The Problem of Information

An Introduction to Information Science

Douglas Raber

The Scarecrow Press, Inc.
Lanham, Maryland, and Oxford
2003

11

Semiotics for Information Science

On occasion a scholarly work reaches far beyond its intended audience and alters the course of thought in a number of different disciplines. Ferdinand De Saussure's *Course in General Linguistics* is such a work[1]. The Library of Congress subject headings assigned to this work include "language and languages," "linguistics," and "comparative linguistics." While it is certainly about these subjects, its influence has reached philosophy, literary criticism, and the social sciences. It is a seminal work for the emerging field of cultural studies and, as we shall see, information science.

At first glance it seems as if Saussure's work should be a central pillar of information science, yet with the exception of a few forays here and there, the discipline has not embraced the implications of Saussure's suggestion that a science of signs is possible.[2] Saussure named this science "semiology," and identified it as the study of "the life of signs in society."[3] More recently, this discourse has come to be known as semiotics. Representation, and the relationship between representation and what is represented, are at the heart of both semiotics and information science. Both semiotics and information science are vitally concerned with representation and the production of culture. Both are concerned in different ways with signs used for the purpose of communication. Both address issues of what we know, what we could know, and what we have forgotten.

Regarding our understanding and use of knowledge and other kinds

of cultural products, both also ask similar questions. Given the signs with which it is possible to communicate, why is one chosen rather than another? What rules govern the process of choosing, ordering and use of these objects?[4] How do the rules governing the constitution of signs as cultural products affect and condition our possible choices? Why are some relevant to understanding situations and others not? In a given speech situation, why do we deploy some signs but not others? What kind of culture is produced as an outcome of our choices? Do the rules ever change and if so, how? In sum, both semiotics and information science are concerned with relationships between content and its representation, between signifier and signified, between reference and referent, and between informative objects and their meaning.

The problem of retrieving information relevant to a need is essentially a problem of penetrating and understanding the nature of what Saussure called the "sign." Signs appear to us as apparently unrelated and heterogeneous objects, yet they are necessarily linked by a common bond created by an act of reading.[5] As an illustration, Roland Barthes provides the following list: "a garment, an automobile, a dish of cooked food, a gesture, a film, a piece of music, a piece of furniture, a newspaper headline."[6] Each, he says, can have something to say us. It might be something about the social status or lifestyle of the owner of the object. It might be an idea or a political statement. Even the notion of reading a newspaper headline, while seemingly obvious, offers more than one way to read, including reading between the lines. And while our reading of other kinds of signs may occur, even without us ever realizing that we are reading, it is the nature of the sign to be at least potentially informative, available to be read, and open to interpretation.

Some signs are straightforward. We read the red light at an intersection as an instruction to stop. However, the apparently simple sign on the interstate highway informing us that the next rest stop is sixty miles away may trigger a complex set of associations regarding the urgency of arriving at a destination, how long the children in the back seat can hold out before a bathroom break, and the price of sanity on a long distance automobile trip. Other signs, such as a symphony by Mozart, a painting by Picasso, a novel by Pynchon, or an article in the *Journal of the American Society for Information Science and Technology*, are considerably more complex at the outset and demand greater attention if they are to be read at all.

Barthes argues that we routinely accept many of the signs we encounter at face value and that "we take them for 'natural' information."[7] This "taken-for-granted" aspect of signs, however, disguises the

way signification provides the principles by and through which meaning is determined and social reality is created and shared. In short, nature may not be quite as natural as it appears, as Barthes himself says.

> To decipher the world's signs always means to struggle with a certain innocence of objects. We all understand our language so "naturally" that it never occurs to us that it is an extremely complicated system, one anything but "natural" in its signs and rules: in the same way, it requires an incessant shock of observation in order to deal not with the content of messages, but with their making.[8]

The sign—or as we might say in information science the informative object—is never as what Barthes calls innocent, if only because its role in a system of signification and meaning that includes a great many other signs. In addition, signifier and signified share a complex relation, as is true of the relation between a text and its content. An article in a scientific journal, for example, may be quite informative on its own, but it is only a part of a body of literature, an ongoing discourse regarding a given subject; and its full meaning depends not only on what it has to say, but its place relative to other statements in the discourse. The rules governing that discourse are likely to be complex and perhaps contested in ways that allow alternative readings of the article in question. Understanding exactly what the article signifies—in other words, what it is about and its relevance to its reader—is neither an easy nor a straightforward task. A surplus of meaning can intrude upon interpretation.[9]

This difficulty affects both ends of the information retrieval process. On the front end is the difficulty of assigning an accurate and adequate representative description to a given text, most commonly but certainly not exclusively a document, in order to appropriately place it in a system of texts whose organization makes a given text accessible when we want it. There are also possible tensions between the signification of a text and the system of organization applied to its description and control, especially if there is no appropriate place in the system to put that text. On the back end is the difficulty of assessing whether or not the accessed text is actually relevant to the need that prompted its retrieval.

Information science and semiotics share another important characteristic: the central theoretical object of each discipline bears an unmistakable indeterminacy. Saussure observed that unlike other sciences, whose theoretical objects are given in advance and then examined from a variety of viewpoints, linguistics presumes "that it is the viewpoint that creates

the object."[10] A word, for example, is nothing more than a sound arbitrarily associated with the expression of an idea, such that the same idea can be expressed by a variety of sounds, with no final criterion for determining which word/sound best expresses it. Thus, the study of language engages a number of dualities that necessarily reflect certain unities. For example, there can be no speech without thought, yet without speech, thought will find no articulation; it has both an individual and a social side. Even though individuals use language to speak and so to think, speech has no meaning unless language is itself a social institution. To fix attention on one side of these dualities, Saussure argues, would lose a consideration of the other. Similarly, to focus exclusively on either information's material or cognitive aspects risks overlooking an important part of its reality.

Saussure concludes by saying that speech, and so communication, is a combination of physiological production of sounds, a physical transmission of sounds, and a psychological association of sounds with sound-images that signify concepts or ideas; a combination which must occur in a social context that associates the same sound-images with the same concepts for most speakers.[11] Speaking (*parole*) is individual, willful, and intellectual—a code that allows speakers to express their own ideas; in contrast language (*langue*) is a social phenomenon, with a history and existence independent of any given speaker, while passively assimilated by speakers who share the same culture.[12] Meaning, the associative element, is created in the moment of speaking a language, thus uniting of *parole* and *langue*.

The parallels between language and information are striking. Saussure's work suggests that text can be regarded as something akin to *parole*. It is willfully created by an individual who wishes to communicate with others. It is unique, a product of choice, and almost unlimited with regard to what it might be. The actual number of ways in which words, musical notes, images, or colors can be put together in order to express an idea has not and likely cannot be counted. The content of a text, on the other hand, is much like *langue*. It is a social phenomenon, constrained by history and culture and serving as the shared set of concepts and meanings from which texts are constructed. For example, a text that is composed from "information" that is not shared in some way by writer and reader will be incomprehensible to the reader.

