CONCEPTUAL FOUNDATIONS:

WHAT IS COMMUNICATION?

K. MILLER

In the classic movie *Cool Hand Luke,* Paul Newman was the recipient of a now famous line: "What we have here," he was told, as he stood with insouciant charm, "is a failure to communicate." Though this comment was delivered well over 30 years ago, the sentiment is a timeless one and still has traction in the early years of the 21st century. In today's society, such a failure would seem a serious—or perhaps fatal—problem because the central concerns in our lives are predictably connected to the ubiquitous concept of communication. We are told that open communication is the key to a good relationship. We are told that the Internet and World Wide Web are part of a global communication revolution. We are told that the communication industry is instilling negative values in our children. We are told that productive organizations are those that communicate effectively with both employees and customers. With all these messages ringing in our ears, it is little wonder that anyone accused of failing to communicate would be highly concerned.

Communication, then, is seen as central to our everyday ideas about what makes life worth living. Thus, it is not surprising that academics have attempted to unravel the secrets of the **communication process.** This desire to study and understand communication is not new. Indeed, Pearce and Foss (1990) trace the systematic study of communication back to the Sophists in the 5th century B.C.; through the times of Plato and Aristotle; through the Middle Ages, the humanistic revival of the Renaissance, and the scientific study of the Enlightenment; and through to the establishment of communication as an academic discipline in the 20th century. In other words, scholars have sought a systematic understanding of the communication process—communication theory, that is—for several thousand years.

Our concern in this book rests primarily with contemporary views of communication theory that have emerged in the communication discipline since the 1950s. Even this limitation is far from straightforward, however. What we now think of as the discipline of communication has incredibly diverse roots. For example, scholars in rhetoric and public communication might trace their forebears to English departments in the early 20th century and the subsequent creation of speech departments. Other scholars might trace their lineage through early studies in mass communication in departments of sociology and political science. Still others might see their roots in the work of social and industrial psychologists. In spite of these diverse histories, we can now identify a discipline of communication. We examine in this book the theorizing and theories of this community of scholars—this discipline of communication.

This textbook considers several important ways to approach communication theory, and it analyzes a wide range of theoretical statements that have sprung from such approaches. Before moving into these

important discussions, however, we must draw a map of the terrain. That is, before we start discussing the wide variety of ideas that make up the body of communication theory, it is important to establish an understanding of what communication theory is.

Drawing this map of communication theory requires two distinct but interrelated tasks: understanding the nature of communication and understanding the nature of theory. We undertake the task of understanding the nature of theory. In this chapter, we consider the first term in the phrase "communication theory" by exploring definitional controversies regarding what communication is, by considering the implications of these debates for the disciplinary study of communication theory, and by previewing the contents of subsequent chapters in our consideration of communication theory.

DEFINING COMMUNICATION

In 1998, political pundits reacted with derision to President Bill Clinton's comment in a deposition that "it all depends on what your definition of the term 'is' is." Though this comment was seen as ludicrous by some, it hits on a central truth of both academia and everyday life: People define terms in different ways, and those differences in definition can have a profound impact on the extent to which we understand each other and can move forward with both academic and everyday pursuits. Given the variety of ways in which words are used and understood, we are often ill-served to search for the single, so-called correct definition of a term. Rather, it is typically more practical to consider the appropriateness and usefulness of particular definitions for the specific context in which those definitions will be employed and to consider the extent to which interactants converge on definitions of relevant terms. In other words, it is better to evaluate definitions in terms of their utility than in terms of their correctness. This is not to suggest that "anything goes" with regard to definitions. However, we should not assume that there is always a single right way to define a concept.

Nowhere is this cautionary note more appropriate than in considering the nature of communication. Conceptualizations of communication have been abundant and have changed substantially over the years. In the middle of the 20th century, defining communication was a popular sport among communication scholars. Consider the following titles of articles published in the mid-1960s: "On Defining Communication: Another Stab" (G. R. Miller, 1966) and "On Defining Communication: Still Another View" (Gerbner, 1966). So widespread was the sport of defining communication that Dance and Larson (1976) reported over 126 definitions proposed in the literature. To illustrate the variety of definitions proposed during this definitional heyday, a sampling is included in Table 1.1.

As Table 1.1 illustrates, however, a great deal of variation existed among these definitions. Some take a very abstract view of communication, whereas others are extremely specific. Some include myriad situations and contexts in which communication might occur, whereas others are very narrow in their specification. For example, consider two of the early conceptualizations put forth in the middle of the 20th century that offer vastly different views of what communication is:

> [Communication is] the process by which an individual (the communicator) transmits stimuli (usually verbal) to modify the behavior of other individuals (the audience). (Hovland, Janis, & Kelley, 1953, p. 12)

> [Communication is] all of the procedures by which one mind can affect another. (W. Weaver, 1949, p. 95)

TABLE 1.1 Some Sample Definitions of Communication

Definition	Source
[Communication is] all of the procedures by which one mind can affect another.	Weaver (1949)
Communication means that information is passed from one place to another.	Miller (1951)
From a communication point of view, the event may be observed in the employment of symbols (act), under specific circumstances (scene), by an individual or individuals (agent), using selected media (agency), for defined ends (purposes).	Babcock (1952)
[Communication is] the process by which an individual (the communicator) transmits stimuli (usually verbal) to modify the behavior of other individuals (the audience).	Hovland, Janis, and Kelley (1953)
Communication is the process by which we understand others and in turn endeavor to be understood by them. It is dynamic, constantly changing and shifting in response to the total situation.	Andersen (1959)
[Communication] is a process that makes common to two or several what was the monopoly of one or some.	Gode (1959)
Communication does not refer to verbal, explicit, and intentional transmission of messages alone. . . . The concept of communication would include all those processes by which people influence one another.	Ruesch and Bateson (1961)
Communication means, fundamentally, the stimulation in the minds of others of essentially your awareness, understanding, and sense of importance of the event, feeling, fact, opinion, or situation you are attempting to depict.	Oliver, Zelko, and Holtzman (1962)
Communication among human beings is the art of transmitting information, ideas, and attitudes from one person to another.	Emery, Ault, and Agee (1963)
Communication is a process by which a person reduces the uncertainty about some state of affairs by the detection of cues which seem to him to be relevant to that state of affairs.	Lewis (1963)
Communication: The transmission of information, ideas, emotions, skills, etc., by the use of symbols—words, pictures figures, graphs, etc. It is the act or process of transmission that is usually called communication.	Berelson and Steiner (1964)
Communication is social interaction through symbols and message systems.	Gerbner (1966)
In the main, communication has as its central interest those behavioral situations in which a source transmits a message to receiver(s) with conscious intent to affect the latter's behavior.	Miller (1966)
Human communication is the eliciting of a response through verbal symbols.	Dance (1967)
Communication cannot be understood except as a dynamic process in which listener and speaker, reader and writer act reciprocally, the speaker acting to provide direct and indirect sensory stimulation of the listener; the listener acting on the stimulation by taking it in, investing it with meaning by calling up images in the mind, testing those images against present information and feelings and sooner or later acting upon those images.	Martin and Anderson (1968)
Communication [is] the sharing of experience, observable as the extent to which the responses of a generator and perceiver (both of which are necessarily living organisms) are systematically correlated to a referent stimulus.	Goyer (1970)
Communication [is] patterned space-time behavior with a symbolic referent.	Hawes (1973)

Source: All definitions drawn from Appendix A of Dance, F. E. X., & Larson, C.E. (1976). *The functions of human communication.* New York: Holt, Rinehart and Winston.

Hovland, Janis, and Kelley provide a relatively narrow view of communication, defining it as a one-way activity encompassing primarily verbal signals used to modify another's behavior. In contrast, Weaver's definition is incredibly broad, including all the procedures by which one "mind" could have an effect on another. For example, if one person decided to plant a flower and another person noticed it, this would count as communication. For most contemporary scholars investigating communication processes, neither of these definitions would pass muster in terms of utility. The definition by Hovland and others excludes too many activities that we normally think of as communication (e.g., just chatting to pass the time of day), whereas the Weaver definition includes practically everything and thus doesn't help us distinguish communication from other forms of human activity.

Through all this definitional turmoil, however, a number of conceptual features have emerged as important points of discussion throughout the years. Some of these features are widely accepted as appropriate to definitions of communication, and we consider these as points of convergence. These concepts—communication as a process, as symbolic, and as transactional—are not considered in detail because they have really become truisms about communication rather than issues of theoretical contention. Other conceptual dimensions, in contrast, have met with a great deal of discussion and debate in the literature. These features are considered in more detail as points of divergence in the conceptualization of communication. Because this textbook serves as an introduction to a wide range of theoretical positions regarding communication, we do not settle on any singular, specific definition to guide our investigations here. However, it is important to lay out the issues of contention in order to draw a map of the conceptual terrain.

Conceptualizing Communication: Points of Convergence

Communication Is a Process Perhaps the most widespread point of convergence in defining communication is the notion that communication is a process. A process-oriented conceptualization of communication suggests that it is continuous and complex and cannot be arbitrarily isolated. That is, communication unfolds over time. David Berlo (1960) popularized this idea over 40 years ago, stating:

> If we accept the concept of process, we view events and relationships as dynamic, on-going, ever-changing, continuous. When we label something as a process we also mean that it does not have a beginning, an end, a fixed sequence of events. It is not static, at rest. It is moving. The ingredients within a process interact; each affects all others.

Think, for instance, of a relatively simple interaction between a child and a parent in which the child is reprimanded for not cleaning up after play. When we see communication as a process, we realize that this interaction is really not all that simple. Rather, the interaction is influenced by the past behavior of these two individuals (e.g., Does the child habitually fail to clean up? Is the parent under other kinds of stress?), by relationships each has had with others (e.g., perhaps an older child was excessively neat, setting up parental expectations for this child), and by the situation surrounding the interaction (e.g., perhaps grandparents are arriving for a visit and neatness is seen as an important priority). Further, this so-called simple interaction will affect subsequent interactions between the child and the parent. In short, when we look at communication as a process, we see that even simple interactions are influenced in complex ways by the past and will also have important implications for the future.

In early conceptualizations of communication, this process was seen as a primarily linear one, in which communication moved from a source to a receiver. For example, a source-message-channel-receiver (SMCR) model of communication characterizes the communication process as a straightforward activity of transmission through a singular conduit. Similarly, Lasswell's (1964) classic model of communication asks a series of linear questions: Who? Says what? To whom? Through what channel? With what effect? Though this conceptualization can be seen as a process (i.e., a sequence of steps), most communication scholars today do not accept this simple linear model, or even one that incorporates a feedback loop from receiver to source. Rather, most communication researchers now take a transactional approach to communication. This point of convergence is considered next.

Communication Is Transactional A second point of widespread convergence in conceptualizations of communication is the notion that communication is **transactional** and hence highly complex. In unpacking the concept of *transaction,* it is useful to contrast it with the related ideas of *action* and *interaction* (see Dewey & Bentley [1949] for an early explication of this distinction).

If we consider communication to be strictly action, we would look at a source presenting a message to a receiver or an audience. We would not consider the reaction of the audience or feedback from it. This linear and one-way approach to communication (like the simple models discussed above) has been labeled the hypodermic needle model, or magic bullet model of communication (see Forsdale, 1981). This action model suggests that communication is a simple process of injecting (with a needle) or shooting (with a bullet) our messages into receivers.

In contrast, if we view communication from an interaction perspective, we move beyond the hypodermic needle and magic bullet to consider the importance of feedback from the receiver. That is, in an interaction model, we look at not only the message of the source but also the reaction of the receiver. An interactional view is clearly a move forward because it acknowledges that communication is not strictly a one-way process with direct and linear effects. However, this model is still relatively simplistic in its isolation of a source and receiver and its consideration of limited influence between them.

Most communication scholars today, however, conceptualize communication in a transactional sense. A transactional view of communication, like an interactional view, includes the important role of feedback. However, a transactional view goes further in seeing communication as a process in which there is constant mutual influence of communication participants. As Burgoon and Ruffner (1978) note:

> People are simultaneously acting as source and receiver in many communication situations. A person is giving feedback, talking, responding, acting, and reacting continually through a communication event. Each person is constantly participating in the communication activity. All of these things can alter the other elements in the process and create a completely different communication event. This is what we mean by transaction.

Consider, again, our exchange between a parent and a child regarding picking up after play. If we view communication as an interaction, we look first at what the parent says, then consider what the child says, and so on. When looking at the exchange as a transaction, we need to look simultaneously at both parties involved. The parent, for instance, might vary the content or tone of the reprimand based on ongoing nonverbal feedback from the child. At the same time, the child might respond to the parent's cues by adjusting messages and behavior.

A view of communication as transactional also emphasizes the importance of context in the communication process. That is, not only do participants constantly influence each other, they are also influenced by the context in which they interact. For example, a comment made in an organization can take on very different meaning depending on whether it is heard in a formal performance appraisal meeting or in casual conversation in the cafeteria. A television show depicting violent acts might be viewed very differently by children alone as compared with children in the company of parents discussing the program's content. In short, a transactional perspective on communication recognizes the inherent complexity of the communication process and will enhance our understanding of a variety of communication exchanges.

Communication Is Symbolic A third area of convergence in conceptualizations of communication is the belief that communication is symbolic. To explore this concept, it is useful to talk briefly about the more general concept of **sign,** investigated by the field of *semiotics* (for treatments in the field of communication, see A. A. Berger, 1989; Leeds-Hurwitz, 1993). Semioticians see a sign as consisting of two inextricably linked parts—the *signifier* and the *signified.* Consider the word *book* and the object made of paper and glue that you hold in your hand right now. In this case, the signifier is the word *book* and the signified is the physical object. In semiotics, a sign is the relationship between the signifier and the signified. This relationship is obviously not a perfect one-to-one correspondence and is often an arbitrary relationship in that there is no natural correspondence, for instance, between the letters *b-o-o-k* and the object to which they refer.

