The World Wide Web has already passed through several stages, each of which refashions some earlier media. The Web today is eclectic and inclusive and continues to borrow from and remediate almost any visual and verbal medium we can name. What is constantly changing is the ratio among the media that the Web favors for its remediations; what remains the same is the promise of immediacy through the flexibility and liveness of the Web's networked communication. The liveness of the Web is a refashioned version of the liveness of broadcast television.
refashioned principally alphabetic media (the book, the letter, the technical report). Although it was possible to transmit digital graphics, most users were limited to ASCII text. And because the Internet could not pretend to offer the range of materials available in print, it had to rely on speed of communication as the only advantage in its remediation. This speed was most telling in electronic mail, by far the most popular use of the Internet even into the early 1990s.

In its obscure first years, the Web too remediated only textual communication. A CERN physicist, Tim Berners-Lee, proposed the World Wide Web hypertext service so that scientists could more readily share their papers and numerical data. The earliest browsers, such as Lynx, presented only text on web pages. . . . However, in 1993, Marc Andressen and colleagues at the University of Illinois created the first graphical browser, the forerunner of Netscape, which permitted static images to appear along with text on the page. . . . This apparently minor addition had two momentous consequences. First, the Web began to engage a much larger audience of users, including most academics and researchers, who were already using email, and soon a large fraction of technically literate people throughout the industrialized world. Without graphics on the World Wide Web, there would not now be tens of millions of Internet users, nor would there be much interest from the business community. The second consequence, related to the first, was that the World Wide Web could now refashion a larger class of earlier media. In addition to the letter and the scientific report, it could now remediate the magazine, the newspaper, and graphic advertising. Internet magazines and news services became popular and important genres. The tradition to which web designers now looked for inspiration was graphic design for print, and the principles of web page design became similar to those for laying out magazine articles, advertisements, and title pages. . . . Even the differences, such as the smaller space and poorer resolution of the computer screen, were analyzed in a vocabulary provided by graphic design.

Graphic designers brought to the Web their obsession with visual perfection, which expressed itself in this new medium as a need to control the placement and color of every pixel on the users screen. (This obsession was not shared by the computer programmers who built the first generation of web sites and browsers. They placed a higher value on user control and customization.) As always, these remediations combined respect and rivalry. While it was clear that the computer screen could not compete with the printed page in precision, the Web did have in its favor speed of delivery and point-and-click interactivity. At the same time, as the numbers of both servers (information sources) and clients (the audience) continued to grow, the Web became an increasingly important remediator of all sorts of printed information. It began to resemble a conventional public library in the scope of its materials, while public libraries themselves were expanding their definition of appropriate materials and even including Internet terminals in reading rooms.

Traditional graphic design could not account for moving images, so the Internet and World Wide Web necessarily passed into a new phase when they began to deliver animation, fuller interactivity, and digital video and audio. The old remediations were not abandoned. The Web still refashions the personal letter, the book, and the magazine, but now it also refashions and reforms CD-ROM or DVD multimedia, radio, film, and television. It rivals all these forms by promising greater immediacy and by recontextualizing them in the encompassing electronic environment of cyberspace.

THE VARIETY OF REMEDIATIONS ON THE WORLD WIDE WEB

There are a number of possible strategies for remediation, from respectful to radical, and designers for the World Wide Web have adopted each of these strategies at various times. There
have been and remain many web sites that highlight other media without any apparent critique. This respectful attitude is most common in remediations of more venerable media: the printed book, static graphics, paintings, and photographs. The purpose of Project Gutenberg is to collect pure verbal versions of "classic" texts; the site adds little in the way of graphic ornamentation, so as not to distract from the alphabetic texts themselves. . . . Its editor, Michael Hart, has called the computer a "Replicator Technology," because it can reproduce texts infinitely and without adding errors (http://www.promo.net/pg/history.html January 13, 1998). Hart's replication is nothing other than respectful remediation. CETH—the Center for Electronic Texts in the Humanities—is another example of respectful remediation (http://www.ceth.rutgers.edu/ January 13, 1998). Such textual databases in fact preceeded the introduction of the Web and at first relied on earlier services of the Internet or even digital tape to achieve their respectful remediations of the book. We can also point to the web site for the American Memory Project of the Library of Congress (http://lcweb2.loc.gov/amhome.html January 13, 1998), which preserves documents, prints, and early photographs, as well as some early films and sound recordings. . . . And there are many virtual museums and art galleries that offer a sampling of digitized images, often laid out in some arrangement that reflects the physical space of the building itself.