Unfortunately, as information science lacks the equivalent of Saussure's distinction between *parole* and *langue*, the word *information* must do double duty, signifying both speech (regardless of its medium) and thought (both text as wells as content). This condition contributes to

theoretical confusion in information science and is at the heart of Fairthorne's frustration with the word. Saussure was aware of an irony regarding his own use of certain words to refer to certain ideas when he wrote "all definitions of words are made in vain; starting from words in defining things is a bad procedure."[13]

Parole and *langue*, like information, have tangible qualities, and they can be reduced to conventional written symbols, but they also represent the collective storehouse of concepts and ideas that provide us with something to talk about.[14] When Saussure argues that writing is merely sound images in tangible form, he comes close to saying that text, regardless of its medium, is merely the tangible form of information. Information then, is the sign that unites text and content.

But what is the nature of this sign, and how can it help us to understand the nature of information as a theoretical object? If definition is inadequate as a means of relating things to words, what procedure is recommended? Saussure's answer begins with the idea that language is not constituted merely by the process by which a word corresponds to the thing it names. Such an approach, for example, would also assume a one-to-one correspondence between the subject of a text and a word that names that subject. If ready-made ideas existed in the world simply waiting to be named, this approach might make sense, but unfortunately, the linking of a name to a thing is not that simple. What, for example, of such subject-naming words as *democracy* or *love*?

Rather, says Saussure, the linguistic sign is a "double entity," uniting not a thing and a name, but a concept and a sound-image.[15] This sound-image can take the physical form of a spoken or written word, but the forms themselves are entirely arbitrary and by themselves without meaning. They merely stand in for a sound-image that psychologically realizes a concept. The sign then is a two-sided psychological entity in and through which concept (which he calls the signified) and sound-image (the signifier) are intimately united. Each recalls the other (Figure 11.1).

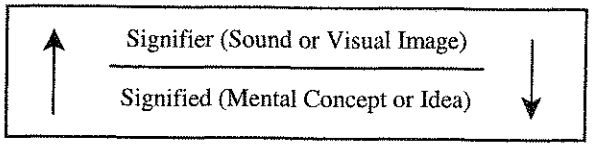

Figure 11.1 The Sign

The signified is an idea or mental entity grounded on some referent in the social or material world. The signifier is the pointer or the signal of the presence of that idea and its deployment in discourse and communication.[16] According to Saussure, the sign displays two "primordial characteristics." First, it is an absolutely arbitrary construction. The signified is not linked to the signifier by any inherent relation between the two. For example, there is no reason why *a tree* should not be named *un arbre*, as indeed it is in French. There is nothing about the idea or the reality of a tree that determines the way in which it is signified. Second, the signifier is linear in nature. It unfolds in time, as sound in speech, and as a spatial line in writing. To receive the communicative message of the signifier, we must wait for it to unfold the signified.[17]

Again, the affinity of the "sign" and the "informative object" as theoretical objects is striking. To receive the communicative message of a text we must wait for it to unfold its content. There is also an arbitrary quality in the relation of text to content—that is to say, many different ways of saying the same thing. Outside of the language of mathematics, there is no absolute determinate relation between text and content. This one exception, however, reveals a disjunction in the above analogy. The relation between text and content can never be entirely arbitrary as is that between signifier and signified; as soon as the relation between the latter two linguistic elements has been fixed in the sign, any given sign in a text will convey a certain relatively a priori fixed content. It is precisely this condition that makes possible the organization and control of texts for the purpose of access.

Still, the informative object, in a manner similar to the sign, realizes its existence by means of a unity created through a relation between text and content. The former acts as the signifier and the latter acts as the signified. Texts as signifiers are themselves composed of signs, and so texts must also unfold their content in time. However, while the representation of content within a text necessarily conforms to Saussure's notion of the arbitrary quality of signifiers, the representation of texts for the purpose of access cannot follow this precept. The assignment of an index term to represent a text and its content, for the purpose of retrieval is a second order signification, and it cannot be arbitrary. On the contrary, the index term, as a signifier, must be selected on the basis of an a priori logical and semantic relation to the text it will signify. Indexing languages, represented by thesauri, are consciously and deliberately created to avoid arbitrariness and ambiguity as much as possible. Without this kind of control, information remains elusive, disorganized, and, as a result, inaccessible. Now we truly confront a

dilemma. If we are to consider the sign and the informative object as being the same kind of theoretical phenomenon, we must resolve the apparent contradiction between the former's essential arbitrary nature and the essential need to control the latter.

Saussure's insight regarding the simultaneous mutability and immutability of the sign provides a way out of this dilemma. The sign is an arbitrary creation because any sound-image or word can be used as a signifier, yet it is also fixed. Thus, language appears to a speaker as a given. It is determined by a community of speakers who share a language and sustain it historically by means of convention and tradition. Each speaker passively receives it as a routine and everyday matter of childhood. In other words, signs, are relatively unchanging despite their essentially arbitrary quality. At the same time, the sign "is exposed to alteration because it perpetuates itself," and over time results in "a shift in the relationship between the signified and signifier."[18] Language is a social institution, says Saussure, and its arbitrary quality is precisely what opens it to change, but such change is likely to be slow and more likely to occur to signs whose meaning can be culturally contested.

The informative object, like the sign, is relatively immutable. Although arbitrary in the sense that the signs used to compose a text are essentially arbitrary in nature, once the selections are made and the text composed, it remains fixed and will not recompose itself. While a new edition of a book may be published to replace a prior one, it is a *different* text. Similarly, certain words can be lifted from a document or chosen from some other source to describe the contents of a document because of their generally accepted meaning and their relation to the content of a text.

At the same time, we recognize that information, if not the informative object, can experience change over time. An object that was once informative becomes obsolete and loses its power to inform. New information is created as the conditions of existence change and new referents are created, and informative objects that once meant one thing now come to mean something else. In these instances, the relations between texts and their content manifest change. As a signifier, the text remains constant, but as a signified, the content changes as the viewpoint brought to bear on the informative object changes. This changing relation between text and content and between signifier and signified constitutes a change in the meaning of the informative object, as new meanings are assigned to existing objects. This simultaneous immutable and mutable quality of the informative object allows the possibility of second order representation for the purpose of organization and access. This quality

also implies that while indexing languages must necessarily change over time if they are to adapt to the way information changes, this change will occur slowly so as to allow the ordering and control of information, much as a culture orders and controls the meaning of signs.

In other words, information, constituted by informative objects is like language constituted by signs. Both are social institutions subject to the same social forces and same kinds of change that can and do result in changes of meaning that reflect changing realities. Yet each also displays a relative stability that offers the possibility of its control. The meanings manifest in and expressed by both unfold and change over time.

The Role of Time Regarding Meaning and Value

Time has another role to play in signification, and this role and its implications reveal another essential attribute of the sign and its affinity with the informative object. In order to create and express meaning, signs engage value as well as signification. The meaning of a sign as an instrument of communication depends simultaneously on signification and value, on the relations between signifier and signified within the sign, and on relations between signs. Like signification, value and, therefore, meaning unfold through time by means of exchange. According to Saussure, language manifests "a system for equating things of different orders."[19] This condition implies that exchange relationships exist allowing the substitution of one thing for another. As in economics, for example, one commodity can be exchanged for another; in language, a signifier is "exchanged" for a signified. The sign's function of linking *parole* and *langue* through such an exchange makes possible our ability to form sentences that we have never before spoken and to understand sentences that we have never before heard.