Once this basic semiotic notion is understood, a number of further elaborations can be made. First, many theorists follow I. A. Richards (1936), an early scholar in the field of semantics, in distinguishing between a sign and a symbol. This distinction deals with the arbitrariness of the connection between the signifier and the signified. For example, Langer, in her book *Philosophy in a New Key,* conceptualizes a sign as something that signals the presence of something else. In this sense, smoke is a sign of fire and tears are a sign of sadness. Of course, even with these signs there is not a perfect match because tears can be shed in joy as well as in sadness. However, a natural match exists between the signifier and the signified in this case. **Symbols,** in contrast, "are not proxy of their objects, but are vehicles for the conception of objects" (Langer, 1942, p. 61). Thus, symbols hold an arbitrary, rather than natural, relationship to what is symbolized, and a symbol has no inherent meaning.

What then is the relationship between the symbol and the referent? Ogden and Richards (1946) explained this relationship in terms of a semantic triangle in which the three points of the triangle are the *symbol* (e.g., the word *book*), the *referent* (e.g., the physical object), and the *reference* (e.g., what you mean by book when you use the symbol). In this triangle, the link between the symbol and the referent is typically represented with a dotted line because this relationship is arbitrary. That is, you might be quite clear about what you mean when you use the term *book,* but that symbol might have different meanings for different people. Not only are there a wide range of physical objects that could be described as books, but individuals also have a wide range of other concepts and emotions associated with the symbol. For some, books are sacred objects that are cherished and saved throughout a lifetime. For others, books are objects that weigh down the backpack and should be sold back as soon as the end of the semester arrives.

However, with most symbols, some degree of shared meaning exists between interactants. This is true because the symbols are developed through shared social experience and exist within a system of

other symbols. However, this imperfect relationship between symbol and referent suggests that there will always be gaps in understanding. These gaps will be smallest for individuals who have shared experiences (e.g., growing up in the same culture, being of the same generation, having professional similarities). They will be largest for those who have had radically divergent social experiences.

So, when theorists say that communication is symbolic, they mean that it requires signs and symbols that have relationships to referents that are to some extent arbitrary. These symbols can be verbal (e.g., the use of language) or nonverbal. Nonverbal symbols can be seen in a wide range of communicative activities and in many contexts. Some nonverbal behavior actually serves more as a sign than a symbol. For example, Ekman and Freisen (1975) have found that facial expressions are widely seen as unarbitrary indicators of emotion that are recognized across cultural bounds. Other nonverbal communication clearly takes on the arbitrary form of a symbol. Consider, for example, some communication examples in the organizational context. When you dress in a suit for a job interview, that suit could symbolize many things—your respect for the company, your willingness to conform, or your sense of organization and decorum. When a manager chooses to send a message by means of a paper memorandum rather than by phone, e-mail, or interpersonal channels, that choice could symbolize many things—the formality of the message or perhaps the need to file the message for future reference. In short, the nonverbal messages we send and receive are characterized by their symbolic nature, and because of the possible gaps between symbol and referent, "perfect" communication is unlikely.

The ways in which symbols function in communication have come under some scrutiny in recent years. This debate has considered not only the issue of whether communication is symbolic (but see Andersen, 1991, for a contrary definitional view), but also the ways in which symbols are attached to referents in the real world—in essence the extent to which we can say that symbols hold any stable meaning. A number of theorists have argued that symbols do not have any stable connection to the world and that meaning is, instead, a function of power relationships, ideology, situational context, or history (e.g., Bochner, 1985; Deetz, 1973; Lannaman, 1991; Stewart, 1986). In contrast, others (see, especially, Ellis, 1995) have argued that though symbols do not have single, correct meanings, those symbols do not have single, correct meanings, those symbols can be seen as having purposeful and significant attachments to referents. As we see in later chapters, this debate is one strand of the ontological discussions that mark important differences among post positivist, interpretive and critical perspectives on communication theory. This debate over the stability of meaning, however, does not detract from agreeing that communication is a symbolic process.

Conceptualizing Communication: Points of Divergence

As noted earlier, most contemporary communication scholars agree that communication can be conceptualized as a process that is symbolic and transactional, though different aspects of these conceptualizations will be emphasized depending on the theoretical needs of the researcher. However, communication scholars have agreed less often in several other areas. One of these areas involves the social nature of communication processes, and another involves whether communication should be conceptualized as a purely intentional behavior. These points of divergence are taken up in this section.

Communication as a Social Activity The first point of some divergence is whether communication necessarily involves two or more people (e.g., is a social or interpersonal activity) or whether communication

can occur within one individual (i.e., **intrapersonal communication**). That is, can you communicate with yourself? Though the colloquialism of "talking to yourself" is frequently used in modern society, many communication scholars would prefer to label this phenomenon as cognition or thinking and leave the term *communication* for situations in which two or more people are involved. Other scholars see intrapersonal communication as distinct from thinking, and divisions within professional associations and numerous publications (see, e.g., C. V. Roberts & Watson, 1989; Vocate, 1994) now acknowledge the importance of intrapersonal communication.

In some ways, though, this issue may be a red herring in the conceptualization of communication. Even scholars who see communication as a clearly social process (e.g., involving two or more people) also acknowledge the importance of internal states such as cognition and emotion on communicative interaction. Indeed, we will see that many theories of message production, message processing, and discourse and interaction highlight the role of planning and other cognitive processes in the creation of messages in social situations and the regulation of behavior during conversation. Further, theories that look specifically at those intrapersonal and perceptual ways of understanding the symbolic world are central to our understanding of communication processes.

The more important point in conceptualizing communication as a social process is in the function that communication serves as a social vehicle. That is, when we see communication as something that occurs between people, the question arises of what communication is doing in that relationship. However, it is worth making some initial distinctions here among the various ways we can look at language:

- The *semantic* level of language study considers the links between signs and referents. Our brief discussion of semiotics in the preceding section dealt primarily with this level of analysis.
- The *syntactic* level of language study considers the rules that govern language use by considering various grammars.
- The *pragmatic* level of language study looks at language in use. That is, a pragmatic view looks at the ways in which we "do things with words" (Austin, 1962).

When we conceptualize communication as a social activity, we are then looking primarily at the pragmatic level. That is, communication, in this social sense, is a vehicle through which we are trying to do something. What we are trying to do with communication could vary greatly—we might be trying to get others to understand or appreciate our internal thoughts or emotions, or we might be trying to understand those internal states in others. We might be trying to coordinate behaviors with others or to have others behave in a specific desired way. In other words, we don't just seek to communicate. Instead, from the pragmatic viewpoint, we seek to do specific things in communicating.

In summary, then, in conceptualizing communication as a social activity, we are not discounting the importance of cognitive and internal psychological states in the communication process. Rather, we are emphasizing the point that communication is a critical part of social commerce and that through communication we seek to have an impact on the people around us.

Communication and Intention Perhaps the most active debate in the area of defining communication revolves around the issue of **intentionality.** Many years ago, Watzlawick, Beavin, and Jackson (1967) wrote a highly influential book, *The Pragmatics of Human Communication*. We deal extensively with

their ideas in our discussion of communication in ongoing relationships. However, this book has probably been cited more for one phrase than for all the rest of the book combined. This is Watzlawick et al.'s dictum that "you cannot not communicate," suggesting that meaning is inherent in all human behavior. For example, an individual who pulls on an old pair of blue jeans and wears them to class may do so simply because everything else in the closet is dirty. Following Watzlawick et al., however, this behavior is communication because others might derive a variety of meanings from it (perhaps disrespect for authority or conformity to peer pressure). As Motley (1990, p. 1, emphasis in original) summarizes, Watzlawick et al.'s dictum "favors a broad approach to communication phenomena, making *communication* synonymous, or nearly synonymous, with behavior."

In early conceptualizations of communication, some theorists disagreed with the idea that you "cannot not communicate," arguing that only intentional behaviors should count as communication (e.g., Burgoon & Ruffner, 1978; G. R. Miller, 1966). In this view, communication occurs only when there is clear intent on the part of the source to communicate. G. R. Miller's (1966, p. 92) definition is a case in point: Communication occurs in "those situations in which a source transmits a message to a receiver with conscious intent to affect the latter's behavior." It should be noted that definitions such as Miller's did not suggest that the intent needed to be successfully realized in order for communication to occur (that is, the attempt doesn't have to be competent or effective in order to be communication), but rather that intent on the part of the source is a defining feature that moves us from the concept of behavior to the concept of communication.

In the early 1990s, this debate flourished once again, with Peter Andersen (1991), Janet Beavin Bavelas (1990), Wayne Beach (1990), Theodore Clevenger (1991), and Michael Motley (1990, 1991) all weighing in with varying positions on the issue. One of the most important underlying threads in the revival of this debate was the distinction between a source perspective on defining communication and a receiver perspective. Motley (1990, 1991) represents the source position, arguing that a source must have a "receiver-based intention" (either conscious or unconscious) in order for communication to occur. In contrast, Andersen (1991) represents the receiver perspective in arguing that any behavior that is received (either through active attention or incidentally) counts as communication.

Consider, again, our example of wearing old blue jeans to class. From a source-based perspective (Motley, 1990, 1991), this behavior is not communication because there is no receiver-directed intent to communicate, either conscious or unconscious, on the part of the person putting on the blue jeans. From a receiver-based perspective, this behavior might be communication, depending on whether the professor (or perhaps other students) receive, either incidentally or through purposeful attention, a message from that wardrobe choice. If a message is received, the wearing of blue jeans is communication. Otherwise, communication has not occurred.

Recently, Burgoon and Hoobler (2002) have proposed a resolution of this debate with regard to nonverbal communication by proposing that theorists take a message perspective rather than a receiver or source perspective. In a message perspective, communication is defined as "those behaviors that could reasonably function as messages within a given speech community" (Burgoon & Hoobler, p. 244). They further elaborate on this position, noting that "[i]f a behavior is commonly encoded deliberately and interpreted as meaningful by receivers or observers, it does not matter if, on a given occasion, it is performed unconsciously or unintentionally" (p. 244). This move to a message orientation is interesting because it no longer relies on the intent or beliefs about intent of specific interactants. However, questions can still be raised within this approach as to the beliefs of "typical" interactants within speech communities.

A second critical issue highlighted in this debate about intentionality is the distinction among *verbal messages, analogic messages,* and *symptomatic behavior* (Andersen, 1987, 1991; Motley, 1990, 1991). Motley (1990, pp. 14–15) describes the distinctions among these three categories:

> Symptomatic behaviors (e.g., stomach growls, observable autonomic responses, scratching, etc.), at least in their pure form, exemplify behaviors whose source is something other than an effort to influence a receiver. Verbal behaviors, on the other hand, are typically intended for receivers, as are analogic behaviors; i.e., intentional imitations of symptomatic behaviors—or "ritual" behaviors in the terms of Cronkhite (1986)—and other nonverbal "behaviors purposively displayed to receivers." (Andersen, 1987)

To illustrate this distinction, imagine that you are talking to a friend on the phone and you are exhausted. Because of your fatigue, you might let out an uncontrollable yawn. This is **symptomatic behavior.** Or you might tell your friend that you are very tired and need to get off the phone. This is **verbal behavior.** Or you might emit a fake yawn to communicate your exhaustion to your friend. This is **analogic behavior.** These distinctions are important for several reasons. First, by highlighting the role of analogic communication in much interaction, these distinctions emphasize the importance of nonverbal messages in our conceptualization of communication. Second, they emphasize that a wide range of consciousness is possible in communication, even when considering receiver-directed and intentional behavior. This issue has been further emphasized in discussions of the "mindlessness" of much communication (see, e.g., Langer, 1989). For example, Kellermann believes that communication is both "inherently strategic" and "primarily automatic" (Kellermann, 1992, p. 288). That is, she argues that though out communication is receiver directed and intentional, it is also often unconscious and guided by cultural scripts and ingrained habits.

In summary, early questions of "Is communication intentional?" have evolved in recent years to include sophisticated debates about receiver perception, strategic intent, automatic communication, and the nature of meaning. It is unlikely that these debates will be resolved to the satisfaction of all involved (see, e.g., the positions expressed by Ellis, 1991, p. 221; Mumby, 1997, p. 21). But perhaps these debates should not be resolved because, as noted earlier, definitions are not right or wrong but are more or less useful for the purposes at hand. It is important, however, to be familiar with these issues as we embark on the study of a variety of communication theories. As Andersen (1991) emphasizes, "These perspectives launch scholars down different theoretical trajectories, predispose them to ask distinct questions, and set them up to conduct different kinds of communication studies" (p. 309). Thus, definitional choices about communication influence—and are influenced by—the theoretical and research commitments of communication scholars.

MOVING BEYOND DEFINITIONS

It appears, then, that we do not have—and probably never will have—an undisputed definition of communication. As noted earlier, this is not necessarily a bad state of affairs because varying definitions can usefully serve different theoretical and practical purposes. Utility depends on the scholar, the research context, and a host of other factors. However, this lack of a singular definition of "what we study" makes it even more important to understand the varying ways that communication is approached by scholars.