Perhaps developers of these web sites and our popular culture at large are inclined to be respectful precisely because these media are regarded as played out and therefore not likely to threaten the new digital media. In reproducing classic texts made for print or oil paintings hanging on a museum wall, the Web can fulfill an archival function without giving up its own claim to being revolutionary. Web designers feel less need to compete with "classic" authors or photographers...
because these modes of representation already seem complete. There are also film archives, as in the American Memory Project, although the Web's relationship to film is more complicated and contentious.

The remediation of print is by no means sacrosanct in this new medium. Web newspapers, magazines, and encyclopedias, for example, do seek to improve on the printed versions. Thus, the encyclopedia in CD-ROM, DVD, or Web form makes predictable claims to both transparency and hypermediacy. All electronic encyclopedias are hypermediated and can claim to move the reader to desired information more efficiently by means of string searches or by hyperlinks. This hypermediacy is the main improvement offered by most web encyclopedias—for example, by the Britannica Online, which, although it contains some video, is primarily a collection of textual articles with static graphics. The CD-ROM or DVD encyclopedias, however, promise a new transparency through the animation, video, and audio that cannot appear in a printed version. The user can hear Martin Luther King's voice or the cry of a particular exotic bird; she can see digitized video of a volcanic eruption or the first landing on the moon. The claim here is that the electronic encyclopedia can bring her closer to the event by offering such transparent media instead of mere prose. Such multimedia encyclopedias are also beginning to appear on the Web.

Web and Internet applications refashion the newer perceptual media of radio, television, and telephone more aggressively than they refashion.
print. With radio and television, the claim is not that the Internet provides a new transparency, although the quality of the audio (if not video) is already approaching the level that broadcasting or cable can provide. However, on the Internet, the listener has greater control over her listening or viewing experience of radio. It is an immediacy that she achieves through the hypermediacy of the windowed interface. She now listens to Internet radio with a mouse in one hand while she looks at a web

page; she reads rubrics as she listens and may change the order of the materials by clicking on the links provided. Similar interfaces for Internet television already exist and will no doubt flourish as soon as the bandwidth to the home can handle full-screen, full-motion images. With the Internet phone services, more senses come into play, as the user makes, retrieves, and modifies calls through a graphical user interface. The main claim of improvement, however, is economic: the Internet phone is cheaper to use for long-distance calls.

WEB CAMERAS

Like other digital media, the Web may radically remEDIATE its predecessors while failing to acknowledge them at all. The so-called web cameras only occasionally acknowledge their cultural role as "television only better." Apparently frivolous, web cameras are in fact deeply revealing of the nature of the Web as a remediator. Trained on some corner of the world—a hamster in a cage, a coffee machine, or the traffic on an expressway—web cameras take up the monitoring function of television and video. Broadcast television and closed-circuit video still perform this cultural task both publicly and privately. Security cameras guard the interior and exterior of buildings and private homes, while we have come to expect that news networks such as CNN will provide us with a constant video stream for any important natural or human disaster. Television monitors the commonplace as well as the disastrous; it both transforms the commonplace into an event (the Weather Channel) and makes the disastrous commonplace (with its endless coverage of developing tropical storms or forest fires).

Now the Web and related services on the Internet have begun to supplement and rival broadcast television in this role. Because streaming video on the Web is relatively cheap, we can now afford to monitor quotidian events more closely than ever. And, as always, the Internet can offer its user an interactivity that is not available with conventional broadcast television. At some sites the visitor can even adjust the camera's view herself.
In comparison with the viewing of film, the monitoring function of television is relatively private, since we watch television in our living room rather than in a public place. An indication of this difference is the way in which the VCR turns film into television. Watching a film amid the distractions and conversations of the living room often becomes an experience of casual monitoring rather than intense viewing. Yet the World Wide Web offers an even more private experience than television, because the individual browser is often alone with her machine, and in any case only one person can conduct the interaction. Web cameras are in some ways better monitors than television, and indeed there are even web sites that allow the viewer to monitor television shows as they progress. Web cameras are now often in stop motion, but full-motion video eventually will put the Web in direct competition with broadcast and cable television.