This condition implies that language manifests two axes of reality. In Figure 11.2, modified from Saussure, *AB* represents the axis of simultaneities and manifests the relations of co-existing things. (Note that the intervention of time is excluded from this axis of reality.) *CD* represents the axis of successions; while only one thing at a time can be considered, it is the axis on "which are located all the things on the first axis together with their changes."[20] Taken together these axes describe a dual reality constituted first by a system of substitutable values, and then by a system of values that are interrelated with respect to time. Saussure uses this idea to make clear that language has both synchronic and diachronic aspects. In order to understand the given state of a language, one must ignore its diachronic aspects. In order to understand how a language is changing and has changed, one must ignore its synchronic aspects. Both of these tasks cannot be undertaken at the same time.

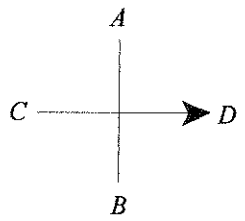

Figure 11.2
Simlutaneities and Successions

This condition of language recalls O'Connor's application of synchrony and diachrony to information. As text, information displays a synchronous character. It manifests itself as information-as-thing, possessing certain invariant attributes whose presence qualify any object as potentially informative and intrinsic to the text itself. It also allows a relatively objective description of the topical aboutness of a text along the lines of Hjorland's notion of true statements that can be made about a text. In turn, the synchronous nature of texts allow them to be classified according to their synchronous attributes, and this condition immutability allows one text to substitute for another in the sense that all texts paradigmatically assigned to the same classification are presumed to be about the same subject. Each text is a specific instance of the general representing category.

As content, however, information demonstrates its diachronous character and its mutability. This is not to say that the content of a text literally changes over time. Recall that once a sign fixes a relation between signifier and signified, by convention, a certain stability of meaning is established. A book using certain signs to speak of animals will not somehow become a book about furniture, but as we are about to see, the value and so the meaning of that content can change as a function of the perspective from which the text is viewed. Certainly time can cause such a change in perspective. A novel one reads in high school may reveal entirely new meanings when reread as an adult.

Time, however, is not the only factor that can affect a reader's

perspective. Intertextuality is also at play in two ways. First, just as a given in an ensemble of texts changes from the addition of new texts and their content, the role played by the content of any given text in the ensemble may change between the extremes of seminal and obsolete. Second, as readers come to know the content of more texts about a given subject, their assessment of the value and meaning of the content of any given text they already know may change.

To apprehend information as an object of control for access, we must engage the synchronous aspects of information. We cannot anticipate changes in the value and meaning of content; and even if we could we might easily find ourselves in a state of utter inconsistency and confusion resulting in a complete breakdown of control. In order to account for the nature, behavior, and representation of information at any given time and to design and execute systems of organization and access, we cannot concentrate too closely on how the meaning of information changes. But control of information has another aspect manifest in the judgment of its relevance. For that purpose we must ignore the synchronous aspects of information and instead engage the diachronous and intertextual relations of content in order to understand why the meaning of a text changes.

Roland Barthes insight regarding how the value of a sign is established helps to resolve this dilemma. To begin with, we have to understand that a sign is not an abstraction but a real object. It is a concrete entity whose existence is determined by a material as well as cultural and psychological association between signifier and signified, such that if only one of these two linguistic elements is retained, the entity of the sign vanishes.[21] Attempting to understand the sign by exclusively focusing on but one of its elements runs the risk of mistaking a part for the whole. Saussure writes that "[a] succession of sounds is linguistic only if it supports an idea."[22] The same can be said for the succession of elements that make up a text or a succession of texts, for that matter. Without a signifier, however, the potential signified remains an abstraction of pure thought. Again, Saussure reminds us that concepts "become linguistic entities only when associated with sound-images; in language a concept is a quality of its phonic substance just as a particular slice of sound is a quality of the concept."[23] If the sign exists only through the relation between signifier and signified, then likewise, information exists only through the relation between text and content—or in other words, through the relation between its physical and cognitive aspects.

Both the sign and the informative object consist of two intimately and inextricably linked elements, but this link alone cannot define their

reality. Both must be delimited and related to others of their kind before they can be defined and understood. Both unfold their role and meaning over time. A foreign language, for example, does not immediately or explicitly reveal how to analyze its sounds. To do so, the speaker must know the meaning and function of particular sound-images in the context of their relations to other sound-images. Saussure writes,

> just as the game of chess is entirely in the combination of the different chess pieces, language is characterized as a system based entirely on the opposition of its concrete units. Language then has the strange, striking characteristic of not having entities that are perceptible at the outset and yet of not permitting us to doubt that they exist and that their functioning constitutes it. Doubtless we have here a trait that distinguishes language from all other semiological institutions.[24]

However, contrary to his final statement, there may be at least one other semiological institution that manifests the same trait: information.

Consider Saussure's discussion of the identity of the sign by means of the example of the 8:25 PM Geneva-to-Paris train. What constitutes the identity of this "train"? It is always, everyday, the same train, even though it is very unlikely that it is literally composed of the same locomotive, the same coaches, or the same personnel on every trip. The key to the train's identity lies not in its inherent material elements, but in the differences between it and other trains as manifest in a system of "trains" composed of routes, schedules, leaving points, and destinations. Still, one cannot conceive of the train's identity outside of its material realization. It is not merely the idea of a train that travels from Geneva to Paris, but the value of "train" given by what it signifies and by its relative position to other "trains." Saussure explains this condition by reminding us that,

> language is a system of pure values which are determined by nothing except the momentary arrangement of its terms. A value, so long as it is somehow rooted in things and their natural relations . . . can to some extent be traced in time if we remember that it depends at each moment upon a system of coexisting values.[25]

In other words, the meaning of a sign depends not only on the relation between signifier and signified, but also on an identity and value based on its relative position in a system of signs—in other words in a language constituted by other signs.[26] This conclusion suggests that the value and meaning of an informative object, for example a text, depends on both

the relation between text and content and on an identity based on its relative position in a system of texts, i.e., in a discourse constituted by other texts.

Information and the Sign

At this point, some tentative conclusions are in order. The affinity and kinship between the informative object and the sign and between information and language as theoretical objects is based on the fact that all informative objects are necessarily signs ultimately expressive of a relationship between a signifier and a signified. The sign, although a material object, is always much more than just that object. It is also a psychological and cultural entity. Saussure makes this point when he writes that linguistics "works in the borderland where the elements of sound and thought combine; *their combination produces a form, not a substance.*"[27] The fox running across my lawn in Tennessee is *le renard* scampering through a field in France, and of course neither word is the animal I see. Both signs are merely forms that represent a substance. Only a community can create a language. The meaning of a sign in the form of either a spoken or written word is entirely a product of convention, common usage, and social acceptance. Still, we must remember that language is also a system. Its elements—its sound-images and concepts—derive from a system of elements whose role in the system of language necessarily depends upon their relations to one another. Meaning, whether of sign or informative object, cannot be understood outside of a context determined by its intertextual relations with other signs.

Like linguistics, information science works in the borderland of two elements: text and content. This borderland is the terrain of aboutness, representation, relevance, and their contribution to the organization of and access to information. In this borderland, an informative object, its content, and its meaning meet as a necessary step in the determination of its relevance to an information user's need. As with the linguistic situation, this situation engages an exchange of values. For access, in particular, content is first exchanged for text, then text for representation. This process represents the signification of aboutness. Access, however, is complete only when need is satisfied. To do so a need must be exchanged for a query signifying that need, which in turn is exchanged for representation to produce retrieval of information.