Real Life Insight

This chapter considers a variety of ways that scholars in the communication discipline have looked at the "meaning" of "communication." In her recent book, *Reconstructing Communicating: Looking to a Future,* Robyn Penman (2000) talks about these various views as different ways of "imagining" communication. She notes that most people in the "everyday world" hold a "transmission" imagining of communication, in which concern is centered on the need to improve communication and solve problems of communication. Penman acknowledges the prevalence of this imagining, but also invites both scholars and practitioners into an alternative imagining. one that "requires us to inquire into communicating and not communication; to treat communicating as the essential problematic of concern; and to recognize that we construct our reality in our communicating" (pp. 6–7). Penman provides substantial historical and theoretical argument regarding her "reconstruction" of communicating. She then closes her book with a fascinating look at several case studies in which she and her colleagues use a constitutive frame to look at the ways in which context and lived experience influence the very nature of communicating.

One of the cases she considers is the information needs of HIV/AIDS patients as they were undertaking a new and complicated triple-combination drug regimen in the late 1990s. By actually listening to the way these patients talked about their lives, she realized how important it was to talk not about patient "compliance" (a physician's term) but about "commitment" to the treatment and "control" over their own lives. Further, her work highlighted that the medical profession's typical focus on "best practice" (e.g., take the medicine on a totally empty stomach three times a day) just didn't work, and that patients needed to know that there were "good" practices that didn't quite hit the ideal.

In short, Penman's work shows that by rethinking our models of communication and by giving credence to both the context and process of interaction, it is possible to address pressing problems of daily living. We won't necessarily find all the answers, but at least we'll be asking the right questions.

In the reminder of this chapter, we consider two procedures for "dividing up" communication studies. One of these procedures is the consideration of varying conceptual approaches to the study of communication. The other procedure involves the subdisciplinary domains that typically define our academic departments and professional associations. Following our discussion of these two frameworks, we consider the domains of communication that are included in this textbook.

Conceptual Domains of Communication Studies

An often-cited essay by Robert Craig (1999) makes a compelling case for the importance of considering distinctions among varying conceptual domains in communication theory. Craig argues that typical discussions of the concept of communication distinguish between a **transmission model of communication** and a **constitutive model of communication**. According to Craig, within the transmission model, "communication is a process of sending and receiving messages or transferring information from one mind to another" (p. 125), whereas the alternative is "a model that conceptualizes communication as a constitutive process that produces and reproduces shared meaning" (p. 125). In a constitutive model, communication "is not a secondary phenomenon that can be explained by antecedent psychological, sociological, cultural, or economic factors; rather, communication itself is the primary, constitutive social process that explains all these other factors" (p. 126).

Craig believes that seeing communication theory as a choice between a transmission and a constitutive model is problematic. First, he argues that a fair fight is rarely provided because "the transmission model, as usually presented, is scarcely more than a straw figure set up to represent a simplistic view"

(p. 127). Second, Craig argues that the transmission view of communication does resonate in many practical settings. That is, in everyday life we often think about communication rather than as the creation and re-creation of social realities. For example, we talk about "sending that guy a message" or "picking up my e-mail" in ways that are clearly oriented toward transmission. Indeed, Penman (2000) argues that in the everyday world of organizations, communication is seen as "a relatively straight-forward activity that we use to achieve effects—sending messages or controlling others" (p. 3). Hence, if we want to deal with communication in the way that "real life" actors see it, the transmission view should not be totally rejected. Finally, Craig argues that the simple contrasting of the transmission model and the constitutive model fails to account for the rich variety of ways in which scholars have often thought about the communication process.

To deal with these conceptual issues, Craig proposes that we recast the constitutive view of communication as a "metamodel," or an overarching way of thinking about communication theory, rather than as a definition of communication. As Craig argues:

> That is, the constitutive model does not tell us what communication really is, but rather implies that communication really is, but rather implies that communication can be constituted symbolically (in and through communication, of course) in many different ways, including (why not, if it is useful to do so for some purpose?) as a transmission process. (p. 127)

Craig then goes on to define seven different conceptual traditions in communication theory. These seven traditions are presented in Table 1.2, along with the ways in which each tradition theorizes communication and problems of communication. It should be emphasized that these traditions all stand within the larger metamodel of communication as a constitutive process. That is, the traditions are not radically different—and incommensurate—paradigms of theory and research. Rather, these traditions are different ways of constituting and talking about communication. For example, a scholar working within the semiotic tradition might consider the ways in which specific linguistic choices are constituted

TABLE 1.2 Conceptual Domains of Communication Theory

	Communication Theorized as:	**Problems of Communication Theorized as:**
Rhetorical	The practical art of discourse	Social exigency requiring collective deliberation and judgment
Semiotic	Intersubjective mediation by signs	Misunderstanding or gap between subjective viewpoints
Phenomenological	Experience of otherness; dialogue	Absence of, or failure to sustain, authentic human relationship
Cybernetic	Information processing	Noise; overload; underload; a malfunction or "bug" in a system
Sociopsychological	Expression, interaction, and influence	Situation requiring manipulation of causes of behavior to achieve specified outcomes
Sociocultural	(Re)production of social order	Conflict; alienation; misalignment; failure of coordination
Critical	Discursive reflection	Hegemonic ideology; systematically distorted speech situation

Source: Adapted from Craig, R. T. (1999). Communication theory as a field. *Communication Theory,* 9, 119–61.

within interaction. In contrast, a proponent of the critical tradition would take a broader view in looking at the means through which the cultural icons communicated in television advertising control the perceptions and actions of the viewing public.

Craig hopes that by establishing this constitutive metamodel, space will be opened up for more dialogue among the various ways of thinking about communication theory and research. As Craig summarizes:

> The scheme I am proposing divides the field according to underlying conceptions of communicative practice. An effect of this shift in perspective is that communication theories no longer bypass each other in their different paradigms or on their different levels. Communication theories suddenly now have something to agree and disagree about—and that "something" is communication. (p. 135)

Craig's use of this conceptual matrix—and particularly his adoption of the constitutive view of communication as a "metamodel" has recently generated some interesting academic debate (see, e.g., Craig, 2001; Myers, 2001). For example, Myers critiques Craig for providing few criteria for adjudicating among various communication models and sees the constitutive meta-model as problematic as it doesn't allow for fundamental differences among those supporting various first-order models. Craig responds that the constitutive metamodel does not impose a grand unified theory but instead "seeks, by turning to the practical life world that all of us share, common ground on which to discuss some of those differences" (Craig, 2001, p. 235). The debate regarding this article suggests that it has already generated productive discussion about the nature of communication, and thus we will rely on some of Craig's points in our presentation of communication theory.

Useful as these conceptual distinctions are, however, they do not reflect the way the field is typically segmented in academic departments or in presentations of communication theory. Craig admits this ("the structure of the matrix differs radically from conventional ways of dividing up the field," p. 132) and argues that this reconceptualization is critical to the development of communication theory. However, it is also important to look at the ways in which the field of communication is typically divided within academic departments and within pedagogical treatments of communication theory and research. These divisions within the field are considered in the next section.

Disciplinary Domains of Communication Studies

There is little doubt that communication is a fragmented discipline. This fragmentation can, not surprisingly, be seen in the way we label ourselves and talk about ourselves. For example, Kellner (1995) notes the wide array of labels used by departments that study communication issues and even notes that there are idiosyncratic preferences for the terms *communication* or *communications* when referring to the discipline. Within the major professional associations of the field (the National Communication Association and the International Communication Association), a wide array of subdisciplines are represented in the divisions and commissions (see Table 1.3). These subdisciplines vary across the different associations (e.g., the National Communication Association has a larger and more diverse structure than the International Communication Association, with more emphasis on pedagogical issues), and their definitional criteria vary within associations. That is, some divisions are defined in terms of levels (e.g., interpersonal communication, group communication, mass communication), some in terms of a

TABLE 1.3 Subdisciplinary Domains in Communication

Divisions and Interest Groups in the International Communication Association (ICA)	Divisions and Commissions in the National Communication Association (NCA)
Information systems	African American communication and culture
Interpersonal communication	American studies
Mass communication	Applied communication
Organizational communication	Argumentation and forensics
Intercultural and development communication	Asian Pacific American communication
Political communication	Basic course
Instructional and developmental communication	Communication and aging
Health communication	Communication and law
Philosophy of communication	Communication in the future
Communication and technology	Communication apprehension and avoidance
Popular communication	Communication assessment
Public relations	Communication ethics
Feminist scholarship	Communication needs of students at risk
Communication law and policy	Critical and cultural studies
Language and social interaction	Ethnography
Visual communication	Environmental communication
Gay, lesbian, bisexual, & transgender studies	Experiential learning in communication
Intergroup communication	Feminist and women studies
	Family communication
	Freedom of expression
	Gay, lesbian, bisexual, transgender studies
	Group communication
	Health communication
	Human communication and technology
	Instructional development
	International and intercultural communication
	Interpersonal communication
	Intrapersonal and social cognition
	Language and social interaction
	Latina/Latino communication studies
	Mass communication
	Organizational communication
	Peace and conflict
	Performance studies
	Political communication
	Public address
	Public relations
	Rhetorical and communication theory
	Semiotics and communication
	Spiritual communication
	Theatre
	Training and development
	Vietnamese communication
	Visual communication

process (e.g., language and social interaction, communication technology, communication apprehension and avoidance), and others in terms of contexts (e.g., instructional, political, health). Even these distinctions are overly simplistic given that a term such as *organizational communication* could imply both a level and a context in which interaction occurs.

The debate regarding disciplinary divisions can be seen within a broader context as well. For instance, when considering the history of the field, we see that wide differences exist between those who look at the development of speech communication (e.g., H. Cohen, 1994) and those who consider the communication discipline as it developed from sociology and social psychology (e.g., E. M. Rogers, 1994). Craig (1995) argues that this fragmentation is evidence of the tenuousness of the communication discipline:

> The rationale for our field's existence, at core amounts to scarcely more than a single, culturally very potent symbol, "communication," a word still trendy enough to attract students, legitimate enough to keep skeptical colleagues at bay for awhile, and ambiguous enough to serve as a lowest common denominator for our otherwise largely unrelated scholarly and professional pursuits. Any further theoretical analysis of "communication," any attempt to define the field that goes much beyond the magic word itself, threatens to elevate some traditions over others and so upset our delicately balanced system of alliances. (p. 178)

Communication is not just fragmented within the discipline, it is also characterized by a high level of interdisciplinary pursuits. Clearly, the history of communication is an interdisciplinary one (see H. Cohen, 1994; Craig, 1995; E. M. Rogers, 1994) given that its development was shaped by fields such as journalism, sociology, psychology, theater, rhetoric, and English. Further, communication remains highly interdisciplinary, as many academics creating scholarship on communication do not reside in communication departments. For example, the study of concepts that we might see as communication is often a mainstay of departments of psychology, sociology, journalism, management, or anthropology.

Is all of this fragmentation a good thing or a bad thing? Commentators differ on this issue, and several representative views can be found in the 1993 "Future of the Field" issue of *Journal of Communication*. In this issue, Rosengren (1993) laments fragmentation, arguing that "it is as if the field of communication research were punctuated by a number of isolated frog ponds—with no friendly croaking between the ponds, very little productive intercourse at all, few cases of successful cross-fertilization" (p. 9). In contrast, B. J. O'Keefe (1993, p. 75) notes that she is "struck by increasing interconnections between previously separate disciplines and by projects that deliberately attempt to forge connections," and she argues (following Bochner & Eisenberg, 1985) that we should not have a coherent discipline in which all agree on theoretical and methodological choices but should instead strive for cohesion in which there is room for subdisciplinary dialogue and in which proponents of those subdisciplines respect and protect each other. For some, the issue comes down to whether we should maintain our allegiance to the *concept* of communication or to the *discipline* of communication. Beninger (1993, p. 18), for instance, argues that we should "embrace the subject, not the field" by looking at communication in a broad conceptual sense rather than in what he sees as a narrow disciplinary way.

THE JUDGMENT OF THAMUS

NEIL POSTMAN

You will find in Plato's *Phaedrus* a story about Thamus, the king of a great city of Upper Egypt. For people such as ourselves, who are inclined (in Thoreau's phrase) to be tools of our tools, few legends are more instructive than his. The story, as Socrates tells it to his friend Phaedrus, unfolds in the following way: Thamus once entertained the god Theuth, who was the inventor of many things, including number, calculation, geometry, astronomy, and writing. Theuth exhibited his inventions to King Thamus, claiming that they should be made widely known and available to Egyptians. Socrates continues:

> Thamus inquired into the use of each of them, and as Theuth went through them expressed approval or disapproval, according as he judged Theuth's claims to be well or ill founded. It would take too long to go through all that Thamus is reported to have said for and against each of Theuth's inventions. But when it came to writing. Theuth declared, "Here is an accomplishment, my lord the King, which will improve both the wisdom and the memory of the Egyptians. I have discovered a sure receipt for memory and wisdom." To this, Thamus replied, "Theuth, my paragon of inventors, the discoverer of an art is not the best judge of the good or harm which will accrue to those who practice it. So it is in this; you, who are the father of writing, have out of fondness for your off-spring attributed to it quite the opposite of its real function. Those who acquire it will cease to exercise their memory and become forgetful; they will rely on writing to bring things to their remembrance by external signs instead of by their own internal resources. What you have discovered is a receipt for recollection, not for memory. And as for wisdom, your pupils will have the reputation for it without the reality: they will receive a quantity of information without proper instruction, and in consequence be thought very knowledgeable when they are for the most part quite ignorant. And because they are filled with the conceit of wisdom instead of real wisdom they will be a burden to society."[1]

I begin with this legend because in Thamus' response there are several sound principles from which we may begin to learn how to think with wise circumspection about a technological society. In fact, there is even one error in the judgment of Thamus, from which we may also learn something of importance. The error is not in his claim that writing will damage memory and create false wisdom. It is demonstrable that writing has had such an effect. Thamus' error is in his believing that writing will be a burden to society and *nothing but a burden*. For all his wisdom, he fails to imagine what writing's benefits might be, which, as we know, have been considerable. We may learn from this that it is a mistake to suppose that any technological innovation has a one-sided effect. Every technology is both a burden and a blessing; not either-or, but this-and-that.

