claims that London held "rarely a Victualing House but you meet with a Tinker, a Cobbler, or a Porter, Criticizing upon the Speeches of Majesty, or the writings of the most celebrated Men of the Age."[17] The Web is still the electronic equivalent of a gated suburban community, and it shouldn't be surprising that it contains a lot of suburban chatter.

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[16] Cf the remarks of Aldous Huxley in 1934:

> …[T]he proportion of trash in the total artistic output is greater now than at any other period. That it must be so is a matter of simple arithmetic. Process reproduction and the rotary press have made possible the indefinite multiplication of writing and pictures. Universal education and relatively high wages have created an enormous public who know how to read and can afford to buy reading and pictorial matter. A great industry has been called into existence in order to supply these commodities. …The population of Western Europe has little more than doubled during the last century. But the amount of reading—and seeing—matter has increased, I should imagine, at least twenty and possibly fifty or even a hundred times.

(The passage is quoted in Benjamin (Benjamin, 1969, p. 248), who adds: "This mode of observation is obviously not progressive.")

Of course Huxley was assuming, as Benjamin seems to do, that the proportion of writers to readers was increasing throughout this period, an impression enhanced by the fact that the ephemera of earlier ages tend to be forgotten, so that the overall quality of contemporary writing always seems infinitely more mediocre when it is compared to the works that are still available from earlier periods. Historically, as we have seen, the impression of proportionally increased participation is probably unjustified, but it could in fact be a cause of some change in the overall quality of public writing as we move from print to electronic communication.

[17] Quoted in Eagleton (Eagleton 1984, p. 14).

Still, it is unfair to expect electronic media to be the agents of sweeping social revolution or even for that matter of a complete overturning of the present order of discourse. And from the literary point of view, it is early days yet; really the appropriate comparison here is not to the *Tatler* or the *Spectator*, but to the seventeenth-century "news letters" and the like that antedated these forms and made them possible. The chief difference is that these new forms inhabit a public space that is already highly developed and differentiated, so that like other technological innovations (plastic furniture, for example), they will wind up assuming certain specialized functions alongside of the established informational genres of print and their derivative electronic representations. This is the only quibble that I have with Derrida's description of the Net as being "in the process of transforming *all* the public and private space of humanity." Rather, I think we should look to electronic discourse to provide a counter and complement to the informational forms of print — a domain that privileges the personal, the private, and the subjective against the impersonal, the public, and the objective.

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