From the perspective of an information user, a mirror image of this process then occurs. At the moment of retrieval, representation is

exchanged for text; upon reading, text is exchanged for content and if access is successful, content is exchanged for relevance and the satisfaction of need. In short, content is exchanged for knowledge. From the point of view of a user of information, aboutness and relevance are themselves merely different moments of the same phenomenon. For example, we predict, on the basis of a match between a query term and an index term, that retrieved informative objects will manifest an expected value we call relevance. However, if a system of information organization and retrieval fails to signify the relevance of potentially informative objects to its user, that system has failed. In the final analysis the determination of aboutness and relevance is both mutual and reciprocal, and the product of this relation is information. Information, to be relevant to its user, must be about the user's need.

To abandon the argument at this point, however, is to overlook the basic fact that information relevant to a user must be meaningful as well, which in turn recalls the notion that meaning is a product of signification and value. However this condition is one that information science implicitly addresses, but tends not to fully grasp. On the one hand, the physical metaphor emphasizes the materiality and immutable characteristics of the informative object as both a theoretical construction and an object of control, which is somewhat like treating the signifier alone as the sign. The cognitive metaphor, on the other hand, embraces the arbitrariness and mutability of the informative object and recognizes that aboutness, and as a result relevance, must be constructed from extra-textual imports, and this is analogous to treating the signified alone as the sign. Both metaphors make the same mistake of taking the part for the whole, although each directs attention to a different part.

Information is more than either of these metaphors convey on their own. It is the product of the relation between them, and like language, it is a system of signs whose values owe their existence and measure "to usage and general acceptance."[28] Its life depends on a community of users, non-users, and producers that agrees a given object is informative and, in turn agrees about its content and meaning. In other words, information science might well be regarded as a form of semiotics. It must embrace the relations of signification and value that produce meaning including relations between text, content, and representation. It must also embrace the relations between texts existing in a system of texts.

Finally, let us consider Saussure's notions of linguistic value, after which we can engage Barthes's insight regarding Saussure to arrive at an understanding regarding the nature of informative value and its relation

to meaning. A crucial property of the word, spoken or written, is that it stands for an idea. In other words, a word as a signifier posits a value, which is clearly an element in signification, such that any given sign is itself, potentially, a counterpart of other signs. The value of a sign depends not only on its general use and acceptance, but also on the simultaneous presence of the other signs.[29] Thus, language, speech, and meaning are constructed from relations between the signifiers and signifieds that constitute signs and the relations between signs, as illustrated in Figure 11.3. The relations that constitute *langue* and *parole* as communication, and assign values to each sign deployed in a discourse are the syntagmatic relations that exist between *A*, *B*, and *C*, the paradigmatic relations that exist between *A* and *A**, *B* and *B**, and *C* and *C**, and their interaction with one another. The simultaneity of

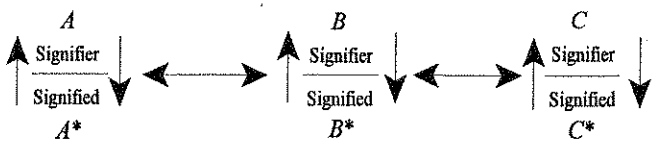

Figure 11.3
Syntagmatic and Paradigmatic Relations

syntagmatic and paradigmatic relations is the source of meaning.

All values, even those outside of language, are always composed of dissimilar things that can be exchanged for one another as well as other comparable things. Saussure writes,

> Both factors are necessary for the existence of a value. To determine what a five-franc piece is worth one must therefore know: (1) that it can be exchanged for a fixed quantity of a different thing, e.g. bread; and (2) that it can be compared with a similar value of the same system (a dollar, etc.). In the same way a word can be exchanged for something dissimilar, an idea; besides, it can be compared with something of the same nature, another word.[30]

From a conceptual viewpoint, value and signification although intimately related, are not at all the same thing. The value of a word, functioning as a signifier within the system of language, depends not only on its signification but on its opposition to other words. In other words, the content of a word and the value of a sign "is really fixed only by the concurrence of everything that exists outside it."[31] The fullness and essence of the sign and the meaning it expresses depend as much on opposition as affinity, on difference as on similarity, and finally on the reciprocally determining relations of within and between signs.

From a material viewpoint, as noted earlier, this conclusion implies that "it is impossible for sound alone to belong to language."[32] The sound-image is a necessary tangible element that supports value and meaning, but on its own it is arbitrary and meaningless. It merely differentiates between one signifier and another. The same condition holds true for letters and their combination in writing. Distinct sounds, sound-images, and words in print constituted by combinations of letters are all entirely arbitrary with respect to signification, serving only to mark the difference between one sign and another.[33]

The above has profound implications for informative objects. While absolutely necessary to the process and communicative purpose of informing, objects are arbitrary, serving only to mark off differences between one meaningful instance of communication and another. This condition is as true of documents as it is paintings, pieces of music, buildings, and any other object that human beings by convention agree upon and, by means of that agreement, constitute as being informative and culturally meaningful. This not to say that particular attributes of such objects do not imply their informative potential and cannot be used to organize and control them for the purpose of access. Their meaning, however, is not due to these attributes in and of themselves, but rather depends on the relations that exist within and between them in a system of signs and signification. As Saussure says,

> in language there are only differences. Whether we take the signified or the signifier, language has neither ideas nor sounds that existed before the linguistic system, but only conceptual and phonic differences that have issued from the system. The idea or phonic substance that a sign contains is of less importance than the other signs that surround it. Proof of this is that the value of a term may be modified without either its meaning or its sound being affected, solely because a neighboring term has been modified.[34]

In sum, signs, including all forms of informative objects, do not stand

on their own declaring their meaning and signification as independent entities. The substance of both language and information remains elusive. Everywhere and always, the relations among and between the material objects that constitute each necessarily mutually establish and condition one another's existence and meaning.

The Semantics of Informative Objects

In an essay entitled "The Semantics of Objects," Roland Barthes begins to explore this phenomenon in a way that has profound implications for information as a theoretical object.[35] His project is to extend Saussure's semiology by trying to understand how humanity gives meaning to things that are not exclusively linguistic in nature: How do such objects signify? At the outset, Barthes grants "a very strong sense to the word *signify*:"

> we must not confuse *signify* with *communicate*: *to signify* means that the objects carry not only information, in which case they would communicate, but also constitute structured systems of signs, i.e. essentially systems of differences, of oppositions and of contrasts.[36]

This point raises some intriguing implications regarding such deliberately informative objects as texts and for information science as the study of information in its textual form. It means that texts as objects, whether composed of sound-images (words) or other kinds of images (pictures, music, etc.), not only communicate, but signify. Like any system of signs, they too constitute structured systems of differences—oppositions and contrasts. Their meaning cannot be understood outside of a context created by the system of which they are a part. To study information then requires that we engage the informative object's place and role in a system of informative objects and its meaning in the context of that system. We must also be aware of how that meaning can change as a result of changes in the system, including the addition of new objects and the withdrawal of old ones.