Nothing could be more obvious, of course, especially to those who have given more than two minutes of thought to the matter. Nonetheless, we are currently surrounded by throngs of zealous Theuths, one-eyed prophets who see only what new technologies can do and are incapable of imagining what they will *undo*. We might call such people Technophiles. They gaze on technology as a lover does on his beloved, seeing it as without blemish and entertaining no apprehension for the future. They are therefore dangerous and are to be approached cautiously. On the other hand, some one-eyed prophets, such as I (or so I am accused), are inclined to speak only of burdens (in the manner of Thamus) and are silent about the opportunities that new technologies make possible. The Technophiles must speak for themselves, and do so all over the place. My defense is that a dissenting voice is sometimes needed to moderate the din made by the enthusiastic multitudes. If one is to err, it is better to err on the side of Thamusian skepticism. But it is an error nonetheless. And I might note that, with the exception of his judgment on writing, Thamus does not repeat this error. You might notice on rereading the legend that he gives arguments *for* and *against* each of Theuth's inventions. For it is inescapable that every culture must negotiate with technology, whether it does so intelligently or not. A bargain is struck in which technology giveth and technology taketh away. The wise know this well, and are rarely impressed by dramatic technological changes, and never overjoyed. Here, for example, is Freud on the matter, from his doleful *Civilization and Its Discontents:*

> One would like to ask: is there, then, no positive gain in pleasure, no unequivocal increase in my feeling of happiness, if I can, as often as I please, hear the voice of a child of mine who is living hundreds of miles away or if I can learn in the shortest possible time after a friend has reached his destination that he has come through the long and difficult voyage unharmed? Does it mean nothing that medicine has succeeded in enormously reducing infant mortality and the danger of infection for women in childbirth, and indeed, in considerably lengthening the average life of a civilized man?

Freud knew full well that technical and scientific advances are not to be taken lightly, which is why he begins this passage by acknowledging them. But he ends it by reminding us of what they have undone:

> If there had been no railway to conquer distances, my child would never have left his native town and I should need no telephone to hear his voice; if travelling across the ocean by ship had not been introduced, my friend would not have embarked on his sea-voyage and I should not need a cable to relieve my anxiety about him. What is the use of reducing infantile mortality when it is precisely that reduction which imposes the greatest restraint on us in the begetting of children, so that, taken all round, we nevertheless rear no more children than in the days before the reign of hygiene, while at the same time we have created difficult conditions for our sexual life in marriage. . . . And, finally, what good to us is a long life if it is difficult and barren of joys, and if it is so full of misery that we can only welcome death as a deliverer?[2]

In tabulating the cost of technological progress, Freud takes a rather depressing line, that of a man who agrees with Thoreau's remark that our inventions are but improved means to an unimproved end. The Technophile would surely answer Freud by saying that life has always been barren of joys and full of misery but that the telephone, ocean liners, and especially the reign of hygiene have not only lengthened life but made it a more agreeable proposition. That is certainly an argument I would make (thus

proving I am no one-eyed Technophobe), but it is not necessary at this point to pursue it. I have brought Freud into the conversation only to show that a wise man—even one of such a woeful countenance—must begin his critique of technology by acknowledging its successes. Had King Thamus been as wise as reputed, he would not have forgotten to include in his judgment a prophecy about the powers that writing would enlarge. There is a calculus of technological change that requires a measure of even-handedness.

So much for Thamus' error of omission. There is another omission worthy of note, but it is no error. Thamus simply takes for granted—and therefore does not feel it necessary to say—that writing is not a neutral technology whose good or harm depends on the uses made of it. He knows that the uses made of any technology are largely determined by the structure of the technology itself—that is, that its functions follow from its form. This is why Thamus is concerned not with *what* people will write; he is concerned *that* people will write. It is absurd to imagine Thamus advising, in the manner of today's standard-brand Technophiles, that, if only writing would be used for the production of certain kinds of texts and not others (let us say, for dramatic literature but not for history or philosophy), its disruptions could be minimized. He would regard such counsel as extreme naïveté. He would allow, I imagine, that a technology may be barred entry to a culture. But we may learn from Thamus the following: once a technology is admitted, it plays out its hand; it does what it is designed to do. Our task is to understand what that design is—that is to say, when we admit a new technology to the culture, we must do so with our eyes wide open.

All of this we may infer from Thamus' silence. But we may learn even more from what he does say than from what he doesn't. He points out, for example, that writing will change what is meant by the words "memory" and "wisdom." He fears that memory will be confused with what he disdainfully calls "recollection," and he worries that wisdom will become indistinguishable from mere knowledge. This judgment we must take to heart, for it is a certainty that radical technologies create new definitions of old terms, and that this process takes place without our being fully conscious of it. Thus, it is insidious and dangerous, quite different from the process whereby new technologies introduce new terms to the language. In our own time, we have consciously added to our language thousands of new words and phrases having to do with new technologies—"VCR," "binary digit," "software," "front-wheel drive," "window of opportunity," "Walkman," etc. We are not taken by surprise at this. New things require new words. But new things also modify old words, words that have deep-rooted meanings. The telegraph and the penny press changed what we once meant by "information." Television changes what we once meant by the terms "political debate," "news," and "public opinion." The computer changes "information" once again. Writing changed what we once meant by "truth" and "law"; printing changed them again, and now television and the computer change them once more. Such changes occur quickly, surely, and, in a sense, silently. Lexicographers hold no plebiscites on the matter. No manuals are written to explain what is happening, and the schools are oblivious to it. The old words still look the same, are still used in the same kinds of sentences. But they do not have the same meanings; in some cases, they have opposite meanings. And this is what Thamus wishes to teach us—that technology imperiously commandeers our most important terminology. It redefines "freedom," "truth," "intelligence," "fact," "wisdom," "memory," "history"—all the words we live by. And it does not pause to tell us. And we do not pause to ask.

This fact about technological change requires some elaboration, and I will return to the matter in a later chapter. Here, there are several more principles to be mined from the judgment of Thamus that require mentioning because they presage all I will write about. For instance, Thamus warns that the

pupils of Theuth will develop an undeserved reputation for wisdom. He means to say that those who cultivate competence in the use of a new technology become an elite group that are granted undeserved authority and prestige by those who have no such competence. There are different ways of expressing the interesting implications of this fact. Harold Innis, the father of modern communication studies, repeatedly spoke of the "knowledge monopolies" created by important technologies. He meant precisely what Thamus had in mind: those who have control over the workings of a particular technology accumulate power and inevitably form a kind of conspiracy against those who have no access to the specialized knowledge made available by the technology. In his book *The Bias of Communication,* Innis provides many historical examples of how a new technology "busted up" a traditional knowledge monopoly and created a new one presided over by a different group. Another way of saying this is that the benefits and deficits of a new technology are not distributed equally. There are, as it were, winners and losers. It is both puzzling and poignant that on many occasions the losers, out of ignorance, have actually cheered the winners, and some still do.

Let us take as an example the case of television. In the United States, where television has taken hold more deeply than anywhere else, many people find it a blessing, not least those who have achieved high-paying, gratifying careers in television as executives, technicians, newscasters, and entertainers. It should surprise no one that such people, forming as they do a new knowledge monopoly, should cheer themselves and defend and promote television technology. On the other hand and in the long run, television may bring a gradual end to the careers of schoolteachers, since school was an invention of the printing press and must stand or fall on the issue of how much importance the printed word has. For four hundred years, schoolteachers have been part of the knowledge monopoly created by printing, and they are now witnessing the breakup of that monopoly. It appears as if they can do little to prevent that breakup, but surely there is something perverse about schoolteachers' being enthusiastic about what is happening. Such enthusiasm always calls to my mind an image of some turn-of-the-century blacksmith who not only sings the praises of the automobile but also believes that his business will be enhanced by it. We know now that his business was not enhanced by it; it was rendered obsolete by it, as perhaps the clearheaded blacksmiths knew. What could they have done? Weep, if nothing else.

We have a similar situation in the development and spread of computer technology, for here too there are winners and losers. There can be no disputing that the computer has increased the power of large-scale organizations like the armed forces, or airline companies or banks or tax-collecting agencies. And it is equally clear that the computer is now indispensable to high-level researchers in physics and other natural sciences. But to what extent has computer technology been an advantage to the masses of people? To steelworkers, vegetable-store owners, teachers, garage mechanics, musicians, bricklayers, dentists, and most of the rest into whose lives the computer now intrudes? Their private matters have been made more accessible to powerful institutions. They are more easily tracked and controlled; are subjected to more examinations; are increasingly mystified by the decisions made about them; are often reduced to mere numerical objects. They are inundated by junk mail. They are easy targets for advertising agencies and political organizations. The schools teach their children to operate computerized systems instead of teaching things that are more valuable to children. In a word, almost nothing that they need happens to the losers. Which is why they are losers.

It is to be expected that the winners will encourage the losers to be enthusiastic about computer technology. That is the way of winners, and so they sometimes tell the losers that with personal computers the average person can balance a checkbook more neatly, keep better track of recipes, and make more

logical shopping lists. They also tell them that their lives will be conducted more efficiently. But discreetly they neglect to say from whose point of view the efficiency is warranted or what might be its costs. Should the losers grow skeptical, the winners dazzle them with the wondrous feats of computers, almost all of which have only marginal relevance to the quality of the losers' lives but which are nonetheless impressive. Eventually, the losers succumb, in part because they believe, as Thamus prophesied, that the specialized knowledge of the masters of a new technology is a form of wisdom. The masters come to believe this as well, as Thamus also prophesied. The result is that certain questions do not arise. For example, to whom will the technology give greater power and freedom? And whose power and freedom will be reduced by it?

I have perhaps made all of this sound like a well-planned conspiracy, as if the winners know all too well what is being won and what lost. But this is not quite how it happens. For one thing, in cultures that have a democratic ethos, relatively weak traditions, and a high receptivity to new technologies, everyone is inclined to be enthusiastic about technological change, believing that its benefits will eventually spread evenly among the entire population. Especially in the United States, where the lust for what is new has no bounds, do we find this childlike conviction most widely held. Indeed, in America, social change of any kind is rarely seen as resulting in winners and losers, a condition that stems in part from Americans' much-documented optimism. As for change brought on by technology, this native optimism is exploited by entrepreneurs, who work hard to infuse the population with a unity of improbable hope, for they know that it is economically unwise to reveal the price to be paid for technological change. One might say, then, that, if there is a conspiracy of any kind, it is that of a culture conspiring against itself.

In addition to this, and more important, it is not always clear, at least in the early stages of a technology's intrusion into a culture, who will gain most by it and who will lose most. This is because the changes wrought by technology are subtle if not downright mysterious, one might even say wildly unpredictable. Among the most unpredictable are those that might be labeled ideological. This is the sort of change Thamus had in mind when he warned that writers will come to rely on external signs instead of their own internal resources, and that they will receive quantities of information without proper instruction. He meant that new technologies change what we mean by "knowing" and "truth"; they alter those deeply embedded habits of thought which give to a culture its sense of what the world is like—a sense of what is the natural order of things, of what is reasonable, of what is necessary, of what is inevitable, of what is real. Since such changes are expressed in changed meanings of old words, I will hold off until later discussing the massive ideological transformation now occurring in the United States. Here, I should like to give only one example of how technology creates new conceptions of what is real and, in the process, undermines older conceptions. I refer to the seemingly harmless practice of assigning marks or grades to the answers students give on examinations. This procedure seems so natural to most of us that we are hardly aware of its significance. We may even find it difficult to imagine that the number or letter is a tool or, if you will, a technology; still less that, when we use such a technology to judge someone's behavior, we have done something peculiar. In point of fact, the first instance of grading students' papers occurred at Cambridge University in 1792 at the suggestion of a tutor named William Farish.[3] No one knows much about William Farish; not more than a handful have ever heard of him. And yet his idea that a quantitative value should be assigned to human thoughts was a major step toward constructing a mathematical concept of reality. If a number can be given to the quality of a thought, then a number can be given to the qualities of mercy, love, hate, beauty, creativity, intelligence, even sanity itself. When Galileo said that the language of nature is written in mathematics, he did not mean to include human feeling or accomplishment or insight. But most of us are now inclined to make

these inclusions. Our psychologists, sociologists, and educators find it quite impossible to do their work without numbers. They believe that without numbers they cannot acquire or express authentic knowledge.

I shall not argue here that this is a stupid or dangerous idea, only that it is peculiar. What is even more peculiar is that so many of us do not find the idea peculiar. To say that someone should be doing better work because he has an IQ of 134, or that someone is a 7.2 on a sensitivity scale, or that this man's essay on the rise of capitalism is an A—and that man's is a C+ would have sounded like gibberish to Galileo or Shakespeare or Thomas Jefferson. If it makes sense to us, that is because our minds have been conditioned by the technology of numbers so that we see the world differently than they did. Our understanding of what is real is different. Which is another way of saying that embedded in every tool is an ideological bias, a predisposition to construct the world as one thing rather than another, to value one thing over another, to amplify one sense or skill or attitude more loudly than another.

This is what Marshall McLuhan meant by his famous aphorism "The medium is the message." This is what Marx meant when he said, "Technology discloses man's mode of dealing with nature" and creates the "conditions of intercourse" by which we relate to each other. It is what Wittgenstein meant when, in referring to our most fundamental technology, he said that language is not merely a vehicle of thought but also the driver. And it is what Thamus wished the inventor Theuth to see. This is, in short, an ancient and persistent piece of wisdom, perhaps most simply expressed in the old adage that, to a man with a hammer, everything looks like a nail. Without being too literal, we may extend the truism: To a man with a pencil, everything looks like a list. To a man with a camera, everything looks like an image. To a man with a computer, everything looks like data. And to a man with a grade sheet, everything looks like a number.