Web cameras would seem to operate under the logic of transparency, as each provides an unedited stream of images that makes some part of the physical world transparent to the Internet. Many cameras are pointed at nature sites such as mountains and beaches, despite the fact that, except for the daily changes in lighting and seasonal changes in the weather, there are few changes to monitor. The function of these nature cameras is to put the viewer in touch with the exotic or the remote, a service performed by photography and film in the last hundred years. Thus, a series of "robot cameras" on Maui track the conditions in paradise at sixty-minute intervals . . ., while another camera takes the viewer to the perpetually frozen Mawson Station in Antarctica . . . . In 1997, when the Mars Pathfinder became the first spacecraft to land on another planet after the widespread deployment of the Web, the site operated by the Jet Propulsion Laboratory became the world's most distant and exotic web camera . . . . The site received millions of "hits" in the first days after the landing, even though there was nothing to see but a rocky desert and an undifferentiated sky. The only movement was made by the spacecraft's own automated rover, as it raced across the surface of the planet at speeds of less than two feet per minute taking pictures and measurements of the rocks and soil. For most of the public, who have no knowledge of geology, the fascination could only have been with the reality of media—the fact that scientists had succeeded in putting several cameras on Mars. What the scientists then asked us to watch—and we responded enthusiastically—were these media in operation.

Web cameras reveal again our fascination with media. What other motive can there be for transmitting around the world an endless stream of images of one's goldfish? Such a site serves no imaginable practical or aesthetic purpose; the designer can only be demonstrating to herself and to us the monitoring function of the Internet. Once again, transparent immediacy passes into hypermediacy, for if these web cameras make part of the physical world available, they also mediate that corner of the physical world by bringing it into cyberspace. They make Maui, Antarctica, and Mars nodes on the Internet. Many of these sites explore the aesthetic of hypermediacy by multiplying the camera images on one page. They may present several images by the same camera taken over time; they may build a panorama from the images of several closely aligned cameras . . . or they may simply present unrelated images. One site lets the browser make her own web jukebox by placing any three cameras side by side . . . . These techniques make us conscious of each web camera as a mediating technology. The "Guinea Pig Television" site goes further in playfully acknowledging the Web's remediation of television, because the designer has put the animals on view inside the graphic frame of a television set . . . .

The cultural expectation that the Web remEDIATE all earlier media means that the web interface can never be completely transparent. The strategy that dominates on the Web is hypermediacy, attaining the real by filling each window with widgets and filling the screen with windows. Hypermediacy is also the predominant strategy
of broadcast television. Insofar as the Web is like television, it is committed to monitoring the real and the quotidian. Indeed, while television may still (barely) distinguish between the physical reality and its mediated presentation, the Web is even more aggressive in breaking down that barrier and insisting on the reality of mediation itself. Everything, from the snow fields of Antarctica to the deserts of Mars, finds its way on to the Web.

CHAPTER 41

A Mobile Network Society

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RELENTLESS CONNECTIVITY

The key feature in the practice of mobile communication is connectivity rather than mobility. This is because, increasingly, mobile communication takes place from stable locations, such as the home, work, or school. But it is also used from everywhere else, and accessibility operates at any time. So, while in the early stages of wireless communication it was a substitute for the fixed-line phone when people were on the move, mobile communication now represents the individualized, distributed capacity to access the local/global communication network from any place at any time. This is how it is perceived by users, and this is how it is used. With the diffusion of wireless access to the Internet, and to computer networks and information systems everywhere, mobile communication is better defined by its capacity for ubiquitous and permanent connectivity rather than by its potential mobility.

NETWORKS OF CHOICE

Mobile communication has considerably improved the chances, opportunities, and reach of interpersonal sociability and shared practices. People—particularly, but not only, young people—build their own networks of relationships, usually on the basis of their face-to-face experiences, interests, and projects, and then keep them constantly open by using wireless communication, more often than the fixed-line Internet. Thus, peer groups become reinforced in this hybrid space of interaction of physical, online, and wireless communication.

But the technology also allows for a rapidly changing network, adding individuals to or deleting individuals from the network, according to the evolving projects and moods of each individual in the network. So that networks expand, overlap, and are modified following a decentralized multiple entry/exit structure of communication. An extremely malleable pattern of communication fol-