Barthes's description of how we conventionally define objects resonates with the way information science tends to approach and discuss texts as objects of utilitarian value except that his purpose is to critique this approach. Objects appear to us in the world as things ready-made to fulfill a function, their use-value apparently self-evident. These appearances may be misleading.

> Ordinarily, we define the object as "something used for something." Consequently the object is at first glance entirely absorbed in a finality of use, in what is called a function. And, thereby, there is, we feel, a kind of transitivity of the object: the object serves man to act upon the world, to modify the world, to be in the world in an active fashion; the object is a kind of mediator between action and man.[37]

Substitute the word *text* or *document* for *object*, and Barthes will have provided us with a very serviceable definition of *information*. Although his concern in this essay is for the meaning of nontextual human fabricated objects, his argument reveals the nature of the informative object which is of central concern to information science. The function of an object, however, even that of an apparently functionless character, is always at play in its signification and value. In other words, objects are imbued with meaning.

Upon perceiving an object, including a text, we are always faced what it means and what it *means*. The first sense of meaning is a product of how an object signifies its function and is related to its literal and obvious use. It is derived from the attributes that characterize, identify, and are determined by its function and use. These attributes in turn imply an object's signification, the reasons for its use, how it is apt to be used, and the conventionally expected ends that its use obtains. On the other hand, the second sense of meaning is a product of its syntagmatic role in a system of meaningful objects. (At this point, Barthes recalls Saussure's discussion of the meaning of signs, and extending its implications to meaningful objects in general.) The syntagmatic role of an object alerts us to other objects and other meanings to which it is systematically related, and reminds us that when objects are combined in certain ways, they can compose a message, a story, and a meaning that no one of them, or even all of them if viewed serially and without connection, can convey. While each object is unmistakably informative, another meaning and a different kind of informative quality arises from their combination. This intertextuality holds for texts that constitute a discourse as it does for words that constitute a text, and it makes possible the logical organization of texts for the purpose of access.

Bathes uses the following example to illustrate his point.[38] The appearance of a telephone by itself conveys a certain meaning attributed to it by its function. It is a mechanism of telecommunication, although even here one must remember its essentially arbitrary nature as a sign. To someone of a culture that knows nothing of electricity, let alone telecommunications, the function of a telephone and its signification will

elude understanding. Even if such an understanding can be taken for granted, however, the context within which the telephone appears must be considered. If it resides on a stand next to a bed and matches the decor of the bedroom, it implies domesticity, a certain kind of taste, and perhaps a desire on the part of its owner to be easily available to friends and family. If it appears on the desk of a teacher or a corporate executive, style is likely to be less relevant, and function more so, although in each instance these functions will differ. Similarly, the absence of a telephone in the bedroom might imply that I don't wish to be disturbed while I'm sleeping, while the absence of one on my desk at work might imply that I'm not important enough to warrant a private means of communication with the outside world. In each case, more information is needed in order to fully determine the content and meaning of the scene. The point is that the second meaning of the object, the one beyond its immediate signification, depends not only on its function but on *something else*: the cultural, and perhaps ideological, role played by the object in a system of objects, such that it serves to signify its user as well as itself as a sign.

In information science we frequently encounter the same kind of phenomenon. Two texts, for example, may be "about" the same subject. They have a similar if not identical function and are intended to accomplish similar if not identical ends. From the perspective of the physical metaphor, they might very well be treated as equivalent and represented in a retrieval system by the same index terms. There may indeed be very many good reasons for this choice, not the least of which is that the same words extracted from the texts occur in the same order of frequency for both of them. In effect, they can be regarded as belonging to the same paradigmatic order and they are substitutable. From the perspective of the cognitive metaphor, what matters is the difference between the texts, especially if their relation is one of opposition regarding the their subject. Two users, based solely on the literal aboutness or function of the two texts, might find both relevant to their need for information. Conversely, it is entirely possible each will arrive at a different conclusion regarding the texts' relevance or irrelevance. One source of this difference will be each text's unique and different interpretation of the subject. Another will be the categorical differences that separate the users themselves. The nature of the use made of each text by each user signifies something about those users and their differences, and about the different role each text plays in the discursive formation of the subject in which our two users are participants. The meaning of each text, despite their similarity of aboutness, is revealed only in the opposition present in their intertextual relation. For both of our hypothetical users one text (and not necessarily the same text) is "right" and the other is "wrong."

Now let us consider two articles on the labor theory of value. It is plausible that each will be indexed in a similar if not identical manner, given that the function of each is to explicate the theory. As informative objects, each can stand as an equivalent of the other, yet one may be an expression of classical economics and the other an expression of Marxist economics. While each is likely to be signified by index terms that point to theories of value and Marxism, their reader, depending on his or her own politics, might view one as evidence of a wrong-headed Marxist ideology and the other a dissimulating bourgeois apology. In other words, the full essence and meaning of each article will stand revealed only when its place and role in a discursive formation regarding the labor theory of value is determined with respect to a reader's interpretative context, despite indexing that is neither inaccurate or inadequate when the articles are considered exclusively in terms of the objective attributes of their aboutness. The meaning of signs, including texts, depends on the relation between signifier and signified within them and their opposition to and affinity with other signs.

This task is less difficult for some signs that it is for others. Recall Saussure's point that the value of a sign depends upon its general social use and acceptance. The practice of science, for example, arguably represents the most rigorous social method of disciplining discourse. The signs and their relations by which scientific discourse is constituted are fixed by theories and operations precisely as a means of fixing their meanings to the greatest extent possible. Signifiers such as "velocity," "distance," and "time" in the discourse of physics are associated with signifieds that are fixed by theories and the operations that measure the realities they represent in way that admits slowly to challenge. Science, however, is not the only human activity whose discourse manifests this stability. "Marriage," for example, is a sign whose value is fixed not only by law but solidly reinforced by conventional behaviors and cultural practices. As we move from definition to experience, however, we begin to lose control over the value of signs. Does "time" mean the same thing to a child as it does to a dying man? For both child and man, a second hand on a watch will click sixty times to yield the passage of a minute, but the experience of that passage may mean one thing to the child and something very different to the man.

In some domains of human activity, convention may be contested or even nonexistent. Widespread use and acceptance of the value of a sign may be difficult to come by. A political scientist might theoretically and

operationally define a democracy as a polity in which government officials are selected by means of free and fair elections under conditions of genuine competition. It is equally possible that even under these conditions the same people always win, then use their official positions, to enrich themselves and their supporters. Does the reality of democracy depend at least as much on the ends achieved by a government as it does on the means by which it is constituted? What is actually meant when a speaker describes a nation-state as a democracy? And depending on the actual nature of that state, what might this statement signify about its speaker?

Clearly, convention is ambiguous regarding signification and value, a situation which has profound implications for the representation and relevance of information. Given that the conditions for which convention is an unreliable guide, resulting in the use of a sign whose signification and value is contested, how do we determine what is being spoken and how is being spoken about?