But such prejudices are not always apparent at the start of a technology's journey, which is why no one can safely conspire to be a winner in technological change. Who would have imagined, for example, whose interests and what world-view would be ultimately advanced by the invention of the mechanical clock? The clock had its origin in the Benedictine monasteries of the twelfth and thirteenth centuries. The impetus behind the invention was to provide a more or less precise regularity to the routines of the monasteries, which required, among other things, seven periods of devotion during the course of the day. The bells of the monastery were to be rung to signal the canonical hours; the mechanical clock was the technology that could provide precision to these rituals of devotion. And indeed it did. But what the monks did not foresee was that the clock is a means not merely of keeping track of the hours but also of synchronizing and controlling the actions of men. And thus, by the middle of the fourteenth century, the clock had moved outside the walls of the monastery, and brought a new and precise regularity to the life of the workman and the merchant. "The mechanical clock," as Lewis Mumford wrote, "made possible the idea of regular production, regular working hours and a standardized product." In short, without the clock, capitalism would have been quite impossible.[4] The paradox, the surprise, and the wonder are that the clock was invented by men who wanted to devote themselves more rigorously to God; it ended as the technology of greatest use to men who wished to devote themselves to the accumulation of money. In the eternal struggle between God and Mammon, the clock quite unpredictably favored the latter.

Unforeseen consequences stand in the way of all those who think they see clearly the direction in which a new technology will take us. Not even those who invent a technology can be assumed to be

4. For a detailed exposition of Mumford's position on the impact of the mechanical clock, see his *Technics and Civilization.*

reliable prophets, as Thamus warned. Gutenberg, for example, was by all accounts a devout Catholic who would have been horrified to hear that accursed heretic Luther describe printing as "God's highest act of grace, whereby the business of the Gospel is driven forward." Luther understood, as Gutenberg did not, that the mass-produced book, by placing the Word of God on every kitchen table, makes each Christian his own theologian—one might even say his own priest, or, better, from Luther's point of view, his own pope. In the struggle between unity and diversity of religious belief, the press favored the latter, and we can assume that this possibility never occurred to Gutenberg.

Thamus understood well the limitations of inventors in grasping the social and psychological—that is, ideological—bias of their own inventions. We can imagine him addressing Gutenberg in the following way: "Gutenberg, my paragon of inventors, the discoverer of an art is not the best judge of the good or harm which will accrue to those who practice it. So it is in this; you, who are the father of printing, have out of fondness for your off-spring come to believe it will advance the cause of the Holy Roman See, whereas in fact it will sow discord among believers; it will damage the authenticity of your beloved Church and destroy its monopoly."

We can imagine that Thamus would also have pointed out to Gutenberg, as he did to Theuth, that the new invention would create a vast population of readers who "will receive a quantity of information without proper instruction . . . [who will be] filled with the conceit of wisdom instead of real wisdom"; that reading, in other words, will compete with older forms of learning. This is yet another principle of technological change we may infer from the judgment of Thamus: new technologies compete with old ones—for time, for attention, for money, for prestige, but mostly for dominance of their world-view. This competition is implicit once we acknowledge that a medium contains an ideological bias. And it is a fierce competition, as only ideological competitions can be. It is not merely a matter of tool against tool—the alphabet attacking ideographic writing, the printing press attacking the illuminated manuscript, the photograph attacking the art of painting, television attacking the printed word. When media make war against each other, it is a case of world-views in collision.

In the United States, we can see such collisions everywhere—in politics, in religion, in commerce—but we see them most clearly in the schools, where two great technologies confront each other in uncompromising aspect for the control of students' minds. On the one hand, there is the world of the printed word with its emphasis on logic, sequence, history, exposition, objectivity, detachment, and discipline. On the other, there is the world of television with its emphasis on imagery, narrative, presentness, simultaneity, intimacy, immediate gratification, and quick emotional response. Children come to school having been deeply conditioned by the biases of television. There, they encounter the world of the printed word. A sort of psychic battle takes place, and there are many casualties—children who can't learn to read or won't, children who cannot organize their thought into logical structure even in a simple paragraph, children who cannot attend to lectures or oral explanations for more than a few minutes at a time. They are failures, but not because they are stupid. They are failures because there is a media war going on, and they are on the wrong side—at least for the moment. Who knows what schools will be like twenty-five years from now? Or fifty? In time, the type of student who is currently a failure may be considered a success. The type who is now successful may be regarded as a handicapped learner—slow to respond, far too detached, lacking in emotion, inadequate in creating mental pictures of reality. Consider: what Thamus called the "conceit of wisdom"—the unreal knowledge acquired through the written word—eventually became the pre-eminent form of knowledge valued by the schools. There is no reason to suppose that such a form of knowledge must always remain so highly valued.

To take another example: In introducing the personal computer to the classroom, we shall be breaking a four-hundred-year-old truce between the gregariousness and openness fostered by orality and the introspection and isolation fostered by the printed word. Orality stresses group learning, cooperation, and a sense of social responsibility, which is the context within which Thamus believed proper instruction and real knowledge must be communicated. Print stresses individualized learning, competition, and personal autonomy. Over four centuries, teachers, while emphasizing print, have allowed orality its place in the classroom, and have therefore achieved a kind of pedagogical peace between these two forms of learning, so that what is valuable in each can be maximized. Now comes the computer, carrying anew the banner of private learning and individual problem-solving. Will the widespread use of computers in the classroom defeat once and for all the claims of communal speech? Will the computer raise egocentrism to the status of a virtue?

These are the kinds of questions that technological change brings to mind when one grasps, as Thamus did, that technological competition ignites total war, which means it is not possible to contain the effects of a new technology to a limited sphere of human activity. If this metaphor puts the matter too brutally, we may try a gentler, kinder one: Technological change is neither additive nor subtractive. It is ecological. I mean "ecological" in the same sense as the word is used by environmental scientists. One significant change generates total change. If you remove the caterpillars from a given habitat, you are not left with the same environment minus caterpillars: you have a new environment, and you have reconstituted the conditions of survival; the same is true if you add caterpillars to an environment that has had none. This is how the ecology of media works as well. A new technology does not add or subtract something. It changes everything. In the year 1500, fifty years after the printing press was invented, we did not have old Europe plus the printing press. We had a different Europe. After television, the United States was not America plus television; television gave a new coloration to every political campaign, to every home, to every school, to every church, to every industry. And that is why the competition among media is so fierce. Surrounding every technology are institutions whose organization—not to mention their reason for being—reflects the world-view promoted by the technology. Therefore, when an old technology is assaulted by a new one, institutions are threatened. When institutions are threatened, a culture finds itself in crisis. This is serious business, which is why we learn nothing when educators ask, Will students learn mathematics better by computers than by textbooks? Or when businessmen ask, Through which medium can we sell more products? Or when preachers ask, Can we reach more people through television than through radio? Or when politicians ask, How effective are messages sent through different media? Such questions have an immediate, practical value to those who ask them, but they are diversionary. They direct our attention away from the serious social, intellectual, and institutional crises that new media foster.

Perhaps an analogy here will help to underline the point. In speaking of the meaning of a poem, T.S. Eliot remarked that the chief use of the overt content of poetry is "to satisfy one habit of the reader, to keep his mind diverted and quiet, while the poem does its work upon him: much as the imaginary burglar is always provided with a bit of nice meat for the house-dog." In other words, in asking their practical questions, educators, entrepreneurs, preachers, and politicians are like the house-dog munching peacefully on the meat while the house is looted. Perhaps some of them know this and do not especially care. After all, a nice piece of meat, offered graciously, does take care of the problem of where the next meal will come from. But for the rest of us, it cannot be acceptable to have the house invaded without protest or at least awareness.

What we need to consider about the computer has nothing to do with its efficiency as a teaching tool. We need to know in what ways it is altering our conception of learning, and how, in conjunction with television, it undermines the old idea of school. Who cares how many boxes of cereal can be sold via television? We need to know if television changes our conception of reality, the relationship of the rich to the poor, the idea of happiness itself. A preacher who confines himself to considering how a medium can increase his audience will miss the significant question: In what sense do new media alter what is meant by religion, by church, even by God? And if the politician cannot think beyond the next election, then *we* must wonder about what new media do to the idea of political organization and to the conception of citizenship.

To help us do this, we have the judgment of Thamus, who, in the way of legends, teaches us what Harold Innis, in his way, tried to. New technologies alter the structure of our interests: the things we think *about*. They alter the character of our symbols: the things we think *with*. And they alter the nature of community: the arena in which thoughts develop. As Thamus spoke to Innis across the centuries, it is essential that we listen to their conversation, join in it, revitalize it. For something has happened in America that is strange and dangerous, and there is only a dull and even stupid awareness of what it is—in part because it has no name. I call it Technopoly.

SCRIPTING THE FUTURE

STEVEN FISCHER

'Writing is the painting of the voice,' penned the French philosopher Voltaire in the mid-1700s, reflecting his era's anthropocentric valuation of writing's innate purpose and scope. Over 250 years—and one electronic revolution—later, many would concede that writing transcends even humanity. It has been a protracted weaning.

After millennia of 'incomplete writing' using token signs and other techniques and graphic images on soft clay and other materials, scribes developed the idea of 'complete writing.' The systemic phoneticism that defines complete writing apparently first appeared, in various forms, between 4000 and 3500 BC in Mesopotamia. Through 'stimulus diffusion'—the transmission of an idea or custom from one people to another—writing's function and technique inspired neighbours to create similar systems or scripts. Surprisingly, throughout history only three main writing *traditions* have obtained: Afro-Asiatic (Mesopotamia, Egypt and the Levant and its derivatives), East Asian and American (Figure 1). All may share one Sumerian source.

Three main writing *systems* have prevailed, too, with many transitional variants and combinations—that is, mixed systems and mixed scripts (even both together, as in Japanese):

- *logography*, or 'word-writing,' whereby the graphemes or writing signs represent words;
- *syllabography*, or 'syllable-writing,' whereby the graphemes convey *in-di-vi-du-al* syllables;
- *alphabet*, whereby signs called 'letters' stand for individual consonants (consonantal alphabets, like Arabic and Hebrew) or individual consonants and vowels (complete alphabets, like Greek and Latin).

Over time, most logographic systems have tended to become syllabic, their earlier semantic (sense) content gradually superseded by phonetic (sound) content. Alphabetic writing does not change in this way. Once ancient Egyptian scribes elaborated it and Cyprian Greeks 'perfected' it, alphabetic writing remained *systemically* the same, though displaying many different types of advancing scripts. Today, because of globalization and modern technology, alphabetic writing is beginning to challenge all other writing.

In the 1800s, one of the founders of modern anthropology perhaps too Darwinistically championed the notion that society's evolution from 'barbarism' to 'civilization' was enabled first and foremost by literacy, the ability to read written language.[1] Today, one would possibly be more inclined to view language as society's chief tool, with written language the haft: writing did not enable, but greatly facilitated, social development. One might also do well to avoid identifying evolutionary 'stages' in the use of writing. The three writing systems—logography, syllabography and the alphabet—are each

maximized by a particular language, society and era. The three systems are not quality grades, nor are they stages in a model of 'writing evolution' (which does not exist). They are simply different forms that accommodate different linguistic and social needs as they arise.[2]

Contrary to popular opinion, economy and simplicity are not the driving forces behind a writing system's or a script's development: otherwise, Indic Brahmi, for example, would never have 'regressed' from a simple consonantal alphabet to a complex system of diacritic vowel marking, creating a large pseudo-syllabary of signs. Much more significant in writing's history than economy and simplicity are precision, greater phonetic salience, resistance to change, unambiguity, veneration and many more, often superficial, factors.

'All writing,' French historian Henri-Jean Martin has recently declaimed, 'is tied to the form of thought of the civilization that created it and to which its destiny is linked.'[3] This would be lovely if it were true. Instead, it appears that no autonomous 'form of thought' underlies any civilization; that all writing involves borrowing and adaptation, not 'creation'; and that 'destiny' actually pits the practicalities of phonetic expedience against the vagaries of social sufficiencies. In those societies in which literacy is limited to a select few, such as ancient Egypt or pre-missionary Easter Island, writing seems in fact to have little effect at all.[4] In societies in which literacy is widespread, however, writing's impact is profound. It preserves spoken language; it levels, standardizes, prescribes, enriches and generates many other language-oriented processes with far-reaching social implications.[5] Advanced human society as we know it in the First World cannot exist without writing. The acquisition of literacy has become, at least among humankind's privileged, second in importance only to the possession of language itself.

If one lesson is to be learned from a history of writing, it is that writing did not gradually 'evolve' from mute pictures. It began immediately as the graphic expression of actual speech and has remained so for millennia. This seems to be changing, however. Modern studies have revealed that reading sequences of characters or letters—not writing them—cerebrally links them directly to thought, bypassing speech altogether. And modern computers are now writing regularly to one another independently of human mediation. It is not these phenomena themselves so much as our new understanding of them that heralds significant future supplementations to writing's role, appearance and technique.

DIGLOSSIA

When a people's written language differs so greatly from their spoken language that two separate tongues obtain, this is *diglossia* (from Greek *di* 'two' and *glōssa* 'language'). The phenomenon has several causes. First, only the cultivated language becomes the object of written conveyance in a society acknowledging 'correct' and 'incorrect' forms of language.[6] Second, the vernacular continues to advance as a living language, but the written language changes much more slowly, or not at all—compare English's spelling of *laugh* with its pronunciation. This separation produces problems similar to those known from the calendar: periodic adjustments are necessary to avoid confusion. There are further factors retarding a change in writing: tradition, æsthetics, veneration, social control, limited literacy and many more. The result of these processes, diglossia, has become a serious social problem in some modern cultures.