This problem resembles what Barthes calls the "sign-function."[39]

> The sign-function bears witness to a double movement, which must be taken apart. In the first stage (this analysis is purely operative and does not imply real temporality) the function becomes pervaded with meaning. This semantization is inevitable: *as soon as there is society, every usage becomes a sign of itself*; the use of a raincoat is to give protection from the rain, but this use cannot be dissociated from the very signs of an atmospheric situation.[40]

We are again dealing with the issue of what a sign means and what it *means*. The raincoat's function is apparent and gives meaning to it as an object, but it also speaks of how we react to a situation. At the very least, it says that getting wet is not a desirable condition. If we investigate the material and the style of the raincoat, we can learn even more about the person wearing it and the culture within which he or she lives. As a sign, it unfolds its meaning.

Information science can benefit from Barthes's analogy by recognizing that texts are not only composed of signs, they are themselves semiological signs that constitute semiological systems we know as discursive formations. Thus, text as signifier and content as signified are intimately linked to produce a kind of sign called an informative object, whose value and meaning are called information. Such signs are utilitarian and functional, in that they imply a use and a signification, yet they also manifest the double movement of Barthes's sign-functions.

Within the discourse they constitute, their meaning depends on their role in that discourse as well as their self-contained characteristics.

Information then is manifest by two languages speaking simultaneously. A first-order language, operating within the context of convention, expresses the function of a text and what it has to say about a subject in order to communicate, inform, and convey knowledge. However, an easily missed second-order language, speaking about how a subject is spoken about and why is also present. This second-order language is crucial to the value of a text—its meaning as a sign—because it relates to cultural, historical, and ideological meanings that are not necessarily explicit.[41] It is possible that producers of texts do not intend for these meanings to be explicit. It is possible that producers of texts are themselves unaware of the implicit meanings they impart to their texts. And it is possible for a user of a text to read a meaning into it that is independent of its producer's will.

As noted earlier, science seeks to avoid such problems through vocabulary control, although this discipline can and sometimes does break down. During times of paradigmatic contests that Kuhn argues are central to scientific revolutions, it is possible to find scientists using the same *parole* to, in effect, speak different *langues*, or as Barthes would put it, the same "lexic" is deciphered differently. Two early seventeenth century astronomers, for example, might observe the "movement" of the stars across the night sky. For each the signifier is constant, yet one takes it literally to mean that the stars are moving while the other employs it metaphorically to describe an apparent action that results from the fact that the earth is moving. When each observes the same phenomena and even agree on the objective nature of their observations, they differ regarding the meaning and theoretical implications of their observations. In the social sciences, not to mention other discourses that make even greater use of metaphorical signs, the possibility of an incongruence between the first-order and second-order language that constitutes a text, between its *parole* and its *langue*, is exacerbated. As a result, such texts and the discourse they in turn constitute are difficult to control for the purpose of access, as their aboutness and relevance to a reader are shrouded by an inherent ambiguity. An informative object then is likely to be a kind of sign for which the impossibility of dissociating and differentiating between signifier and signified, as much as it is to be desired, will not be easily realized, and information itself is likely to remain an indeterminate theoretical object.

In its approach to "information" as a theoretical object, information science tends to deploy two dominant metaphors, each of which attends

to a different aspect of the informative object as a sign. The physical metaphor attends the signifier and its structural, logical, semantic, syntactic, and paradigmatic relations to other signifiers. Meaning is conceived as a matter of equivalencies between signifiers and is based on the notion that it is possible, on the basis of their functional attributes, to identify signifiers that can stand in for one another and to organize them in a way that controls information. From this perspective, "information" is a material, tangible, and rule-bound phenomenon that is external to consciousness and manifest in the informative object's role as sign-function in discourse. The physical metaphor attends the first-order language of texts.

In contrast, the cognitive metaphor attends the signified and its intellectual, affective, and meaningful relations to a user of information, and to other signifieds or concepts, especially concepts that a users brings to a reading of a text in order to interpret it. Meaning is conceived as a matter of differences, particularly in terms of the difference a text makes to its user and what difference is made by a user through the use of a text. At issue here is how the knowledge, experience, and reality of a user is changed through the use of a text. From this perspective, "information" is a non-material, intangible, creative phenomenon—essentially a matter of consciousness—and manifest in the content of an informative object. The cognitive metaphor attends the second-order language of texts.

In other words, the physical metaphor is concerned with the paradigmatic aspects of information while the cognitive metaphor is concerned with its syntagmatic aspects. This condition can be nicely illustrated by another of Barthes's analogies. Food is a sign system that displays a unity of paradigm and syntagm. The paradigm or system, as he calls it, is constituted by "a set of foodstuffs which have affinities or differences, within which one chooses a dish in view of a certain meaning: the types of entree, roast, or sweet." The syntagm is constituted by the "real sequence of dishes chosen during a meal: this is the menu."[42] Likewise information can be regarded as sign system in which, on one hand, there exists a set of texts within a discourse that have affinities or differences and, on the other hand, real sequences of texts actually chosen in an access situation. Indexing, or any other form of information control, brings to bear texts that exist in paradigmatic relation to one another, based on affinities or differences regarding their aboutness. Each text of the same paradigmatic order can in some way be substituted for any other text in the order. One chooses, i.e., retrieves, a text in view of a certain meaning that applies to all texts of a given order. Ordinarily, successful access is conceived as a matter of selecting texts whose paradigmatic order matches that of a query. However, a query can be complex, requiring the making of a menu such that it may be necessary to select texts from a variety of paradigmatic orders; topics, approaches, theories, and methods represent a few of the more likely types of texts that might be chosen.

Still, the selection of texts is only a part of access. How do the texts go together? How do the "tastes" of these texts combine? Let us consider the problem of a menu. Different types of dishes, and a wide variety of dishes from each type, may be selected to make a meal, but does that ensure the meal yields satisfaction? Does it deliver the desired experience? Does it appropriately signify the diner's wishes? What exactly does it signify about the diner? Does it signify something about the diner in the same way a raincoat signifies something about its wearer? These kinds of questions can be answered only by determining and investigating the syntagmatic relations between the objects selected—by the real sequence of objects chosen, from among texts or dishes, in a particular instance of choice. Regarding a meal, we can ask if the selection of a different particular dish from a type of dish, or a different type of dish altogether from among the types available, would make a difference to the meal and its experience, not just because there are differences, but because of the way these differences affect their unity as a combination?

The same condition holds true for texts. Two texts from the same paradigmatic order may not actually be entirely equivalent nor the difference trivial. Given a collection of texts retrieved in response to a query, the relevance of any one may depend as much on how it combines with the other texts selected as it does on any inherent attribute of the text itself and reminding us once again of the nature and consequences of intertextuality. The meaning of a single text in a discursive formation depends on its relations with all of the texts in that formation. Some combinations of text may yield only confusion, while other combinations yield an insight that could not have been anticipated. Clearly, both paradigmatic and syntagmatic aspects of information are related to relevance.