Diglossia directly involves not the writing system or script but the *language* they convey, which is no longer a spoken language. This does not mean dialects. All writing systems, phonetically deficient as they are, allow at least some dialect variation. Australians, for example, write *day* and say 'die'—for they

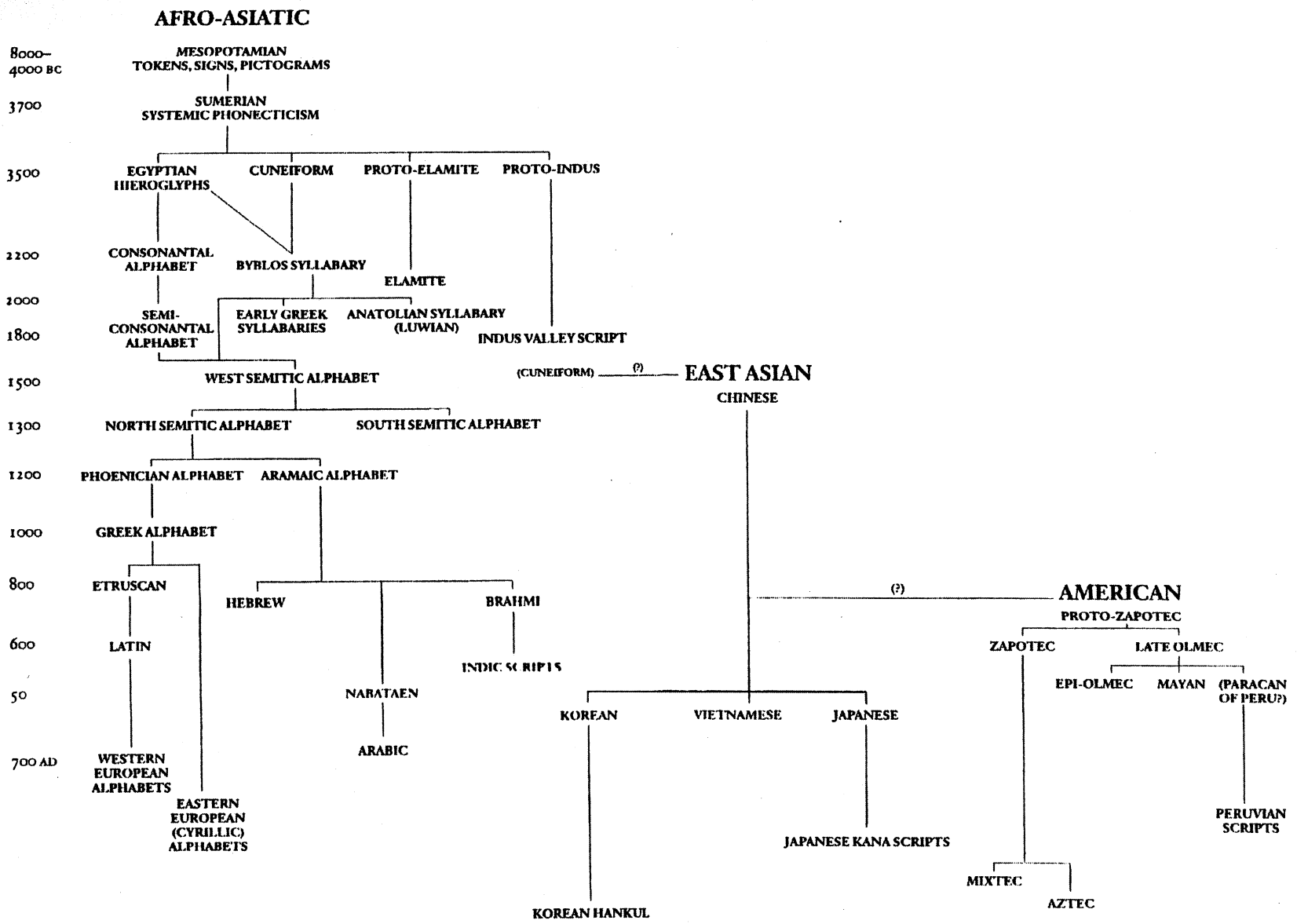


FIGURE 1 The world's three main writing traditions: Afro-Asiatic, East Asian, and American.

know that 'correct' *die* is /doi/. Here, English's alphabet allows local internal regulation. Only when external rules intrude (i.e., American into Australian) does confusion result. Diglossia represents such a confusion, but of style and time.

Diglossia was first recognized a century ago by the Munich Classicist Karl Krumbacher.[7] While studying modern Greek's relation to Classical Greek, Krumbacher identified greatly divergent written and spoken varieties of the one language. Since then, diglossia has been identified in many of the world's major scripts with a long literary tradition.[8] The practice includes a broad spectrum of phenomena from English's petty archaisms to Welsh's 'linguistic schizophrenia.'

India's literary culture sees diglossia as 'one of [its] most salient features.'[9] Most of that country's languages that possess a written form display an unfordable Ganges separating the written 'high' variety from the spoken 'low' variety.[10] Each literate Indian is in fact bilingual, speaking both the language of the library and that of the marketplace. Already in the fifth century BC, Sanskrit had become a language of scholars, studied and maintained according to strict rules of grammar, while the Prakrit languages of the people continued to advance. By the third century BC, Sanskrit writing no longer had a relationship to the spoken language, and therefore one needed special tuition to learn and practise it. Over the following centuries, the same thing happened many more times with newly elaborated scripts, as scholars repeatedly fossilized 'correct' forms of speech that were altered by common usage. Now the meaning of 'to read and write correctly' in India is to read and write the perceived 'high' variety of language, while literacy in 'low' varieties of speech—the actual language of the people—is regarded as inferior and undesirable. As a direct result, over 50 percent of India's population remain illiterate.

Classical Chinese, or *Wényán*, is as different from spoken Chinese as an Indic 'high' language is from an Indic 'low' one. Students must now learn Classical Chinese writing character by character in order to understand it.

Modern Standard Welsh, or *yr iaith safonol* ('the standard language'), is a literary language only, the Welsh of education and publication. Colloquial Welsh, or *yr iaith lafar* ('the spoken language'), is the everyday spoken language of the Welsh community. For example, the sentence 'I did not know you had seen him' would be Modern Standard Welsh *Ni wyddwn eich bod wedi ei weled*, but Colloquial Welsh *O'n i 'im wybod bo chi di weld e*. Many Welsh today have access only to Colloquial Welsh, being unable to speak, read or write Modern Standard Welsh at all—though they may sing hymns in it every Sunday. The situation is even more complicated by the fact that Modern Standard Welsh displays many varieties ranging from archaic biblical forms to bureaucratic official forms. And Colloquial Welsh exists in extreme regional forms. In addition, a standardization of Welsh called *Cymraeg Byw*, or 'Living Welsh,' has been proposed in recent years as a non-regional national language bridging the gap between Modern Standard and Colloquial Welsh. This new form is being rapidly adopted by younger speakers, increasingly suppressing the use of local regional forms; it is also being used more in writing. However, today's prescribed Modern Standard Welsh remains the written language of nearly all Welsh-language instruction in Welsh schools.

In India, with its high illiteracy, the written languages that differ markedly from the vernaculars will evidently continue to prevail, retarding the country's growth. In Wales, on the other hand, the ultimate success of *Cymraeg Byw* might result in greater literacy in the Welsh language—alongside English literacy—and eventually eliminate diglossia there altogether.

Most languages display a wide gap between written and spoken style(s). The mark of an educated person is often how closely s/he speaks the written language. Those who speak most closely to the writ-

ten style would generally be leading members of that society. It is writing alone that causes this phenomenon.[11] In many cases, an elimination of diglossia would be unthinkable. For example, in the 1300s Literary Sinhalese of Ceylon (Sri Lanka) emerged as a literary standard. This purely written language is still venerated by all Sinhalese, who perceive it to be more beautiful, cultured and 'correct' than today's spoken language. Indeed, Literary Sinhalese is greatly respected by all in Sri Lanka chiefly *because* the country is one of high illiteracy.

Sometimes, a society regards the discrepancy between written and spoken language as unnecessary historical baggage. It hinders a society's growth when it leads to confusing and ponderous writing that serves its users poorly and is laborious—that is, expensive in time and money—to pass along to one's children. When this belief becomes common cause, a spelling reform can occur.

ORTHOGRAPHY AND SPELLING REFORMS

All writing systems and their scripts, no matter how revered or innovative, are imperfect and conventional, being an approximation—not a reproduction—of speech.[12] Ambiguity, the doubt or uncertainty in meaning arising from indistinctness or obscurity, occurs often with syllabic and alphabetic systems. In English, as we have seen, the single letter *a*, depending on dialect, can represent as many as six different phonemes (smallest significant sounds). English in particular fails to reproduce its suprasegmentals—that is, pitch (*Yes?/Yes!*), length (British English *cot/cart*), stress (*désert/desért*), juncture (*Van Dyke/vanned Ike*) and tone (*eee!/duhhh*)—because it uses a deficient alphabet. Writers of English try to correct the problem with unsystematic punctuation, space between words, capital letters and other devices. However, a precise reproduction of English as spoken simply cannot be written with the standard English alphabet.

Ideally, an alphabetic script should perhaps represent all phonemic utterances. But only the linguist's special symbols can reproduce fairly exact pronunciations, and these are too ponderous for popular use. Standard alphabetic scripts in use throughout the world constitute only convenient approximations, then, with many ambiguities and enormous differences in pronunication not only between different languages using essentially the same system and script (German and English) but also between different dialects of the same language (British English and American English). Though the demonstrable efficacy of simple alphabetic writing has assured its adoption by most of the world, morpheme-syllabic writing such as Chinese and Japanese still continues to be practised by a significant portion of humanity, who find it eminently preferable for their respective languages.

Is 'precise reproduction' of speech desirable in a writing system? Probably not. Greatest international comprehension of written English, for example, is assured through maintenance of phonological and other latitudes. In other words, the looser the system, the greater its general usefulness.

All the same, changes take place frequently in writing systems and scripts. There are two basic types: gradual and abrupt. The gradual happen 'of themselves,' usually because someone simplifies something and others copy it. For example, until the 1960s schools throughout the English-speaking world insisted on the maintenance of diacritics, yet *rôle* is now *role*, *naïve* is *naive*, and *coöperate* is *co-operate* or *cooperate*—and few seem to have noticed the reform. New words are constantly being coined, too, by altering the spelling of existing ones: *lite* for 'of low alcoholic content' is a recent example, from *light*. Such minor orthographic adjustments and supplementations are natural, and are steered by common acceptance.

Abrupt reforms are steered by governments (usually successfully) or private societies or individuals (almost always unsuccessfully). These changes are unnatural and problematical. As general literacy is a prerequisite of the modern state, most modern societies hope to encourage greater literacy through simplified spelling, the most common form of abrupt reform.

English, for one, is often cited as a language requiring a spelling reform that would encourage greater literacy and reduce learning time. After more than two hundred years of carefully directed standardization, English orthography is still not completely standardized. One of the problems is the difference between Commonwealth and US English, chiefly attributable to the fact that standardization commenced in earnest only after British America's settlement. Though the chasm between these spelling systems is now closing, many systemic differences remain (Commonwealth *left* / US *right*): *litre/liter*, *colour/color*, *marvellous/marvelous*, *worshipping/worshiping*, *traveller/traveler* and so on. Dual spellings are allowed in both, but with differing preferences: *spelt/spelled*, *learnt/learned*, *gaol/jail*, *practise/practice* (verb), *encylopædia/encyclopedia*. There are also individual word differences that are not systemic: *grey/gray*, *programme* (except computing)/*program*, *licence/license* (noun), *defence/defense* and many more. Even one letter can hold different sound values: *z* (ZED)/*z* (ZEE). *Spelt* and *learnt* are everywhere becoming the US's *spelled* and *learned*—the latter now indistinguishable from the adjective *learned* (rarely still written *learnèd*), meaning 'erudite.' Britain's *-ise* and *-sation* endings are now yielding to the US's *-ize* and *-zation* (as in this book), but not in Australia and New Zealand, where the *s*-forms command a greater domain than in the UK. (New Zealand is currently considering adopting US orthography.)

The orthographic differences between Commonwealth and US English are few in number when compared to their linguistic differences. Both orthographically and linguistically, however, the two varieties are converging into one shared International Standard English, an emergent tongue, rather than generating the entirely separate daughter systems that historical development would have produced in the past.

English orthography has greater problems than international variation, including being a system often perceived as 'awkward' and difficult to learn. Early on in its history, only 24 signs had to represent 40 phonemes, so 'doubling-up' has long featured in English spelling. After the Norman Conquest, the Norman-French scribes filling scriptoria and chanceries on English soil began respelling English words in Norman fashion. Printing later introduced linguistic norms; it even added extra letters to words (like the *e* in *write*) merely to stretch a printed line to the margin. Printing also fossilized spelling, while spoken English continued to change (*light* now preserving only in its spelling an ancient Indo-European sound otherwise lost in English). Latin and Greek spellings became fashionable, using many letters not even pronounced in English. And a wealth of foreign words entered the lexicon, particularly in the 1500s and 1600s, with other spellings incompatible with the English norm.

English spelling is thus a hybrid—the product of 'Anglo-Saxon,' French and classical traditions, with many outside influences. One can suggest any number of classes of systemic spelling anomalies in the English language, some of which can fit into more than one class and all of which complicate the process of learning to read and write English. In many of the following (and the list could easily be expanded), visible language—the written word—can immediately place a phonetically ambiguous word in its proper semantic slot, actually improving on speech's adequacy. In other cases, the written word cannot adequately convey the necessary distinction(s) inherent in the spoken word.

- **Class I:** same spelling, same pronunciation, different meaning
  bear 'mammal; to bring or support'
  can 'metal container; to be able'
  row 'linear arrangement; to propel using oars' [also Classes 2 and 3]
- **Class 2:** same spelling, different pronunciation, different meaning
  read 'to comprehend written material (present verb); to comprehend written material (past verb)'
  row 'linear arrangement; to quarrel noisily'
  tear 'eye secretion; to rip'
- **Class 3:** different spelling, same pronunciation, different meaning
  roe/row/rho/Rowe
  so/sew/sow/soh
  way/whey/weigh
- **Class 4:** same spelling (but for upper-case/lower-case distinction), same pronunciation, different meaning
  Faith/faith
  Rugby/rugby
  Sue/sue
- **Class 5:** same spelling (but for punctuation), same pronunciation, different meaning
  chills/chill's
  its/it's
  were/we're
- **Class 6:** same spelling (but for punctuation), different pronunciation, different meaning
  coop/co-op
  coward/co-ward
  learned/learnèd
- **Class 7:** same spelling, different pronunciation (irrespective of dialect), same meaning
  data pronounced / dæta/, /deta/ or/ data/

In addition, English orthography has a redundancy frequency of approximately 50 per cent—*wch mns tht abt hf of th ltrs n a rtn Eglsh sntnc r uncsry to achv fl cmprhnsn, mst of ths bng vwls.* (Written Arabic and Hebrew have long exploited the principle of consonantal alphabetism with eminent success.)

Despite its shortcomings (and long-windedness), English spelling is still fundamentally phonemic—that is, written using English's smallest significant sounds. However, the phonemes do not always lie in the individual letters, but frequently occur in patterns of letters. As with Chinese 'significs' (sense identifiers), English spelling maintains visual cues, usually through the so-called 'unnecessary letters,' in root relationships between words—as in *sign* and *signature*—quite distinct from their pronunciation, allowing rapid visual identification of a word's meaning without recourse to speech. All the same, the spoken language continues to move away from the written, and so teachers of English are forever explaining to their pupils why *would of* and '*cause* have to be written 'would have' and 'because.'

The gradual changes in orthography that have accompanied written English's history have sufficed for most purposes. However, not everyone has thought this. Already in 1551, the Englishman John Hart complained of English writing's 'vices' which caused it to be 'learned hard and evil to read.' Over the centuries, many alternative orthographies have been proposed. The 1800s in particular saw three basic

types of abrupt reform emerge: *standardizing*, calling for a more regular use of familiar letters; *supplementing*, adding new letters to the alphabet; and *supplanting*, creating all new letters.

From 1828, the American Noah Webster successfully began to reform US orthography with a standardization popularized by his own dictionary of American English; among other changes, he introduced such lasting innovations as *-our* (as in *honour*) becoming US *-or (honor)*, and *-re (theatre)* becoming US *-er (theater)*. In 1844, Isaac Pitman proposed a supplementing 'Phonotypy' in Britain. Americans founded the Spelling Reform Association in 1876; the Simplified Spelling Board was founded in 1906 and the Simplified Spelling Society in 1908 in Britain. This latter Society presented a standardized spelling reform as a bill to Parliament in 1949 that was defeated by 87 votes to 84. Four years later, a similar bill was actually passed—only to succumb to the Ministry of Education.

Current reform proposals include New Spelling, Simpler Spelling, Regularized English and World English Spelling, among others. George Bernard Shaw (1856–1950) left a sum in his will for the Public Trustee of Great Britain to hold a competition for the 'Proposed British Alphabet' of at least 40 new letters (this was to be a supplanting reform), thus enabling English to be written without groups of letters—or diacritical marks—for single sounds. The winning entry, by Kingsley Read, was ingenious . . . and subsequently forgotten.

There are advantages to an English spelling reform, such as the reduction of learning time which may encourage the language's international diffusion. But there seem to be more disadvantages: the impracticability, loss of tradition, cost, the phonetic spellings creating too much ambiguity between dialects (recall Australian 'die') and loss of etymological markings (*sign/signature*), the lack of consensus as to what type of reform would be best and so on. Also, English is not as irregular as is often alleged. One study has shown that 84 per cent of English words were normally spelt according to a regulated usage, and only 3 per cent (around four hundred of the most frequently written words) so unpredictably that they had to be learned by rote.[13]

Written French maintains many historical spellings often held to be 'unnecessary.' For example, *-s* and *-t* at the ends of words are often not pronounced: *les garçons* ('the boys') and *petit garçon* ('small boy'). However, before vowels they are pronounced, as in *les élèves* ('the pupils') and *petit élève* ('small pupil'). In the first example, unpronounced *-s* and *-t* appear to serve no function; nonetheless, they are graphically marking lexemes—that is, they are providing visual cues to word recognition beyond phonetic reality. The 'unnecessary' letters of written French are almost always necessary, just for this reason.

The conflict of 'orthographic deficiency versus systemic regulation' is also waged in German, where a similar adequate resolution obtains. German spelling simply ignores the devoicing rule of word endings: *Hund* ('dog,' pronounced HOONT) but plural *Hunde* ('dogs,' HOONDEH). It also ignores the glottal stop in front of beginning vowels and between junctured vowels: *(')alles* ('all') and *The(')ater* ('theatre'). Germans simply 'fill these in' when reading aloud. The devoicing and glottal rules are system-wide, so there is no need to specially mark them in German writing. 'Phonetic fidelity' would be pointless here.

However, German spelling has other problems. For one, Austria's spelling conventions differ from Germany's, though not to the systemic extent that US spelling differs from Commonwealth spelling: German *Abnutzung*, Austrian *Abnützung* ('abrasion'); G. *karätig*, *A. karatig* ('[24]-carat'); G. *fauchen*, A. *pfauchen* ('hiss'); and so forth. Most differences are minor and only sporadic. And most have been addressed in the recent German spelling reform, the first in nearly a century.

On 1 July 1996, after years of careful planning, official delegates representing all of the German-speaking nations convened in Vienna to issue the Joint Declaration Towards a Reform of German Orthography. Their stated intent was to simplify, through a standardizing reform, the learning of written German and to alter the rules laid down by the Second Orthographic Conference in Berlin in 1901 to suit modern requirements. Directly affecting over a hundred million readers and writers in many countries—but principally in Germany, Austria and Switzerland—the reform had no intention of drastically changing the traditional German script derived, like English, from the Latin alphabet. Instead, it concentrated on eliminating violations against German's principle of word-roots, seeking to maintain the same spelling of a root in all possible combinations of its written occurrence for easier visual identification (like the English example *sign/signature* above). Many other spelling changes and writing conventions were effected, too, such as *ss* for old *ß* in all instances, or the general separation of verbal compounds. In this way, old *Stengel* ('stalk') became new *Stängel* (from root *Stange* 'pole'), old *Kuß* ('kiss') became new *Kuss*, and old *kaltbleiben* ('to remain unperturbed') became new *kalt bleiben.*

Not everyone has been happy with the reform. Besides spelling chaos, it has caused, as critics pointed out almost immediately, the loss of important distinctions in the German language. For example, one is now to write *kalt bleiben* for what used to be either *kalt bleiben* ('to remain cold [weather]') or *kaltbleiben* ('to remain unperturbed'). Pre-reform German spelling used space/no space to mark semantic distinctions. By now using only space in verbal compounds, the new German spelling reform has increased ambiguity in this and in other cases. Humorists have pointed out that, if *Stengel* must be *Stängel*, then shouldn't Berlin become *Bärlin?* (*Bär* is 'bear' in German.) Within a year of the reform's introduction, major German-language publications were returning to the old system, claiming too much confusion and ambiguity had resulted.

'The "fundamental fallacy" of all spelling reformers,' Sir Alan Herbert once affirmed in the British Parliament, 'is that the function of the printed or written word is to represent the spoken word. The true function of the printed or written word is to convey meaning, and to convey the same meaning to as many people as possible.'[14] Spelling reformers do indeed habitually champion spoken language without appreciating the special position, characteristics and benefits of written language, which are altogether different. Writing systems are usually one of two types: 'shallow phonographic' or 'deep phonographic.'[15] Because natural languages change over time while writing's inherent inertia causes increasing conservatism, 'shallow' automatically turns to 'deep.' When this happens, it is not really necessary to change the orthography, since the changes in spoken language already hold innate systemic markers permitting fluent reading and writing. Most generative phonologists—linguists who believe that languages are analyzed in terms of two levels of organization, known as *deep structure* and *surface structure*—are convinced that, in the process of reading and writing, the human mind applies particular rules to a mental lexicon in order to easily use otherwise 'incorrect' spellings. A major spelling reform might actually backfire: by introducing features incompatible with the internal patterns that have developed over time, it could create greater ambiguity. To those who wish to reform English spelling in order to 'improve' the language's accessibility, generative phonologists have countered that 'conventional [English] orthography is . . . a near optimal system for the lexical representation of English words.[16]

It is true that most alphabetic scripts display a deficit as regards the vowels of their respective language. This is because the vocalic phonemes in the language nearly always outnumber available letters of the alphabet, forcing 'doubling up' (as with English *a*, as we have seen). However, most alphabetic scripts manage to strike a successful compromise between spoken and written language, between 'accuracy to

the mouth and intelligibility to the mind.'[17] Abrupt reforms are seldom needed with alphabetic scripts, because these, using a panoply of devices such as gradual adjustment and redundancy, are able to maintain comprehension and usefulness over many centuries.

One of the greatest, and least known, obstacles to a successful spelling reform is its failure to address the essential dichotomy between reading and writing, judging both to be one and the same process. In fact, reading and writing are separately processed cerebral activities. Writing is spelling, and many people who spell excellently read only poorly, while many who read excellently spell poorly. This is because these processes involve different learning strategies in the human brain. Writing is an active linguistic activity that demands both the visual and the phonetic component, appealing directly to phonological essentials. Reading is a passive visual activity, linking graphic art directly to meaning, most often bypassing speech altogether. No spelling reform could ever adequately reconcile two such disparate neural capacities.

STENOGRAPHY, SYMBOLS, AND 'VISUAL LANGUAGE'

Stenography or shorthand is a method of rapid writing using special symbols or abbreviations for common letters or words. It lies in a separate category of writing, because it is limited to special circumstances—the quick, short-term preservation of speech—and to special practitioners. It is an ancient practice. The Greek historian Xenophon (*c.* 430–354 BC) wrote the memoirs of Socrates in a form of shorthand. The Roman free-man Marcus Tullius Tiro devised a shorthand to record the speeches of Cicero in 63 BC; this Latin version was used for over a thousand years. Ignored during the High Middle Ages, short-hand was only revived in the 1500s. One century later, various systems were invented for use in school and church. The Industrial Revolution of the 1700s saw shorthand benefiting office work, and in the 1800s the principal systems were devised that still prevail. The two most popular in English are those of Isaac Pitman—Britain's main system—and John Robert Gregg—the US's main system, also used for several other languages.

Over four hundred shorthand systems have been devised just for English. Today, its most common use is in press reporting and clerical and secretarial work. Normally, about 65 letters are used: 25 single consonants, 24 double consonants and 16 vowels (though most vowels are omitted, as their presence is usually obvious). The stenotype machine, invented by the American court reporter W. S. Ireland in 1906, is principally used to record verbatim legal proceedings and legislative meetings. Very few people customarily command shorthand, whose use has diminished in recent years because of new technology.

Some scholars wonder whether alphabetic writing could become more efficient if more logograms were introduced to create a mixed system like Chinese morpheme-syllabic writing. The German Philosopher and mathematician Gottfried Wilhelm Leibniz (1646–1716) believed that one could elaborate a universal script, apart from any of the world's natural languages; as with mathematics and music, it should also be generally implementable. This has long been a dream of those who do not understand writing systems' fundamental dependence on phonography. Writing has always been, and will always be, language-bound. Each language in history has elaborated, through borrowing, the script that 'best' reproduces its particular sounds. Even ancient Egyptian hieroglyphs contain a sizable phonetic component that is indispensable in order to avoid ambiguity.

With the beginning of mass international travel in the 1970s, all countries perceived a need to communicate essential facilities using symbols that are universally obvious—that is, pictograms rather than language-based characters or signs (letters). A major American study was effected at the time which found

those symbols to be efficient which easily identified objects—bus, taxi, woman, man. Less efficient were symbols indicating an activity, such as ticket sales, custom control and passport control; these were too ambiguous. The general conclusion was that symbols were indeed helpful, but capable of communicating only a highly limited range of things. International symbolic writing was subsequently introduced throughout the world with these findings in mind. It was not an attempt to 'return to pictographic writing,' but merely the helpful supplementation of normal writing in international venues—airports, ports, train stations and other places—using a very restricted 'lexicon' of easily identifiable objects or situations.

Some modern researchers are now seeking a way to expand this inchoate system into Leibniz's universal writing system, believing that it may be possible to construct a non-linguistic pictography to replace writing as we know it. These researchers contend that text and pictures have grown interdependent in our culture, in such a way that they might together be regarded as an autonomous language: a 'visual language.'[18] This would not be the symbol-writing of airports and train stations, they are careful to point out, but the marriage of visuality and writing, a separate hybrid phenomenon. The process of visual textual presentation may be a more efficient means of conveying complex ideas than our current practice, as it will allow us to cope better with the inundation of written data to which each person must respond daily. Visual language could achieve this by greatly reducing the period of digestion of complex material, they believe.