The "wrong" text can spoil a search for information in the same way the "wrong" adjective can spoil a sentence or the "wrong" dessert can spoil a meal. Let's suppose we've executed a search in an online database whose search strategy is "*A* and (*B* or *C*)", where *A*, *B*, and *C* are our search terms. We expect our results to include a set of documents that have been indexed with either term *B* or *C*, and this set is then examined for only those documents within it that have been indexed with term *A*. Let's further suppose that term *A* retrieves two documents, *x* and *y*. Both

are "right" in the sense that the subject of both is accurately and adequately characterized by term *A*, but *x* is "wrong" in the sense that it will not contribute to a solution of the problem that motivated the search. If at least one of us has knowledge enough reject *x* as irrelevant, then we will be able to combine the documents indexed with *A*, *B*, and *C* in a way that will create a useful problem solving syntagm. Any other combination can cause problems. For example, if *x* is accepted, and *y*, which is relevant to our problem is rejected, or if *y*'s "rightness" influences our judgement of *x* and we accept both, or if *x*'s "wrongness" influences our judgment of *y* and we reject both, then we are likely to find ourselves in a state of confusion. Similarly, all of these problems can easily influence the reading and ultimately the relevance judgment of the texts retrieved with terms *B* and *C* that are associated with texts retrieved with term *A*. Thus, successful access to information, like a successful meal, depends not only on the individual items presented, but on their collective identity as an ensemble. It is entirely possible that a dinner of 'information' can be spoiled by the inclusion of the "wrong" dish.

Conclusion

I began this book with the assertion that "information" is an indeterminate theoretical object, not because its essence forever eludes understanding, but because it can be plausibly determined in so many—often incompatible— ways. The physical metaphor's positing of information-as-thing and the cognitive metaphor's positing of information-as-thought can now be regarded as different and differently articulated moments of the same phenomenon. The separation between these views is practical rather than categorical, a means of holding one aspect of information in suspension in order to examine another. Given our state of knowledge, this strategy is probably necessary and will be useful so long as we keep in mind that "information" is both thing and thought, and neither.

Information, like language, is always already everywhere. It is a given in things, processes, and minds, and it is a social institution—a well of shared knowledge and meanings conventionally attributed to reality. This attribution is signified through various of ways of knowing, including science, religion, ideology, and folklore. Like all cultural products, information assumes material form, and so its assumed identity as something natural and external to the self appears plausible, but its sources in culture reminds us of its reality as internal to the self. Information, manifest in material form, collectively exchanged, and individually internalized is then a foundational substance of community.

But just as not everyone shares the same language, not everyone shares the same information. Both conditions contribute to the creation and identity of different communities. The nature of and extent to which discourses constituted by information are shared allows us to distinguish equivalences and differences that mark different communities as being closely related or distantly separated, integrated or disintegrated, relevant or irrelevant to one another, and in consonance or conflict.

Also, like language, information manifests a latency. It exists only as a possibility until it is deliberately constituted by signs. In the case of language, the deployment of signs unites *langue* and *parole*. Language itself and on its own does not communicate until spoken, but without it there is nothing to say. Similarly, the signs that constitute information are informative objects. Informative objects, however, are special kinds of signs, already composed of other signs such as words, images, and sounds. These other signs are collectively and logically assembled and intended to communicate. As a whole, they constitute text which can be regarded as a special kind of signifier. Its counterpart, the signified, existing separately yet in unity with text, is content (Figure 11.4).

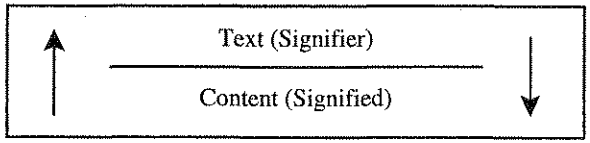

Figure 11.4 The Informative Object (Sign)

By means of the informative object, information is transformed into communication, a deliberate and intentional process known as discourse. From discourse in turn arise the discursive formations that constitute human reality. Like *langue*, information is shared and necessarily possesses a collective character. Like *parole*, the informative object is unique, the product of individual articulation and individual appropriation. Until information is given material form as an informative object, its reality remains latent. It exists as only one possibility, as Shannon might put it, among the many possibilities that could be communicated and play a role in a discursive formation.

However, in order for information to fulfill this role the informative object must be apprehended and appropriated by an interpreting subject, i.e., a user. Language does not come alive upon its being spoken but upon

its being heard. Texts must be read for them to release their informative potential. At the moment of reading, the apparent dualities separating information-as-thing from information-as-thought melt into air. *Langue* can scarcely be separated from *parole*, nor *parole* from *langue*. They imply, require, and condition one another's existence. Buckland's insight that information-as-thing and information-as-thought can be interchanged through information-as-process, specifically the process of reading texts and becoming informed, ironically confirms these three apparently different phenomena are overdetermined by their equivalences and actually represent different moments of the same phenomenon, namely the phenomenon of information.

In the moment of information-as-process, when a text is read, Popper's Three Worlds, Dervin's Three Informations, and all of Buckland's distinctions regarding information collapse into one another. Content is apprehended and its information is released for appropriation by the reader. Text (thing) and content (cognitive structure) are reunited by the act of using the informative object. This act is composed of physical and cognitive, individual and social aspects, from which information is re-produced. The unity of signifier and signified, of text and content, is inherent in the informative object; but to complete the act of communication requires a twofold act of participation. First, a willful apprehension of information on the part of an individual must occur in order to access and use an informative object. Second, a cognitive transformation of that object must occur for it to enter into a meaningful and relevant relation to the problem that motivates and conditions participation. If this participation does not occur, then informing does not take place, and information falls back into the well of latency and existential possibility. Earlier in this text I posed the question, if information falls in a forest and no one hears it, is it information? The answer can only be *yes* and *no*.

The most intriguing aspect of bringing Saussure's work to bear on information as a theoretical object is that it accounts for the apparent separation of information into its physical, cognitive, and social aspects, even as it suggests a distinctly unitarian way of theoretically reconstituting these aspects into a meaningful whole. This outcome is especially important given Frohmann's cogent critique of information science as a discipline that tends to look away from information's status as a social phenomenon with the potential to inhibit rather than enhance human freedom.

On a more practical level, bringing semiotics to bear on information science allows us to understand how and why the discipline developed

the two distinctly different research agendas observed by Ellis, one devoted to things and the other to people, when neither can operate without at least a tacit recognition of the presence of the other. Research based on the physical metaphor cannot entirely exclude people from its investigations of things. After all, the goal of this research is to provide users with access to information. Likewise, for the same reason, research based on the cognitive metaphor cannot entirely exclude things from its investigations of people. Each approach yields its insights precisely because it holds its apparent opposition with the other in suspension. The physical metaphor attends to the synchronous quality of information in its aspect as a signifier, and the cognitive metaphor attends to the diachronous quality of information in its aspect as a signified.

If we grant that information works like language, however, in ways congruent with both the physical and cognitive metaphor, then we can see how, through aboutness, representation, and relevance, the act of becoming informed involves the deliberate deployment and interpretation of signs. Both the objective attributes of texts and their interpretative apprehension and appropriation by subjects are located on the terrain of discourse. Aboutness, representation, and relevance are phenomena conditioned by social relations that constitute and are constituted by discourse. To paraphrase a well-known aphorism, this means that we can indeed *determine* the aboutness, representation, and relevance of information, but not exactly as we choose.

Information is clearly a matter of relations between thing and thought. However, thought and the discursive formations that sustain and reproduce it occur in a social context within which systems of information organization and retrieval, categories of aboutness, and a priori assumptions regarding relevance are, like language, socially constructed. No, these phenomena are not exclusively the products of power and expressions of a dominant hegemony, nor are rationality and choice subverted, precluded or denied. Neither is scientific investigation of the relations between thing and thought, and the means by which these relations constitute information, an impossible task, incapable of meaningfully advancing knowledge and solving of human problems.