Regarding information overload not as a problem of volume but of perceptual management, these researchers wish to convey complex ideas simply. This can be achieved, they insist, through more than a mere combining of words and pictures, charts and timelines. Holding visual language to be an actual language—that is, possessing formal rules of syntax and semantics—they claim that it commands a freedom in the expression of these rules that natural languages do not display, bestowing on visual language its unique strength. The most significant conclusion of the proponents of visual language is that images and their standardized placement in text do indeed help to convey complex ideas more simply than conventional writing. This is attributable, some claim, to the fact that the human brain uses different pathways to process verbal and non-verbal information—a reader using both channels at once will understand better and more quickly and be able to recall more.

Visual language is, in fact, now present everywhere. Most of us take it for granted, aware neither of its existence nor of its increasing infiltration throughout modern society. Merely sitting in our cars, we are besieged by visual language: speedometer, odometer, fuel gauge, battery indicator, seatbelt sign, radio programme, temperature and so on. Much of this comes with text (letters, numbers) 'read' as visual language, not as spoken text. In this way, an enormous amount of data can be processed almost at a glance. The shortcomings of visual language are that it is weak in detail and precision. It certainly cannot convey the full range of human thought. However, mainly because of new technology, visual language has shown itself to be an essential supplement to complete writing. With it, the world's writing systems have acquired a new dimension.

THE FUTURE OF WRITING

Efficiency and simplicity do not determine a script's future—the prestige and power of those using it do. Languages evolve naturally; writing systems and scripts do not. These are purposefully borrowed, changed and abandoned primarily for social and psychological reasons that have little to do with speech or orthography. In this way, the descendants of the writers of ancient hieroglyphs and cuneiforms now

use the Arabic consonantal alphabet. And the people who carved and painted the logosyllabic glyphs of Mesoamerica now write in an alphabetic script the ancient Romans once used. Neither of these instances represents the triumph of a 'superior' writing system.

Politics have played a massive role in writing's history. In the early 1800s, for example, Russia acquired Azerbaijan, whose people wrote using the Arabic consonantal alphabet. Around 1929, Joseph Stalin, suspecting the Azerbaijanis' loyalty, actively sought to have them abandon Arabic for the Latin alphabet. But in the 1930s, Stalin became convinced that the Azerbaijanis were linking up with the Turks, who had just adopted the Latin alphabet themselves, and so he ordered the Azerbaijanis to adopt Russia's Cyrillic alphabet instead. Today's citizens of Azerbaijan, independent since 1991, write their national tongue using two scripts: all street signs and commodity labels are in the Latin alphabet while all newspapers are in the Cyrillic alphabet (Arabic has disappeared). Azerbaijan's current regime is planning to encourage the wider use of the Latin alphabet in order to reflect the country's professed non-sectarian openness.

Other forms of writing have survived for mercenary reasons. Most countries have a law insisting that a production date be displayed in public broadcasting. In Western countries, at least, Roman numerals still announce the production dates of TV and film programmes simply because few people can read them, thus preventing viewers from realizing just how old a re-sold programme truly is—as one British producer recently confessed.[19]

Despite the general unpredictability of such things, certain broad trends are recognizable in writing's future. Though many writing directions and orientations have obtained in the past-right-to-left linear, top-to-bottom vertical, spirals, boustrophedon and many more—increasingly the writing systems of the world (including Chinese, Korean and Japanese) are being written in imitation of the Latin arrangement, horizontally, from left to right, in uni-directional lines proceeding from the top of a page to the bottom. This will evidently be Earth's only writing arrangement within a few centuries, though some scripts (like Arabic and Hebrew) might preserve traditional right-to-left writing for as long as they are written.

Of greater significance to the future of writing is the Latin alphabet's advance, which began with the conquests of the Roman Empire over two thousand years ago and is now accelerating as never before. This has little to do with the Latin alphabetization of hitherto scriptless languages, preserving them as one preserves species from an endangered rain-forest, a peripheral activity. The main metropolitan languages of the planet—Chinese, English, Spanish and Portuguese, those spoken by most of humankind and thus likely to survive the next four hundred years—will determine writing's future, one that appears, at least at the onset of the computer age, to be boldly Latin-alphabetic.

This has several explanations. First of all, three of the above languages already use the Latin alphabet, and China is actively encouraging the use of Pinyin. Further, a single world language, International Standard English, is emerging that is written in the Latin alphabet. And the computer, developed by a culture using the Latin alphabet, is redefining our modern world in this script; anyone who wishes to share the tool must command its keyboard.

Computers and on-line networking operate best in the Latin alphabet principally because their invention and diffusion, as writing-based procedures, occurred in it. Other alphabets, and even entire writing systems, can of course be programmed. However, these will remain peripheral as they are generally foreign to the system and incompatible with mainline computing and networking—that is, with the Latin alphabet that most of the world is currently using for this activity. If the future lies with computer-based

societies and economies, then non-Latin alphabetic systems will have to adapt or suffer the economic and social consequences. Computers are now 'forcing' the world itself to romanize, in other words.

The Latin alphabet is certainly not writing's pinnacle, but it is clearly writing's crest. It alone is now meeting the unprecedented requirements of our modern world, leaving all other writing systems and scripts behind—those who choose to use it and join the new technology will be those who profit. It is an uncontested election at this point in history, indeed, some would say, an ultimatum, understandably rousing among many peoples sentiments akin to those of losing one's native tongue. However, as seen with Chinese Pinyin, romanization is not tantamount to adopting a global language, with loss of one's tongue and ethnic 'identity.' On the contrary, both a culture and its language are preserved by romanization, through the enabled or continued reading and writing of the respective language, which otherwise might fall to a metropolitan aggressor. In this case, a supplanting reform becomes an essential social mechanism for the preservation of a culture . . . the reality that the Chinese are currently confronting.

It is possible, however, that the trend towards one writing system and script for the world will become in the end merely a handmaiden of English-language 'imperialism.' Around four thousand languages are spoken at present; in a hundred years, perhaps only a thousand of these will be left.[20] All metropolitan languages are encroaching rapidly on all non-metropolitan tongues, English apparently more aggressively than others, for a variety of reasons. Romanization could ultimately participate in this historical process. Though the Chinese actively support romanization and the Japanese use *rōmaji* with increasing frequency, Arabic and Hebrew speakers appear unlikely ever to romanize, chiefly for religious but also for practical reasons: without vowels, the Arabic script, for one, can transmit a far greater number of dialects than the Latin script, a complete alphabet. Many cultures might be bi-scriptural in future, using traditional writing for local needs and the Latin alphabet for everything else. Within two or three centuries, only a small number of minority writing systems and scripts will survive, however, whereas the Latin alphabet will dominate the planet. It will be the World Script.

A book published in 2301 will probably be almost identical in appearance to this one, in whatever 'hard' or 'soft' format it may appear: the same alphabetic system with the same letters in the same direction and orientation, even in Roman type. Only the language will seem 'odd,' with many unknown words. Indeed, the Latin alphabet's increased international, and in time interplanetary, use will mean accelerated fossilization. In time, like the Egyptian hieroglyphs, the World Script will become a written monolith.

Writing's use in society, however, will change dramatically. As a result of the personal computer, one can witness this transformation even now. An ever-increasing number of people are spending more hours per day using written—that is, keyboard—language rather than spoken language.[21] This is especially true of students, office workers, journalists, editors, writers, researchers, computer programmers, pensioners and many others. (In the Middle Ages, only scribes, who comprised a very small percentage of the population, were to be found in the scriptoria.) Within a few years, computers will be enriching nearly every household of the developed world. Human life in these countries is centring on, and contracting to, electronic texts and international networking, and moving away from speech. Soon, written language might be more prominent worldwide than spoken language. A different sort of language is emerging from this artificial interfacing: an 'oral written language' occupying a special position between spoken and written language.[22] Computers now regularly communicate with one another, too, through writing—that is,

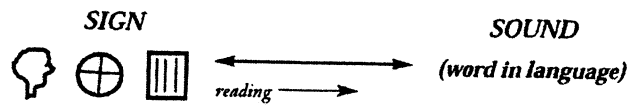


FIGURE 2 Writing's future: Will only reading be left? (Compare Figures 3, 4.)

through written programming languages—without human mediation. Writing has, in this way, transcended humanity itself. We have redefined the very meaning of 'writing.'

At the beginning of the 2000s, as the number of writing systems and scripts is diminishing, the amount of writing is soaring and that of writing materials and techniques abounds. Laser lettering now types our correspondence. Mid-air holographic writing emblazons open-air concerts. 'E-ink,' electronic ink that fills a sheet composed of microscopic spheres—one hemisphere with a positive charge, the other negative—changing colour when subjected to an electron pulse, can now instantaneously transform the Bible, for example, into the *Bhagavad Gita* with one mouse click. Until fairly recently, our society and its fundamental economic processes depended largely on the multiplication of *physical* things, such as the printed word. This no longer obtains, and what is replacing it is unknown territory. We are not only redefining writing but re-inventing its place in society.

Some believe that there may be no place for writing in future. At the same time as electronic texting supersedes physical printing, writing itself is challenged: computer voice-recognition systems could eventually replace writing altogether, leaving only the one arrow—reading (Figure 2). But even reading might vanish, once computer voice-response systems are perfected. Then one need never again write one's name . . . or read a poem.

However, the benefits and joys of reading and writing will probably still outweigh those of computer voice-recognition systems for many centuries, because writing is innate in most literate cultures. Modern societies everywhere are dependent on the written word for nearly every aspect of human interaction. A starship commander of the 2400s may depend on voice commands and response with her vessel's main computer, granted; but one would expect her, in the privacy of her quarters, to open for pleasure a volume of Whitman, Bashō or Cervantes indistinguishable from one we might read today.

That starship commander might well be the same one who will retrieve humankind's first attempt to communicate with aliens through writing. The Pioneer 10 spacecraft, launched in 1972, bore on its antenna a 15-by-23-cm gold-anodized aluminium plate (Figure 3) designed by the American astronomer Carl Sagan and 'written in the only language we share with the recipients: Science.' Now beyond our Solar System, the plate's 'text' pinpoints the craft's exact origin, its date in relation to the Milky Way galaxy (in 1970) and its makers (both genders). The plate's inscription is not complete writing as we know it but, through pictograms and pulse signals, conveys what should be, at least according to human scientists, a 'universally understandable message.' Ironically, noted Sagan, 'the human beings are the most mysterious part of the message.'

It is possible that by the time Pioneer 10's plate is discovered or retrieved, little will have radically altered humankind's most fundamental relationship with writing. Those with intelligence and understanding will always appreciate that, as linguist Florian Coulmas has written, 'The skills of reading and writing provide access to knowledge, and knowledge is power.'[23]

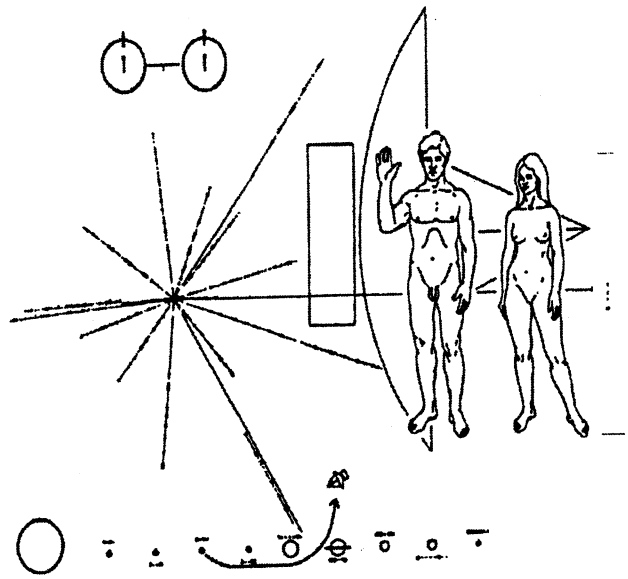


FIGURE 3 Humankind's interstellar epistle: the Pioneer 10 inscription launched in 1972.

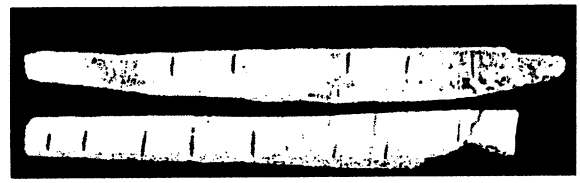


FIGURE 4 'Leaving a mark on creation that imparts a form of thought': bird-bone tubes incised at regular intervals by Neandertals around 30,000 years ago.

So writing is much more than the 'painting of the voice.' At Pelkor Chode monastery in Gyangze, Tibet, pilgrims still crawl underneath stacks of holy texts as they have done for centuries in a gesture believed to absorb the wisdom of Buddhist scriptures. The very act of writing about one's feelings, recent studies have revealed, can rid one of depression, boost the immune system and lower blood pressure—recalling Aristotle's belief that writing could express 'affections of the soul.' And spacecraft beyond the Solar System now respond to written commands received from Earth's computers. However imperfect, writing has become an indispensable expression of our social species as we begin to venture beyond all known limits. Yet to leave a mark on creation that imparts a form of thought itself—this impulse characterizes not only us but also our immediate antecedants of tens of thousands of years ago (Figure 4). As writing continues to serve and advance humankind with multiform wonder, it is defining and creating a new humanity.

Whatever form writing may take in future, it will remain central to the human experience, empowering and memorializing. As an Egyptian scribe brushed in ink some four thousand years ago: 'A man has perished and his body has become earth. All his relatives have crumbled to dust. It is writing that makes him remembered.'