Rather what we legitimately and conventionally determine to be information and informative is constrained and contingent on particular ideological, historical, and cultural conditions; and rationality and choice, while governed by rules that may indeed be objective, initially arise from the need to maintain power and sustain social relations, whether progressive or oppressive. Information is undoubtedly a social institution, but the control of this institution may not be evenly distrib-

uted across all segments of society. A need for information may be conditioned by what a dominant culture recognizes as legitimate and useful information, such that a need for any other kind of information is deemed illegitimate. At the same time, we must bear in mind that these constraints need not be imposed by official agents of authority, nor are they signs of a totalitarian polity.

Open societies, for example, manifest far fewer constraints than closed societies, but in fact sanctions may be subtle and culturally imposed. In capitalist democracies, information as a social institution is increasingly characterized by its commodity status. Its production, distribution, and use is determined by markets which are notorious for both their efficiency at distributing social goods and their discrimination against certain goods and needs that fail to find or create a large enough market. Thus, while the market for information is clearly based on economic rationality, fairness and egalitarianism are not automatic outcomes.

Systems of information collection, organization, and retrieval, systems of information access, and the conceptions of "information" as a theoretical object: all may appear to be natural, objective, and conforming to regularities discoverable and describable by science, when in fact they legitimize and confirm some needs as they displace and marginalize others. The key to this self-deception, as Frohmann implies, and the reason why we accept it, is that rational processes of discovering truths about and organizing information for access are grounded on unconscious and sometimes ideological premises. Distortions of rationality occur not in the process of investigating problems but in the moment of identifying and defining them. Now here is the truly intriguing point. Even if information is not a social institution of hegemony and power, even if relevance is not predetermined by what is it allowed to be, and even if information needs are not ideologically conditioned, it still stands to reason that none of these phenomena are free of situational contingency. We must still investigate the historical and cultural contingency of "information" as a theoretical object, and the influence of this contingency on whatever means we employ to understand the crucial theoretical dimensions of information: aboutness, representation, and relevance.

"Information" as a theoretical object is in an unenviable position. It must somehow embrace information as a material object, as an individual cognitive effect, and as a social institution. No wonder Fairthorne is so frustrated with the word. It is applied to signifier and signified, as well as to the cultural processes and conventions that condition the relations

between the two and between the signs they constitute. As a result of the latter, it must also be accounted for as a commodity that exchanges for other commodities in both formal and informal markets.

Information exists in a borderland between text and content, between consistency and contingency, between social convention and social conflict, between synchrony and diachrony, between message and meaning.

The project of information science is indeed a daunting one.

Endnotes

1. Ferdinand De Saussure, *Course in General Linguistics*, ed. Charles Bally and Albert Sechehaye, trans. Wade Baskin (New York: Philosophical Library, 1959).
2. Soren Brier, "Cybersemeotics: A New Disciplinary Development Applied to the Problems of Knowledge Organisation and Document Retrieval in Information Science," *Journal of Documentation* 52 no. 3 (September 1996); Gulten S. Wagner, *Public Libraries as Agents of Communication: A Semiotic Analysis* (Metuchen N.J.: Scarecrow Press, 1992); and Julian Warner, "Semiotics, Information Science, Documents and Computers," *Journal of Documentation* 46 no. 1 (March 1990).
3. Saussure, *Course*, 16.
4. Jere Paul Surber, *Culture and Critique: An Introduction to the Critical Discourses of Cultural Studies* (Boulder, Colo.: Westview Press, 1998), 164.
5. Roland Barthes. "The Kitchen of Meaning," *The Semiotic Challenge*, trans. Richard Howard (Berkeley, Calif.: University of California Press, 1994), 157-159.
6. Ibid., 157.
7. Ibid., 158.
8. Ibid., 158.
9. Michel Foucault, *The Archaeology of Knowledge*, trans. A.M. Sheridan Smith (New York: Pantheon Books, 1972), p. 31-39.
10. Saussure, *Course*, 8.
11. Ibid., 9, 11-13.
12. Ibid., 14.
13. Ibid.
14. Ibid., 15.
15. Ibid., 65.
16. Ibid., 67.
17. Ibid., 67-70.
18. Ibid., 74, 75.
19. Ibid., 79.
20. Ibid., 80.

21. Ibid., 102-103.
22. Ibid., 103.
23. Ibid.
24. Ibid., 107.
25. Ibid., 80.
26. Ibid., 108-109.
27. Ibid., 113. Italics in original.
28. Ibid.
29. Ibid., 14.
30. Ibid., 115.
31. Ibid.
32. Ibid., 118.
33. Ibid., 118-119.
34. Ibid., 120.
35. Roland Barthes, "The Semantics of Objects," in *The Semiotic Challenge*, trans. Richard Howard (Berkeley, Calif.: University of California Press, 1988, 1995), 179-190.
36. Ibid., 180.
37. Ibid., 181.
38. Ibid., 189.
39. Roland Barthes, *Elements of Semiology*, trans. Annette Lavers and Colin Smith (New York: Hill and Wang, 1967, 1973), p. 41.
40. Ibid., 41.
41. Ibid., 42.
42. Ibid., 63.

Bibliography

Aluri, Rao, D. Alasdair Kemp, and John J. Boll. "The Database." Chap. 2 in *Subject Analysis in Online Catalogs*. Englewood, Colo.: Libraries Unlimited, Inc., 1991.

———. "Language in Information Retrieval." Chap. 3 in *Subject Analysis in Online Catalogs*. Englewood, Colo.: Libraries Unlimited, Inc., 1991.

Anderson, James D. "Indexing and Classification: File Organization and Display for Information Retrieval." In *Indexing: The State of Our Knowledge and the State of Our Ignorance, Proceedings of the 20th Annual Meeting of the American Society of Indexers*, edited by Bella Hass Weinberg, 71-82. Medford, N.J.: Learned Information, Inc., 1989.

Asher, R. E., ed. *The Encyclopedia of Language and Linguistics*, Vol. 6. Oxford: Pergamon Press, 1994.

Barry, Carol L. "User-Defined Relevance Criteria: An Exploratory Study." *Journal of the American Society for Information Science* 45 (April 1994): 149-159.

Barthes, Roland. *Elements of Semiology*. Trans. Annette Lavers and Colin Smith. New York: Hill and Wang, 1967, 1973.

———. "The Kitchen of Meaning." *The Semiotic Challenge*. Trans. Richard Howard. Berkeley, Calif.: University of California Press, 1994.

———. "The Semantics of Objects." In *The Semiotic Challenge*. Trans. Richard Howard. Berkeley, Calif.: University of California Press, 1994.

Beghtol, Clare. "Bibliographic Classification Theory and Text Linguistics: Aboutness Analysis, Intertextuality and the Cognitive Act of Classifying Documents." *Journal of Documentation* 42 (June 1986): 84-113.

Belkin, N. J. "The Cognitive Viewpoint in Information Science." *Journal of Information Science* 16 (1990): 11-15.

———. "Progress in Documentation: Information Concepts for Information Science." *Journal of Documentation* 34 (March 1978): 55-85.

Belkin, N. J., H. M. Brooks, and P. J. Daniels. "Knowledge Elicitation Using